ACC Principles of Macroeconomics

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Course Learning Outcomes

Macroeconomics Learning Outcomes

The Learning Outcomes covered by these Macroeconomics course materials are:

Module (Chapter)	Learning Outcomes
Economic Thinking: Prepare for success in studying economics	• Explain what economics is and explain why it is important • Explain how economists use economic models • Use mathematics in common economic applications • Use graphs in common economic applications
Choice in a World of Scarcity: Use economic thinking to explain choice in a world of scarcity	• Explain the cost of choices and trade-offs • Illustrate society's trade-offs by using a production possibilities frontier (or curve) • Explain the assumption of rationality by individuals and firms • Define marginal analysis • Differentiate between positive and normative statements
Supply and Demand: Analyze how buyers and sellers interact in a free and competitive market to determine prices and quantities of goods	• Describe and differentiate between major economic systems • Explain the determinants of demand • Explain the determinants of supply • Explain and graphically illustrate market equilibrium, surplus and shortage
Elasticity: Measure how changes in price and income affect the behavior of buyers and sellers	• Explain the concept of elasticity • Explain the price elasticity of demand and price elasticity of supply, and compute both using the midpoint method • Explain and calculate other elasticities using common economic variables • Explain the relationship between a firm's price elasticity of demand and total revenue

Government Action: Evaluate the consequences of government policies in markets	• Analyze the consequences of the government setting a binding price ceiling • Analyze the consequences of the government setting a binding price floor • Explain how the price elasticities of demand and supply affect the incidence of a sales tax • Define progressive, proportional, and regressive taxes
Surplus: Use the concept of producer, consumer surplus, and total surplus to explain the outcomes of markets for individuals, firms, and society	• Define and calculate consumer, producer and total surplus; graphically illustrate consumer, producer and total surplus • Use the concepts of consumer, producer and total surplus to explain why markets typically lead to efficient outcomes
Macroeconomic Measures of Performance: GDP and Unemployment: Evaluate macro economic performance using indicators that include output measures and unemployment	• Define the term “economic indicator;” identify the major economic indicators used to assess the state of the macroeconomy • Explain the expenditure and national income approaches to calculating GDP • Describe the relationships among GDP, net domestic product, national income, personal income, and disposable income • Explain how the unemployment rate is calculated • Critique the unemployment rate as a measure of the unemployment problem • Identify and differentiate between the different types of unemployment

Macroeconomic Measures of Performance: Inflation and Price Indexes: Evaluate macro economic performance using indicators that include inflation	• Define the rate of inflation; explain how the rate of inflation is calculated • Explain the consequences of price instability (i.e., inflation) • Explain the concept of a price index and explain how price indices are derived; define the consumer price index and the producer price index; calculate a price index number given a basket of goods & services and the nominal price of each in a base year and at some later time • Use a price index to translate between real and nominal data • Define the GDP price index (also known as the GDP deflator or the Implicit Price Deflator) • Differentiate between nominal GDP and real GDP
Macro Workings: Model the macro economy over the short and long terms	• Describe the business cycle and its primary phases • Define economic growth • Identify the sources of economic growth • Explain productivity and relate productivity growth to improvements in the standard of living • Use the AD-AS model to explain the equilibrium levels of real GDP and price level; define aggregate demand (AD) and explain the factors that cause it to change; define aggregate supply (AS) and explain the factors that cause it to change • Use the AD-AS model to explain periods of growth, recession, and expansion, demand-pull inflation and cost-push inflation

Keynesian and Neoclassical Economics: Identify, compare, and apply key features of Neoclassical and Keynesian economic models	• Understand the tenets of Keynesian Economics and apply the tenets through the aggregate demand and supply model; identify the Keynesian portion of the AS curve and explain the logic for it • Use the Income-Expenditure model to explain periods of recession and expansion; find the GDP Gap (negative or positive) • Use the Expenditure Output model to explain periods of recession and expansion • Understand the tenets of Neoclassical Economics; identify the Neoclassical portion of the AS curve and explain the logic for it; differentiate between the long run and short run aggregate supply curves • Compare and contrast the circumstances under which it makes sense to apply the Keynesian and Neoclassical perspectives
Fiscal Policy: Understand what government budgets consist of, and how fiscal policy affects the economy	• Identify the major spending categories and major revenue sources in the U.S. Federal budget • Identify the major spending categories and major revenue sources in U.S. state and local budgets • Define fiscal policy, identifying the roles of tax rates and government spending • Differentiate between discretionary and automatic fiscal policy; define Automatic Stabilization Tools; define discretionary fiscal policy; differentiate between structural and cyclical budget balance • Compare and contrast expansionary and contractionary fiscal policies • Compare and contrast the way tax changes and government spending changes work

Monetary Policy: Explain the role of money, banking and monetary policy in the economy	• Define money; explain the functions of money; define liquidity • Define credit (or debt) • Explain what a bank does • Understand how money is created by lending; calculate the lending capacity of a bank given its deposits and a required reserve ratio • Explain the structure, functions and responsibilities of the Federal Reserve System; define the money multiplier, explain how to calculate it, and demonstrate its relevance • Differentiate between M1 and M2 (measures of the supply of money) • Define monetary policy and differentiate it from fiscal policy; identify the tools of monetary policy • Define interest rates; differentiate between the Federal funds rate, the Prime rate and the Discount rate • Explain how the equilibrium interest rate is determined in the market for money; describe what economists mean by the demand for money • Explain the mechanism by which market operations affect the money supply and interest rates • Explain how monetary policy affects GDP and the price level

Policy Application: Use an understanding of the strengths and weakness of fiscal and monetary policy to determine an appropriate stabilization policy for a given macroeconomic situation	• Understand the Keynesian view on changes in government spending and taxation; define the multiplier effect; define the crowding out effect and explain why it occurs and how it reduces the fiscal multiplier; define the Keynesian concept of the Liquidity Trap and explain why it occurs and how it reduces the effectiveness of monetary policy • Understand the effects of tax and spending policy from a neoclassical perspective; define and give examples of supply-side economics; explain the types of lag times that often occur when solving economic problems; describe the neoclassical long-run aggregate supply curve; understand and describe the emergence of New Classical Economics, along with its main tenets; define Ricardian Equivalence • Identify appropriate macro policy options in response to the state of the economy; understand the effectiveness and limitations of fiscal and/or monetary policy for a given state of the economy; choose an appropriate fiscal and monetary policy for a given state of the economy
Globalization, Trade, and Finance: Analyze the benefits and costs of international trade	• Define and calculate comparative and absolute advantage • Explain how a nation's workers and consumers are affected by impact of international trade • Understand the way government regulations (e.g. tariffs, quotas and non-tariff barriers) affect business, consumers and workers in the economy • Differentiate between alternative international trade regimes and how they impact global trade • Define currency exchange rates and explain how they influence trade balances • Explain how the balance of trade (surplus or deficit) affects the domestic economy, and how the domestic economy affects the balance of trade • Connect globalization, international trade, and international finance

Intro

Parts of this book were taken from different OER resources and then also built by Joan Anderssen.

All sources will be listed here

PART I

FACULTY RESOURCES: AVAILABLE WITH LOGIN

1. Overview of Faculty Resources

This course comes with a collection of the best available OER faculty resources. All resources for this course are tightly aligned with learning outcomes and content. Since they are openly licensed, you may use them as is or adapt them to your needs.

The collection is continuously updated with new materials from designated subject matter experts, faculty teaching the course, and Lumen Learning staff.

Now Available

- Quiz question banks: 774 questions, 99 formative assessments, and 14 summative quizzes
- Discussion prompts
- Assignments
- Problem sets for modules 1-4, with algorithmically generated problems and targeted feedback

Under Development

- Problem sets for modules 5+, with algorithmically generated problems and targeted feedback
- PowerPoint decks

Share Your Favorite Resources

If you have sample resources you would like to share with other faculty teaching this course, please send them with an explanatory message to share@lumenlearning.com. Be sure to mention which learning outcome(s) they align with.

2. Quiz Survey

The quizzes are organized in two ways. You can download the one you prefer.

- Consolidated: consists of fourteen quizzes, with a total of 774 questions.
- Granular: consists of ninety-nine quizzes, with the same 774 questions.

Consolidated:

There are fourteen multiple choice quizzes with a total of 774 questions. Quizzes cover the following fifteen topics:

- Choice in a World of Scarcity: 50 questions
- Economic Thinking: 48 questions
- Elasticity: 48 questions
- Fiscal Policy: 52 questions
- Globalization, Trade and Finance: 37 questions
- Government Action: 38 questions
- Keynesian and Neoclassical Economics: 64 questions
- Macro Workings: 94 questions
- Macroeconomic Measures: GDP and Unemployment: 57 questions
- Macroeconomic Measures: Inflation and Price Indexes: 39 questions
- Monetary Policy: 87 questions
- Policy Application: 60 questions
- Supply and Demand: 86 questions
- Surplus: 14 questions

Granular:

There are ninety-nine multiple choice quizzes with a total of 774 questions. Quizzes cover the following seventy-four topics:

- Apply the Keynesian and Neoclassical Perspectives: 3 questions
- Applying the AS/AD Model: 11 questions
- Banks: 6 questions
- Calculating a Bank's Lending Capacity: 3 questions
- Calculating GDP: 7 questions
- Calculating Price Elasticity: 18 questions
- Calculating Price Indexes: 3 questions
- Changes in Tax and Spending: 5 questions
- Comparative and Absolute Advantage: 9 questions
- Components of GDP: 14 questions
- Consequences of Price Instability: 14 questions
- Consumer Price Index vs. Producer Price Index: 4 questions
- Consumer Surplus: 11 questions
- Critiquing the Unemployment Rate: 3 questions
- Crowding Out: 6 questions
- Crowding Out Revisited: 5 questions
- Defining Credit: 4 questions
- Defining Economic Growth: 10 questions
- Defining Monetary Policy: 9 questions
- Defining Money: 9 questions
- Defining the GDP Price Index: 4 questions
- Demand: 24 questions
- Demand for Money: 5 questions
- Discretionary and Automatic Fiscal Policy: 6 questions
- Discretionary Fiscal Policy: 6 questions
- Economic Indicators: 6 questions
- Economic Models: 10 questions
- Economic Rationality: 10 questions
- Economic Systems: 10 questions

- Equilibrium: 22 questions
- Exchange Rates and International Finance: 4 questions
- Expansionary and Contractionary Fiscal Policies: 4 questions
- Explaining Elasticity: 10 questions
- Federal Funds, Prime and Discount Interest Rates: 3 questions
- Fiscal Policy and Tax Rates: 3 questions
- GDP and Income: 3 questions
- Globalization: 3 questions
- Graphs in Economics: 10 questions
- Impact of Government Regulations: 6 questions
- Impact of International Trade: 3 questions
- Interests Rates: 3 questions
- Keynesian Policy Prescriptions: 3 questions
- Lending and Money Creation: 6 questions
- Lessons from the 1970s: 2 questions
- Long Run and Short Run AS Curves: 3 questions
- M1 and M2: 6 questions
- Major Macroeconomic Indicators: 6 questions
- Marginal Analysis: 4 questions
- Math in Economics: 10 questions
- Monetary Policy and GDP: 5 questions
- Neoclassical Policy Prescriptions: 3 questions
- New Classical Economics and Rational Expectations: 7 questions
- No Phillips Curve Tradeoff: 3 questions
- Nominal and Real GDP: 12 questions
- Open Market Operations: 4 questions
- Other Elasticities: 10 questions
- Policy Implications: Inflation, Recession, and Unemployment: 7 questions
- Policy Lags: 6 questions
- Positive and Normative Statements: 10 questions
- Practical Problems with Discretionary Fiscal Policy: 3 questions
- Price Ceilings: 11 questions
- Price Elasticity and Total Revenue: 10 questions

- Price Floors: 16 questions
- Price Indexes: 4 questions
- Price Indexes and Real Data: 3 questions
- Productivity: 7 questions
- Rate of Inflation: 3 questions
- Real World Macro Policy Options: 5 questions
- Ricardian Equivalence: 3 questions
- Sources of Economic Growth: 9 questions
- Standardized vs. Actual Budget Figures: 5 questions
- State and Local Budgets: 4 questions
- Supply: 30 questions
- Surplus and Inefficiency: 3 questions
- Tax Incidence: 3 questions
- Taxation: 8 questions
- The AD-AS Model and Economic Growth: 3 questions
- The AD-AS Model and Equilibrium: 41 questions
- The AD-AS Model and Recession, Expansion and Inflation: 8 questions
- The Balance of Trade: 3 questions
- The Business Cycle: 16 questions
- The Cost of Choices: 10 questions
- The Equilibrium Rate: 10 questions
- The Expenditure Multiplier: 4 questions
- The Expenditure Output Model: 8 questions
- The Federal Budget: 19 questions
- The Federal Reserve: 4 questions
- The GDP Gap: 4 questions
- The Keynesian Perspective: 16 questions
- The Keynesian Portion of the AS Curve: 6 questions
- The Money Multiplier: 4 questions
- The Neoclassical Perspective: 10 questions
- The Neoclassical Portion of the AS Curve: 3 questions
- The Production Possibilities Frontier: 10 questions
- The Unemployment Rate: 6 questions
- Tools of the Monetary Policy: 6 questions

- Trade Policy and Agreements: 9 questions
- Types of Unemployment: 12 questions
- What Is Economics? 18 questions

PART II

LESSON 1: ECONOMIC THINKING

3. Why It Matters: Economic Thinking

Why explain the basic premises and tools of economic thinking?

Many students find the prospect of taking an economics course daunting (or maybe just dull). At the heart of this worry is perhaps just a misperception of what economics is about. It's not rocket science, it's not a collection of boring facts, and it's not the study of money or the stock market. Economics is really just a set of interesting questions organized around a simple fact: There aren't enough resources (money, land, time, etc.) to go around or satisfy all our needs and desires. Economists call this condition *scarcity*. It affects individuals, nations, and the entire human species—no one ever has enough of the things they want. On some level, everyone

has to grapple with scarcity, and economists are interested in understanding how people do that.

If you understand how people behave in the face of scarcity—and learn to think like an economist—economics can be an amazingly powerful tool. You can predict the behavior of individual economic agents, such as consumers or businesses—what economists call the micro level. You can predict the behavior of an economy (or economies) as a whole—what economists call the macro level. You can have a better understanding of the choices—and consequences—in your own life.

Consider the following example:

Imagine that you're about to catch a flight to Italy. You've saved and saved to pay for this trip, and you're thrilled to finally be going. You're on top of the world, until . . .

You get to the airport and have to go through security. The line is terrible. What choice do you have? You can't board the plane without passing security. As you wait, you notice a different aisle for "special" passengers who fly more often. They aren't waiting at all. In fact, if more than three of them collect in the line and have to wait for more than a minute, they act very annoyed—shifting their weight, rolling their eyes, checking their phones, and so on. Oh, brother! You've been waiting so much longer! How is that fair?

Finally you make it through security and reach your gate. Sadly, you are in zone 5, which boards last. You have to struggle down the aisle—past rows of seats with more leg room—to a center seat. Worse, those who boarded before you have filled all the overhead bins. A flight attendant seems irritated that you have a large carry-on bag that won't fit under your seat. He takes your bag off the plane and tells you to pick it up at baggage claim after the flight.

You tuck in your elbows and squeeze into you seat thinking, This isn't fair.

Not sure what all this has to do with scarcity? You need to study economics!

Learning Outcomes

- Explain what economics is and why it is important
- Explain how economists use economic models
- Use mathematics in common economic applications
- Use graphs in common economic applications

4. Outcome: What Is Economics?

What you'll learn to do: explain what economics is and explain why it is important

In order to understand economics it's important to master a set of key definitions and understand how they interconnect. These concepts will be used many times throughout the course. At the most basic level:

- Scarcity means that there are never enough resources to satisfy all human wants
- Economics is the study of the trade-offs and choices that we make, given the fact of scarcity
- Opportunity cost is what we give up when we choose one thing over another

We will spend more time with these definitions, and understand how they're used in the context of this discipline.

The specific things you'll learn in this section include the following:

- Define scarcity and explain its economic impact
- Define opportunity cost
- Define productive resources
- Explain why trade and markets exist
- Distinguish between macroeconomics and microeconomics

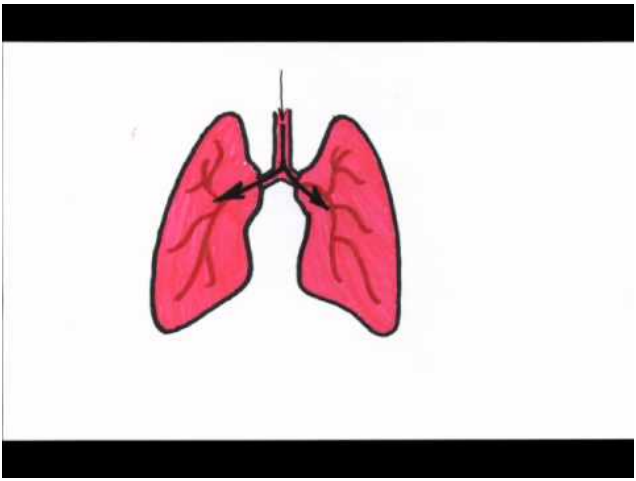
Learning Activities

The learning activities for this section include the following:

- Video: Scarcity and Choice
- Reading: Understanding Economics and Scarcity
- Video: Resources
- Reading: The Concept of Opportunity Cost
- Video: Opportunity Cost
- Reading: Labor, Markets, and Trade
- Video: Micro vs. Macro
- Reading: Microeconomics and Macroeconomics
- Self Check: What Is Economics

5. Video: Scarcity and Choice

Throughout this course you'll encounter a series of short videos that explain complex economic concepts in very simple terms. Take the time to watch them! They'll help you master the basics before heading to the readings (which tend to cover the same information in more depth).



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As you watch the video, consider the following key points:

1. Economics is the study of how humans make choices under conditions of scarcity.
2. Scarcity exists when human wants for goods and services exceed the available supply.

3. People make decisions in their own self-interest, weighing benefits and costs.

6. Reading: Understanding Economics and Scarcity

Scarcity

The resources that we value—time, money, labor, tools, land, and raw materials—exist in limited supply. There are simply never enough resources to meet all our needs and desires. This condition is known as scarcity.

At any moment in time, there is a finite amount of resources available. Even when the number of resources is very large, it's limited. For example, according to the U.S. Bureau of Labor Statistics, in 2016, the labor force in the United States contained more than 158 million workers—that's a lot, but it's not infinite. Similarly, the total area of the United States is 3,794,101 square miles—an impressive amount of acreage, but not endless. Because these resources are limited, so are the numbers of goods and services we can produce with them. Combine this with the fact that

human wants seem to be virtually infinite, and you can see why scarcity is a problem.

Economics

When faced with limited resources, we have to make choices. Again, economics is the study of how humans make choices under conditions of scarcity. These decisions can be made by individuals, families, businesses, or societies.

Let's consider a few decisions that we make based on limited resources. Take the following:

1. What classes are you taking this term?

Are you the lucky student who is taking every class you wanted with your first-choice professor during the perfect time and at the ideal location? The odds are that you have probably had to make trade-offs on account of scarcity. There is a limited number of time slots each day for classes and only so many faculty available to teach them. Every faculty member can't be assigned to every time slot. Only one class can be assigned to each classroom at a given time. This means that each student has to make trade-offs between the time slot, the instructor, and the class location.

2. Where do you live?

Think for a moment, if you had all the money in the world, where would you live? It's probably not where you're living today. You have probably made a housing decision based on scarcity. What location did you pick? Given limited time, you may have chosen to live close to work or school. Given the demand for housing, some locations are more expensive than others, though, and you may have chosen to spend more money for a convenient location or to spend less money for a place that leaves you spending more time on transportation. There is a limited amount of housing in any location, so you are forced to choose from what's available at any time. Housing decisions always have to take into account what

someone can afford. Individuals making decisions about where to live must deal with limitations of financial resources, available housing options, time, and often other restrictions created by builders, landlords, city planners, and government regulations.

The Problem of Scarcity

Every society, at every level, must make choices about how to use its resources. Families must decide whether to spend their money on a new car or a fancy vacation. Towns must choose whether to put more of the budget into police and fire protection or into the school system. Nations must decide whether to devote more funds to national defense or to protecting the environment. In most cases, there just isn't enough money in the budget to do everything.

Economics helps us understand the decisions that individuals, families, businesses, or societies make, given the fact that there are never enough resources to address all needs and desires.

7. Video: Resources

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Below are the key points from the video:

There are four **productive resources** (resources have to be able to produce something), also called **factors of production**:

- **Land:** any natural resource, including actual land, but also trees, plants, livestock, wind, sun, water, etc.
- **Economic capital:** anything that's manufactured in order to be used in the production of goods and services. Note the distinction between financial capital (which is not productive) and economic capital (which is). While money isn't directly productive, the tools and machinery that it buys can be.

- **Labor:** any human service—physical or intellectual. Also referred to as *human capital*.
- **Entrepreneurship**: the ability of someone (an entrepreneur) to recognize a profit opportunity, organize the other factors of production, and accept risk.

8. Reading: The Concept of Opportunity Cost

The Idea of Opportunity Cost

Since resources are limited, every time you make a choice about how to use them, you are also choosing to forego other options. Economists use the term **opportunity cost** to indicate what must be given up to obtain something that's desired. A fundamental principle of economics is that every choice has an opportunity cost. If you sleep through your economics class (not recommended, by the way), the opportunity cost is the learning you miss. If you spend your income on video games, you cannot spend it on movies. If you choose to marry one person, you give up the opportunity to marry anyone else. In short, opportunity cost is all around us.

The idea behind opportunity cost is that the cost of one item is the lost opportunity to do or consume something else; in short, opportunity cost is the value of the next best alternative.

Since people must choose, they inevitably face trade-offs in which they have to give up things they desire to get other things they desire more.

Opportunity Cost and Individual Decisions

In some cases, recognizing the opportunity cost can alter personal behavior. Imagine, for example, that you spend $8 on lunch every day at work. You may know perfectly well that bringing a lunch from home would cost only $3 a day, so the opportunity cost of buying lunch at the restaurant is $5 each day (that is, the $8 that buying lunch costs minus the $3 your lunch from home would cost). Five dollars each day does not seem to be that much. However, if you project what that adds up to in a year—250 workdays a year × $5 per day equals $1,250—it's the cost, perhaps, of a decent vacation. If the opportunity cost were described as "a nice vacation" instead of "$5 a day," you might make different choices.

Opportunity Cost and Societal Decisions

Opportunity cost also comes into play with societal decisions. Universal health care would be nice, but the opportunity cost of such a decision would be less housing, environmental protection, or national defense. These trade-offs also arise with government policies. For example, after the terrorist plane hijackings on September 11, 2001, many proposals, such as the following, were made to improve air travel safety:

- The federal government could provide armed "sky marshals" who would travel inconspicuously with the rest of the passengers. The cost of having a sky marshal on every flight would be roughly $3 billion per year.
- Retrofitting all U.S. planes with reinforced cockpit doors to make it harder for terrorists to take over the plane would have a price tag of $450 million.
- Buying more sophisticated security equipment for airports, like three-dimensional baggage scanners and cameras linked to face-recognition software, would cost another $2 billion.

Lost time can be a significant component of opportunity cost.

However, the single biggest cost of greater airline security doesn't involve money. It's the opportunity cost of additional waiting time at the airport. According to the United States Department of Transportation, more than 800 million passengers took plane trips in the United States in 2012. Since the 9/11 hijackings, security screening has become more intensive, and consequently, the procedure takes longer than in the past. Say that, on average, each air passenger spends an extra 30 minutes in the airport per trip. Economists commonly place a value on time to convert an opportunity cost in time into a monetary figure. Because many air travelers are relatively highly paid businesspeople, conservative estimates set the average "price of time" for air travelers at $20 per hour. Accordingly, the opportunity cost of delays in airports could be as much as 800 million (passengers) × 0.5 hours × $20/hour—or, $8 billion per year. Clearly, the opportunity costs of waiting time can be just as substantial as costs involving direct spending.

Opportunity Cost Video

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9. Reading: Labor, Markets, and Trade

Assembly Line

The Division and Specialization of Labor

We have learned that there aren't enough resources to fulfill all of our wants and this reality forces us to make choices that have opportunity costs. How do we get the most we can from the resources we have? Over time, markets and trade have come into existence and have become highly efficient mechanisms for optimizing our use of resources and bringing us the most and best combination of goods and services.

Think back to pioneer days, when the average person knew how to do so much more on his or her own than someone today—everything from shoeing a horse to growing, hunting, and preserving food to building a house and repairing equipment. Most of us don't know how to do all—or any—of those things. It's not because we're not capable of learning them. It's because we don't have to. The reason for this is something called the "division and specialization of labor," a production innovation first put forth by Adam Smith.

The formal study of economics began when Adam Smith (1723–1790) published his famous book, *The Wealth of Nations*, in 1776. Many authors had written about economics in the centuries before Smith, but he was the first to address the subject in a comprehensive way.

In the first chapter of the book, Smith introduces the idea of the **division of labor**, which means that the way a good or service is produced is divided into a number of tasks that are performed by different workers, instead of all the tasks being performed by the same person. To illustrate the division of labor, Smith counted how many tasks were involved in making a pin: drawing out a piece of wire, cutting it to the right length, straightening it, putting a head on one end and a point on the other, packaging pins for sale, and so on. Smith counted *eighteen* distinct tasks that were typically performed by different people—all for a pin!

Modern companies divide tasks, too. Even a relatively simple business like a restaurant divides up the task of serving meals into a range of jobs: top chef, sous chefs, less-skilled kitchen help, host/hostess, waiters/waitresses, janitors, a business manager to handle accounts and paychecks, etc. A complex business like a large manufacturing factory or a hospital can have hundreds of job classifications.

Why the Division of Labor Increases Production

When the tasks involved with producing a good or service are divided and subdivided, workers and businesses can produce a greater quantity of those goods or services. In his study of pin

factories, Smith observed that one worker alone might make twenty pins in a day, but that a small business of ten workers (some of whom would need to do two or three of the eighteen tasks involved in pin making), could make forty-eight thousand pins in a day. How can a group of workers, each specializing in certain tasks, produce so much more than the same number of workers who try to produce the entire good or service by themselves? Smith offered three reasons.

First, **specialization** in a particular small job allows workers to focus on the parts of the production process in which they have an advantage. People have different skills, talents, and interests, so they will be better at some jobs than at others. The particular advantages may be based on educational choices, which are shaped, in turn, by interests and talents. Only those with medical training qualify to become doctors, for instance. For some goods, specialization will be affected by geography—it's easier to be a wheat farmer in North Dakota than in Florida, but easier to run a tourist hotel in Florida than in North Dakota. If you live in or near a big city, it's easier to attract enough customers to operate a successful dry-cleaning business or movie theater than if you live in a sparsely populated rural area. Whatever the reason, if people specialize in the production of what they do best, they will be more productive than if they produce a combination of things, some of which they are good at and some of which they are not.

Second, workers who specialize in certain tasks often learn to produce more quickly and with higher quality. This pattern holds true for many workers, including assembly-line laborers who build cars, stylists who cut hair, and doctors who perform heart surgery. In fact, specialized workers often know their jobs well enough to suggest innovative ways to do their work faster and better. A similar pattern often operates within businesses. In many cases, a business that focuses on one or a few products is more successful than firms that try to make a wide range of products.

Third, specialization allows businesses to take advantage of **economies of scale**, which means that, for many goods, as the level

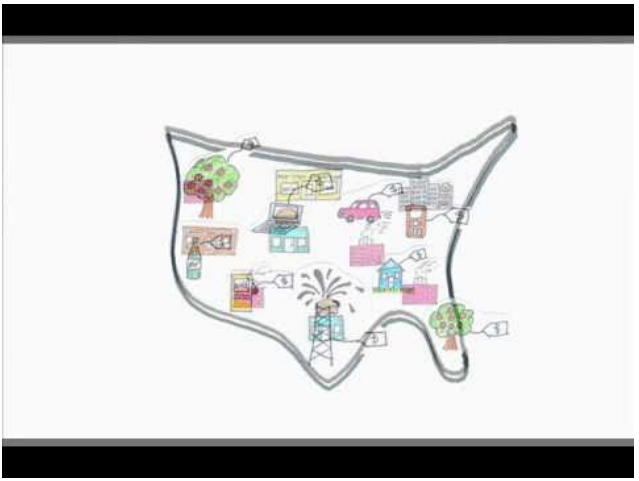
of production increases, the average cost of producing each individual unit declines. For example, if a factory produces only one hundred cars per year, each car will be quite expensive to make on average. However, if a factory produces fifty thousand cars each year, then it can set up an assembly line with huge machines and workers performing specialized tasks, and the average cost of production per car will drop. Economies of scale implies that production is becoming more efficient as the scale of production rises.

The ultimate result of workers who can focus on their preferences and talents, learn to do their specialized jobs better, and work in larger organizations is that society as a whole can produce and consume far more than if each person tried to produce all of their own goods and services. The division and specialization of labor has been a force against the problem of scarcity.

Trade and Markets

Specialization only makes sense, though, if workers (and other economic agents such as businesses and nations) can use their income to purchase the other goods and services they need. In short, specialization requires trade. You do not have to know anything about electronics or sound systems to play music—you just buy an iPod or MP3 player, download the music, and listen. You don't have to know anything about textiles or the construction of sewing machines if you need a jacket—you just buy the jacket and wear it. Instead of trying to acquire all the knowledge and skills involved in producing all of the goods and services that you wish to consume, the market allows you to learn a specialized set of skills and then use the pay you receive to buy the goods and services you need or want. This is how our modern society has evolved into a strong economy.

10. Video: Micro vs. Macro



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11. Reading: Microeconomics and Macroeconomics

Micro vs. Macro

It should be clear by now that economics covers a lot of ground. That ground can be divided into two parts: **Microeconomics** focuses on the actions of individual agents within the economy, like households, workers, and businesses; **macroeconomics** looks at the economy as a whole. It focuses on broad issues such as growth, unemployment, inflation, and trade balance. Microeconomics and macroeconomics are not separate subjects but are, rather, complementary perspectives on the overall subject of the economy.

To understand why both microeconomic and macroeconomic perspectives are useful, consider the problem of studying a biological ecosystem like a lake. One person who sets out to study

the lake might focus on specific topics: certain kinds of algae or plant life; the characteristics of particular fish or snails; or the trees surrounding the lake. Another person might take an overall view and instead consider the entire ecosystem of the lake from top to bottom: what eats what, how the system remains in balance, and what environmental stresses affect this balance. Both approaches are useful, and both researchers study the same lake, but the viewpoints are different. In a similar way, both microeconomics and macroeconomics study the same economy, but each has a different starting point, perspective, and focus.

Whether you are looking at lakes or economics, the micro and the macro insights should illuminate each other. In studying a lake, the "micro" insights about particular plants and animals help us to understand the overall food chain, while the "macro" insights about the overall food chain help to explain the environment in which individual plants and animals live.

In economics, the micro decisions of individual businesses are influenced by the health of the macroeconomy—for example, firms will be more likely to hire workers if the overall economy is growing. In turn, the performance of the macroeconomy ultimately depends on the microeconomic decisions made by individual households and businesses.

Microeconomics

What determines how households and individuals spend their budgets? What combination of goods and services will best fit their needs and wants, given the budget they have to spend? How do people decide whether to work, and if so, whether to work full time or part time? How do people decide how much to save for the future, or whether they should borrow to spend beyond their current means?

What determines the products, and how many of each, a firm

will produce and sell? What determines what prices a firm will charge? What determines how a firm will produce its products? What determines how many workers it will hire? How will a firm finance its business? When will a firm decide to expand, downsize, or even close? In the microeconomic part of this text, we will learn about the theory of consumer behavior and the theory of the firm.

Macroeconomics

What determines the level of economic activity in a society or nation?—that is, how many goods and services does it actually produce? What determines how many jobs are available in an economy? What determines a nation's standard of living? What causes the economy to speed up or slow down? What causes firms to hire more workers or lay them off? Finally, what causes the economy to grow over the long term?

An economy's macroeconomic health can be assessed by a number of standards or goals. The most important macroeconomic goals are the following:

- Growth in the standard of living
- Low unemployment
- Low inflation

Macroeconomic policy pursues these goals through monetary policy and fiscal policy:

- **Monetary policy**, which involves policies that affect bank lending, interest rates, and financial capital markets, is conducted by a nation's central bank. For the United States, this is the Federal Reserve.
- **Fiscal policy**, which involves government spending and taxes, is determined by a nation's legislative body. For the United

States, this is the Congress and the executive branch, which establishes the federal budget.

To keep the differences between these policies straight, remember that the term *monetary* relates to money, and the term *fiscal* relates to government revenue or taxes.

These are the main tools the government has to work with. Americans tend to expect that government can fix whatever economic problems we encounter, but to what extent is that expectation realistic? These are just some of the issues that will be explored later in this course.

Self Check: What Is Economics?

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the four Readings in this section.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

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12. Outcome: Economic Models

What you'll learn to do: explain how economists use economic models

Earlier we defined economics as the study of how people choose to use scarce resources to best satisfy their unlimited wants. Economists try to analyze these choices both at the individual level (What wage does Alissa require in order to take that job?) and broader societal level (What is the impact of minimum wage on the unemployment rate?). The principal tool economists use to do this is models.

In this section, we'll define models and show how economists use them.

The specific things you'll learn in this section include the following:

- Define an economic model
- Explain why economic models are useful to economists
- Identify common economic models

Learning Activities

The learning activities for this section include the following:

- Video: Economic Models and Theories
- Reading: Using Economic Models
- Self Check: Economic Models

13. Reading: Using Economic Models

Economic Models and Math

Economists use models as the primary tool for explaining or making predictions about economic issues and problems. For example, an economist might try to explain what caused the Great Recession in 2008, or she might try to predict how a personal income tax cut would affect automobile purchases.

Economic models can be represented using words or using mathematics. All of the important concepts in this course can be explained without math. That said, math is a tool that can be used to explore economic concepts in very helpful ways. You know the saying "A picture is worth a thousand words"? The same applies to graphs: they're a very effective means of conveying information

visually—without a thousand words. In addition to being a "picture," a graph is also a math-based model. Math is one way of working with (or manipulating) economic models.

Why would an economist use math when there are other ways of representing models, such as with text or narrative? Why would you use your fist to bang a nail, if you had a hammer? Math has certain advantages over text. It disciplines our thinking by making us specify exactly what we mean. You can get away with fuzzy thinking and vague approximations in your own mind, but not when you're reducing a model to algebraic equations. At the same time, math has certain disadvantages. Mathematical models lack the nuances that can be found in narrative models. The point is that math is one tool, but it's not the only tool or even always the best tool economists can use.

Examples of Models

An architect who is designing a major office building will probably build a physical model that sits on a tabletop to show how the entire city block will look after the new building is constructed. Companies often build models of their new products that are rougher and less finished than the final product but can still demonstrate how the new product will work and look. Such models help people visualize a product (or a building) in a more complete, concrete way than they could without them.

Similarly, economic models offer a way to get a complete view or picture of an economic situation and understand how economic factors fit together.

A good model to start with in economics is the **circular flow diagram** (Figure 1, below). Such a diagram indicates that the economy consists of two groups, households and firms, which interact in two markets: the **goods-and-services market** (also called the *product market*), in which firms sell and

households buy, and the **labor market**, in which households sell labor to business firms or other employees.

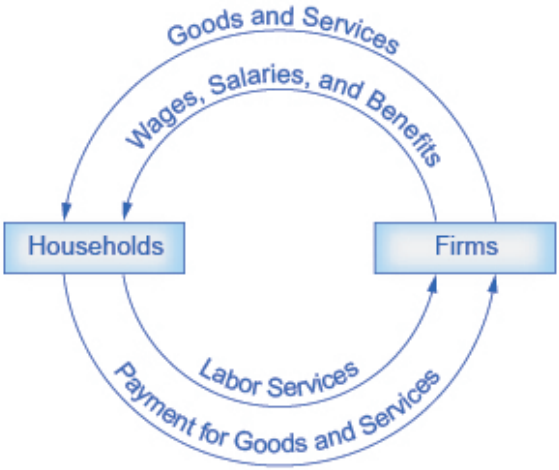


Figure 1. The Circular Flow Diagram

Of course, in the real world, there are many different markets for goods and services and markets for many different types of labor. The circular flow diagram simplifies these distinctions in order to make the picture easier to grasp. In the diagram, firms produce goods and services, which they sell to households in return for payments. The outer ring represents the two sides of the product market (which provides goods and services), in which households demand and firms supply. In addition, households (as workers) sell their labor to firms in return for wages, salaries, and benefits. This is shown in the inner circle, which represents the two sides of the labor market, in which households supply and firms demand. This version of the circular flow model is stripped down to the essentials, but it has enough features to explain how the product and labor markets work in the economy.

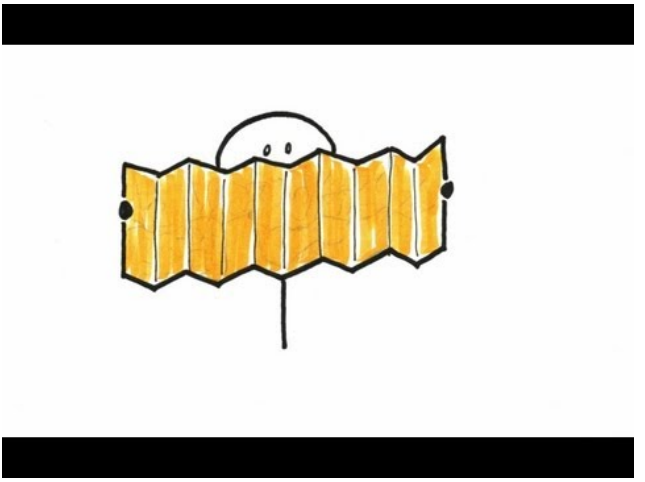
We could easily add details to this basic model if we wanted

to introduce more real-world elements, like financial markets, governments, or interactions with the rest of the world (imports and exports). Economists reach for theories in much the same way as a carpenter might grab a tool. When economists identify an economic issue or problem, they sift through the available theories to see if they can find one that fits. Then they use the theory to give them insights about the issue or problem. In economics, theories are expressed as diagrams, graphs, or even as mathematical equations. Counter to what you might expect, economists don't figure out the solution to a problem and then draw the graph. Instead, they use the graph to help them discover the answer. At the introductory level, you can sometimes figure out the right answer without using a model, but if you keep studying economics, before too long you'll encounter issues and problems whose solution will require graphs. Both micro and macroeconomics are explained in terms of theories and models. The most well-known theories are probably those of supply and demand, but you will learn about several others.

Economic Models and Theories Video

An **economic model** is a simplified version of reality that allows us to observe, understand, and make predictions about economic behavior. The purpose of a model is to take a complex, real-world situation and pare it down to the essentials. If designed well, a model can give the analyst a better understanding of the situation and any related problems.

A good model is simple enough to be understood while complex enough to capture key information. Sometimes economists use the term *theory* instead of *model*. Strictly speaking, a theory is a more abstract representation, while a model is a more applied or empirical representation. Often, models are used to test theories. In this course, however, we will use the terms interchangeably.



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Self Check: Economic Models

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the Reading in this section.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

An interactive or media element has been excluded from this version of the text. You can view it online here: https://pressbooks.ccconline.org/accmacro/?p=44

14. Outcome: Math in Economics

What you'll learn to do: use mathematics in common economic applications

Economists use math as a tool for manipulating and exploring economic models. Sometimes it makes sense to express economic ideas in words; other times, math does a better job. What I would like to see is a statement that models can be articulated in different ways from verbal to mathematical. Economics is not math, but rather math is a tool for presenting and manipulating/exploring/using economic models. Many economic models use math to explain cause and effect. Don't worry, though: We're going to cover all the math you need to solve the problems in this course.

This section provides a quick review of some basic math (so you can avoid common errors) and then introduces the mathematical concepts you'll need throughout the course. Don't forget: return to this section later on if you encounter math that you can't follow.

Some students, when they find out that economics involves math, fear that the math will trip them up and prevent their success in the course—"I'm not a math person!" they think. If you share these thoughts, it may surprise you to know there's scientific research showing that when you practice new ways of thinking, your brain physically changes and adapts. Essentially, there's no such thing as "a math person" (or an "economics person"). You don't need a special talent or aptitude. It's mainly a matter of practice, hard work, and training your brain. The more you challenge your mind to learn, the more your brain cells connect to one another and the stronger those connections become.

So, how do you actually develop your brain and succeed in this

kind of course? We asked some former students to tell us their advice for success. They said it was most important to

- Do the practice problems in the course.
- Ask questions.
- Study your mistakes.
- Explain the ideas to yourself in different ways until they are clear.

You will need to learn new things to pass this class, and you should expect it to feel hard as you wrestle with unfamiliar ideas and new ways of thinking. Don't give up, though! The feeling of struggling is a normal part of how the brain gets stronger when it learns things.

The specific things you'll learn in this section include the following:

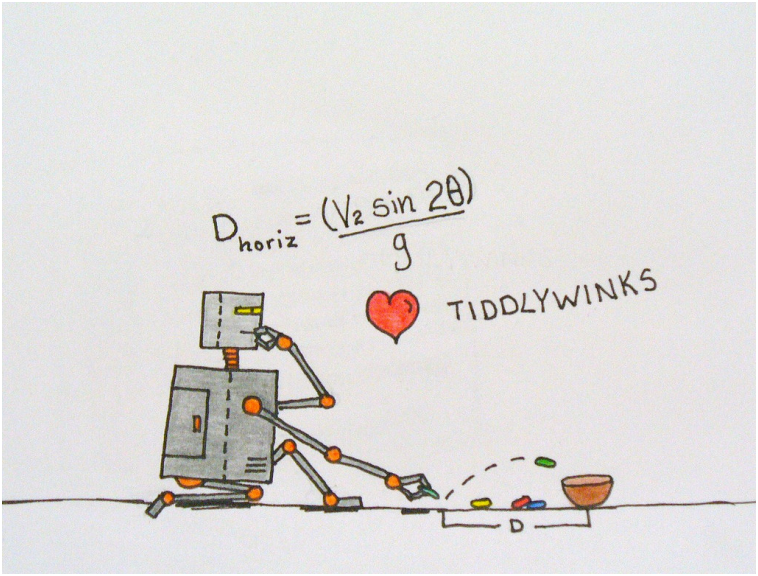
- Use an equation to understand the impact of changing economic variables
- Explain how functions describe cause and effect

Learning Activities

The learning activities for this section include the following:

- Reading: Purpose of Functions
- Reading: Solving Simple Equations
- Self Check: Math in Economics

15. Reading: Purpose of Functions



Often, economic models are expressed in terms of mathematical functions. What's a function? Basically, a **function** describes a relationship involving one or more variables. Sometimes the relationship is a definition. For example (using words), Joan of Arc is a professor. This could be expressed as Joan of Arc = professor. Or, food = cherries, cheese, and chocolate means that cherries, cheese, and chocolate are food.

In economics, functions frequently describe cause and effect. The variable on the left-hand side is what is being explained ("the effect"). On the right-hand side is what's doing the explaining ("the causes"). Functions are also useful for making predictions. For example, think about your grade in this course. We might be able to predict how well you will do in this course by considering how well you've done in other courses, by how much you attend class

or participate in the online activities, and by how many hours you study.

Not all of those things will have equal impact on your grade. Let's assume that your study time is most important and will have twice as much impact as the other factors. We are trying to describe 100 percent of the impact, so study time will explain 50 percent, attendance and participation will explain 25 percent, and your prior class grades will describe 25 percent. Together, this adds up to 100 percent.

Now, let's turn that into a function. Your grade in the course can be represented as the following:

Grade = (0.50 x hours_spent_studying) + (0.25 x class_attendance) + (0.25 x prior_GPA)

This equation states that your grade depends on three things: the number of hours you spend studying, your class attendance, and your prior course grades represented as your grade-point average (GPA). It also says that study time is twice as important (0.50) as either class_attendance (0.25) or prior_GPA score (0.25). If this relationship is true, how could you raise your grade in this course? By not skipping class and studying more. Note that you cannot do anything about your prior GPA, since that is calculated from courses you've already taken and grades you've already received.

Economic models tend to express relationships using economic variables, such as Budget = money_spent_on_econ_books + money_spent_on_music (assuming that the only things you buy are economics books and music). Often, there is some assumption that has to be explained in order to identify where the model has been simplified.

As you can see, in economic models the math isn't difficult. It's used to help describe and explain the relationships between variables.

16. Reading: Solving Simple Equations

Let's quickly review some math concepts that will help you avoid simple errors in your work.

Order of Operations

Remember, when you solve an equation it's important to do each operation in the following order:

1. Simplify inside parentheses and brackets.
2. Simplify the exponent.
3. Multiply and divide from left to right.
4. Add and subtract from left to right.

In this course you will not use exponents, but you will need to remember the order of the other steps.

So, in solving the following equation, you multiply first, then add:

[latex]\begin{array}{l}y=9+3\times10\\y=9+30\\y=39\ end{array}[/latex]

Lines

In this course the most common equation you will see is [latex]y=b+mx[/latex]. This is the equation for a line. We will revisit this equation later in this module when we review graphs. For now, let's practice solving this common equation using different variables.

Understanding Variables

To a mathematician or an economist, a **variable** is the name given to a quantity that can assume a range of values. In other words, the value of a variable can change or vary. In an equation it's represented by a letter or a symbol.

Because economic models often consider cause and effect, variables are important. You will often be asked to consider a range of options that result from different variables. Below is a very simple example:

[latex]y=9+3x[/latex]

In order to understand the range of options, we might start with 0. What does *y* equal if [latex]x=0[/latex]?

[latex]\begin{array}{l}y=9+3x\\y=9+3(0)\\y=9+0\\y=9\\ end{array}[/latex]

Now, let's look at the same formula with different information. What does y equal if [latex]x=5[/latex]?

[latex]\begin{array}{l}y=9+3x\\y=9+3(5)\\y=9+15\\y=24\\ end{array}[/latex]

Working with Variables

Remember that when you're trying to solve an equation with one or more variables, you need to isolate the variable. Let's walk through a simple example using the same equation from above.

What if we want to solve the equation in a case where [latex]y=24[/latex]?

[latex]\begin{array}{r}y=9+3x\\24=9+3x\end{array}[/latex]

First, subtract the same number from each side of the equation to simplify the equation without changing the fact that it's an equality. In this case, we want to subtract the number that will

enable us to isolate x (x is on one side of the equal sign all by itself). We can do that by subtracting 9 from each side.

[latex]\begin{array}{l}\,24=9+3x\\-9=-9\\\,15=3x\\ end{array}[/latex]

Now we can further simplify the equation by dividing both sides by 3.

[latex]\begin{array}{l}\underline{15}=\underline{3x}\\\,\,3\,\,\,\,\,\,\,\,\,\,\,\,\,\,3\\\,\,\,5=x\end{array}[/latex]

Let's practice solving for x one more time. What does x equal if [latex]y=12[/latex]?

[latex]\,\,12=9+3x\\-9=-9\\\,\,\,\,\,\,\,\,3=3x\\\,\,\,\,\,\,\,\,\under line{3}=\underline{3x}\\\,\,\,\,\,\,\,\,3\,\,\,\,\,\,\,\,\,\,\,\,\,\,3\\\,\,\,\,\,\,\,\,1=x[/latex]

Self Check: Math in Economics

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the two Readings in this section.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

An interactive or media element has been excluded from this version of the text. You can view it online here: https://pressbooks.ccconline.org/accmacro/?p=50

17. Outcome: Graphs in Economics

What you'll learn to do: use graphs in common economic applications

In this course, the most common way you will encounter economic models is in graphical form.

A graph is a visual representation of numerical information. Graphs condense detailed numerical information to make it easier to see patterns (such as "trends") among data. For example, which countries have larger or smaller populations? A careful reader could examine a long list of numbers representing the populations of many countries, but with more than two hundred nations in the world, searching through such a list would take concentration and time. Putting these same numbers on a graph, listing them from highest to lowest, would reveal population patterns much more readily.

Economists use graphs not only as a compact and readable presentation of data, but also for visually representing relationships and connections—in other words, they function as models. As such, they can be used to answer questions. For example: How do increasing interest rates affect home sales? Graphing the results can help illuminate the answers.

This section provides an overview of graphing—just to make sure you're up to speed on the basics. It's important to feel comfortable with the way graphs work before using them to understand new concepts.

The specific things you'll learn in this section include the following:

- Explain how a graph shows the relationship between two variables
- Differentiate between a positive relationship and a negative relationship
- Interpret economic information on a graph

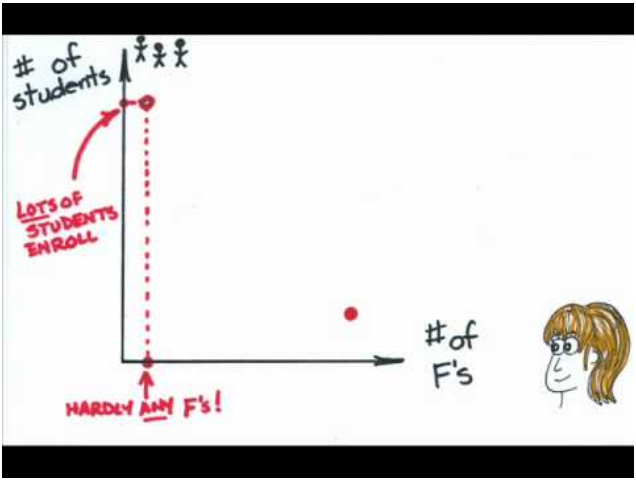
Learning Activities

The learning activities for this section include the following:

- Video: Graph Review
- Reading: Creating and Interpreting Graphs
- Reading: Interpreting Slope
- Reading: Types of Graphs
- Self Check: Graphs in Economics

18. Video: Graph Review

NOTE: Around the two-minute mark, the narrator inadvertently says "indirect," rather than "inverse." This is corrected later in the video.



A YouTube element has been excluded from this version of the text. You can view it online here:
https://pressbooks.ccconline.org/accmacro/?p=54

19. Reading: Creating and Interpreting Graphs

It's important to know the terminology of graphs in order to understand and manipulate them. Let's begin with a visual representation of the terms (shown in Figure 1), and then we can discuss each one in greater detail.

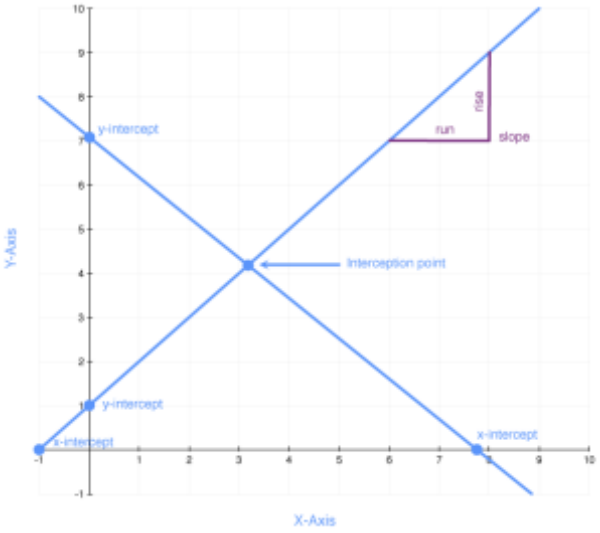


Figure 1. Graph Terminology

Throughout this course we will refer to the horizontal line on the graph as the **x-axis**. We will refer to the vertical line on the graph as the **y-axis**. This is the standard convention for graphs.

An **intercept** is where a line on a graph crosses ("intercepts") the x-axis or the y-axis. You can see the x-intercepts and y-intercepts on the graph above. The point where two lines on a graph cross is called the **interception point**.

The other important term to know is *slope*. The slope tells us how steep a line on a graph is. Technically, **slope** is the change in the vertical axis divided by the change in the horizontal axis. The formula for calculating the slope is often referred to as the "rise over the run"—again, the change in the distance on the y-axis (rise) divided by the change in the x-axis (run).

Now that you know the "parts" of a graph, let's turn to the equation for a line:

">y = b + mx

Let's use the same equation we used earlier, in the section on solving algebraic equations:

y = 9 + 3x

">In this equation for a line, the *b* term is 9 and the *m* term is 3. The ta

Values for the Slope Intercept Equation

x	**y**
0	9
1	12
2	15
3	18
4	21
5	24
6	27

Next we can place each of these points on a graph. We can start with 0 on the *x*-axis and plot a point at 9 on the *y*-axis. We can do the same with the other pairs of values and draw a line through all the points, as on the graph in Figure 2, below.

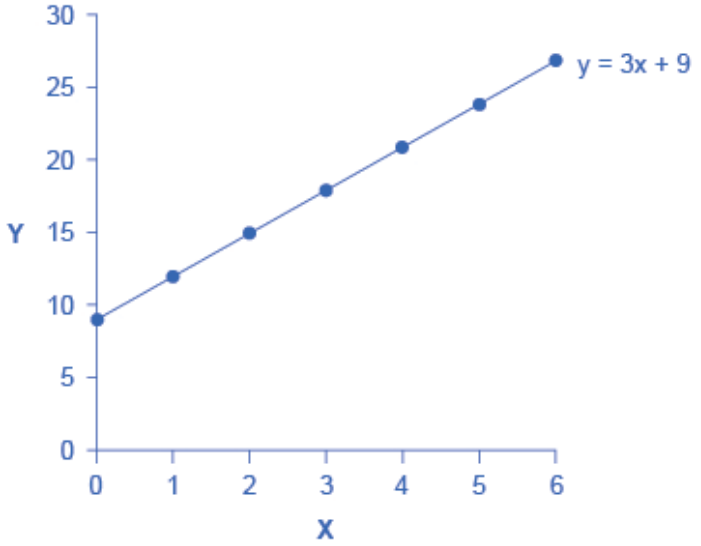


Figure 2. Slope and Algebra of a Straight Line

This example illustrates how the b and m terms in an equation for a straight line determine the shape of the line. The b term is called the y-intercept. The reason is that if $x = 0$, the b term will reveal where the line intercepts, or crosses, the y-axis. In this example, the line hits the vertical axis at 9. The m term in the equation for the line is the slope. Remember that slope is defined as rise over run; the slope of a line from one point to another is the change in the vertical axis divided by the change in the horizontal axis. In this example, each time the x term increases by 1 (the run), the y term rises by 3. Thus, the slope of this line is 3. Specifying a y-intercept and a slope—that is, specifying b and m in the equation for a line—will identify a specific line. Although it is rare for real-world data points to arrange themselves as a perfectly straight line, it often turns out that a straight line can offer a reasonable approximation of actual data.

20. Reading: Interpreting Slope

What the Slope Means

The concept of slope is very useful in economics, because it measures the relationship between two variables. A **positive slope** means that two variables are positively related–that is, when x increases, so does y, and when x decreases, y decreases also. Graphically, a positive slope means that as a line on the line graph moves from left to right, the line rises. We will learn in other sections that "price" and "quantity supplied" have a positive relationship; that is, firms will supply more when the price is higher.

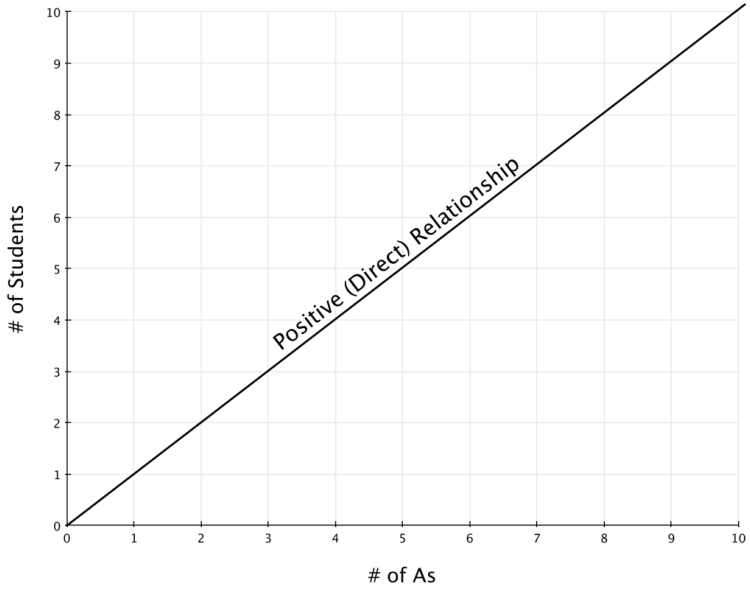


Figure 1. Positive Slope

A **negative slope** means that two variables are negatively related; that is, when x increases, y decreases, and when x decreases, y increases. Graphically, a negative slope means that as the line on the line graph moves from left to right, the line falls. We will learn that "price" and "quantity demanded" have a negative relationship; that is, consumers will purchase less when the price is higher.

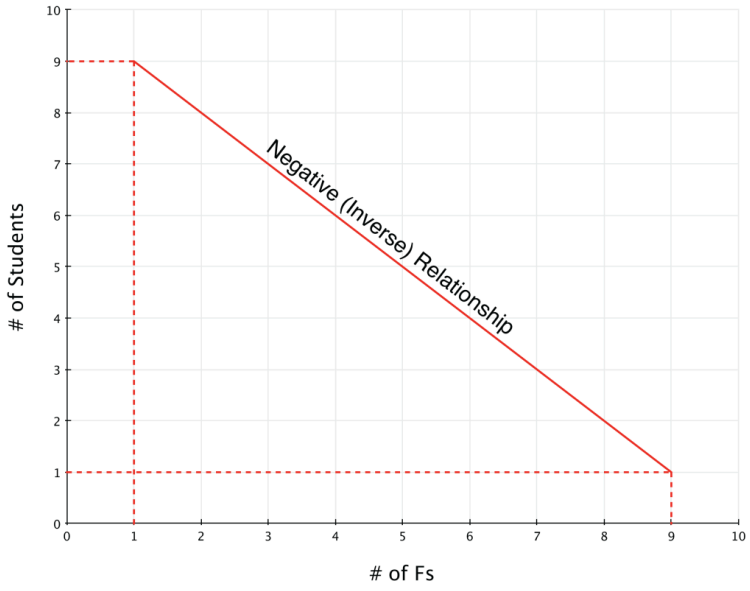


Figure 2. Negative slope

A **slope of zero** means that there is a constant relationship between x and y. Graphically, the line is flat; the rise over run is zero.

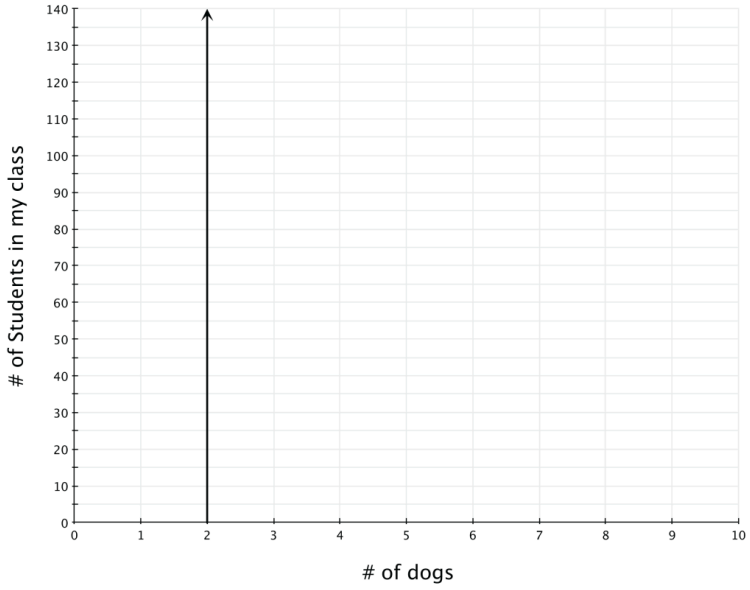


Figure 3. Slope of Zero

The unemployment-rate graph in Figure 4, below, illustrates a common pattern of many line graphs: some segments where the slope is positive, other segments where the slope is negative, and still other segments where the slope is close to zero.

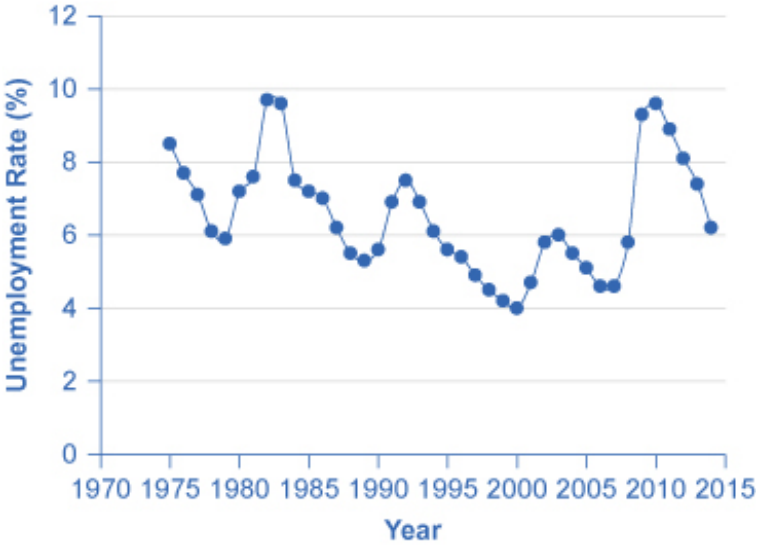


Figure 4. U.S. Unemployment Rate, 1975–2014

Calculating Slope

The slope of a straight line between two points can be calculated in numerical terms. To calculate slope, begin by designating one point as the "starting point" and the other point as the "end point" and then calculating the rise over run between these two points.

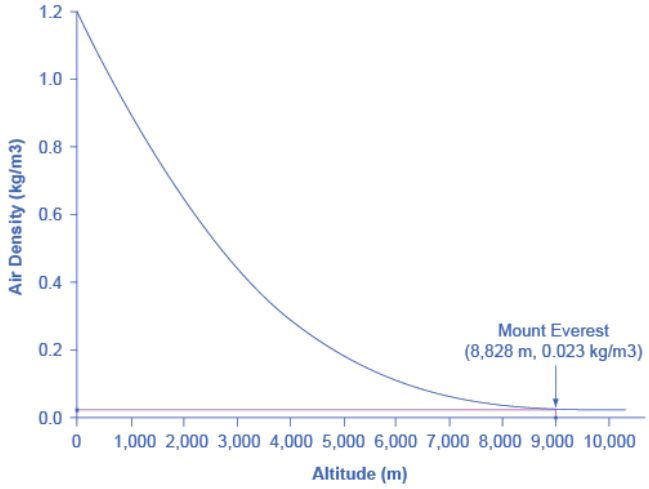


Figure 5. Altitude–Air Density Relationship

As an example, consider the slope of the air-density graph, above, between the points representing an altitude of 4,000 meters and an altitude of 6,000 meters:

Rise: Change in variable on vertical axis (end point minus original point)

“>0.100 – 0.307 = –0.207

Run: Change in variable on horizontal axis (end point minus original point)

“>6,000 – 4,000= 2,000

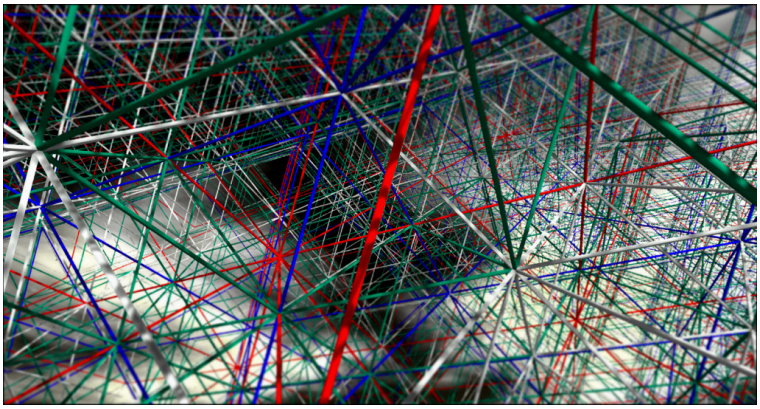
Thus, the slope of a straight line between these two points would be the following: from the altitude of 4,000 meters up to 6,000 meters, the density of the air decreases by approximately 0.1 kilograms/cubic meter for each of the next 1,000 meters.

Suppose the slope of a line were to increase. Graphically, that means it would get steeper. Suppose the slope of a line were to decrease. Then it would get flatter. These conditions are true

whether or not the slope was positive or negative to begin with. A higher positive slope means a steeper upward tilt to the line, while a smaller positive slope means a flatter upward tilt to the line. A negative slope that is larger in absolute value (that is, more negative) means a steeper downward tilt to the line. A slope of zero is a horizontal flat line. A vertical line has an infinite slope.

Suppose a line has a larger intercept. Graphically, that means it would shift out (or up) from the old origin, parallel to the old line. If a line has a smaller intercept, it would shift in (or down), parallel to the old line.

21. Reading: Types of Graphs



Three types of graphs are used in this course: line graphs, pie graphs, and bar graphs. Each is discussed below.

Line Graphs

The graphs we've discussed so far are called line graphs, because they show a relationship between two variables: one measured on the horizontal axis and the other measured on the vertical axis.

Sometimes it's useful to show more than one set of data on the same axes. The data in the table, below, is displayed in Figure 1, which shows the relationship between two variables: length and median weight for American baby boys and girls during the first three years of life. (The median means that half of all babies weigh more than this and half weigh less.) The line graph measures length in inches on the horizontal axis and weight in pounds on the vertical axis. For example, point A on the figure shows that a boy who is 28 inches long will have a median weight of about 19 pounds. One line on the graph shows the length-weight relationship for boys, and the other line shows the relationship for girls. This kind of graph

is widely used by health-care providers to check whether a child's physical development is roughly on track.

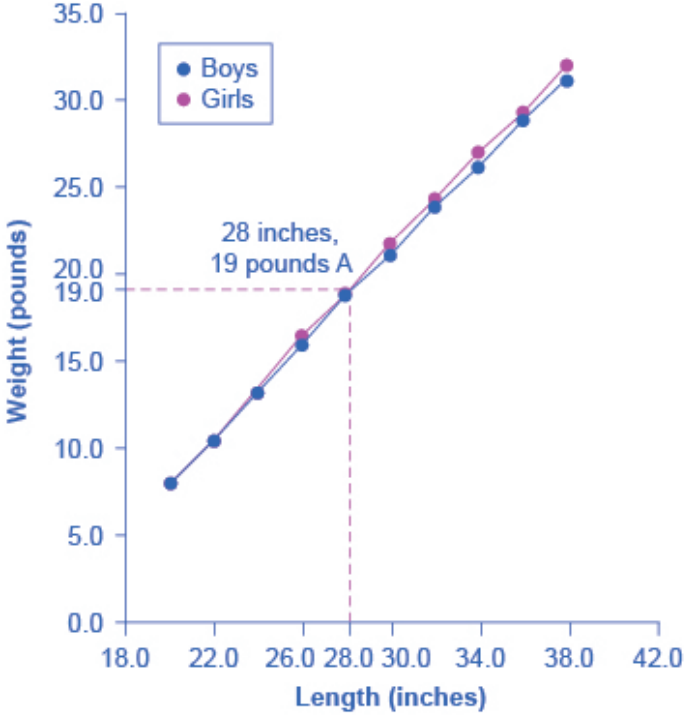


Figure 1. The Length-Weight Relationship for American Boys and Girls

Length-to-Weight Relationship for American Boys and Girls

Boys from Birth to 36 Months		**Girls from Birth to 36 Months**	
Length (inches)	Weight (pounds)	Length (inches)	Weight (pounds)
20.0	8.0	20.0	7.9
22.0	10.5	22.0	10.5
24.0	13.5	24.0	13.2
26.0	16.4	26.0	16.0
28.0	19.0	28.0	18.8
30.0	21.8	30.0	21.2
32.0	24.3	32.0	24.0
34.0	27.0	34.0	26.2
36.0	29.3	36.0	28.9
38.0	32.0	38.0	31.3

Not all relationships in economics are linear. Sometimes they are curves. Figure 2, below, presents another example of a line graph, representing the data from the table underneath. In this case, the line graph shows how thin the air becomes when you climb a mountain. The horizontal axis of the figure shows altitude, measured in meters above sea level. The vertical axis measures the density of the air at each altitude. Air density is measured by the weight of the air in a cubic meter of space (that is, a box measuring one meter in height, width, and depth). As the graph shows, air pressure is heaviest at ground level and becomes lighter as you climb. Figure 1 shows that a cubic meter of air at an altitude of 500 meters weighs approximately one kilogram (about 2.2 pounds). However, as the altitude increases, air density decreases. A cubic meter of air at the top of Mount Everest, at about 8,828 meters, would weigh only 0.023 kilograms. The thin air at high altitudes explains why many mountain climbers need to use oxygen tanks as they reach the top of a mountain.

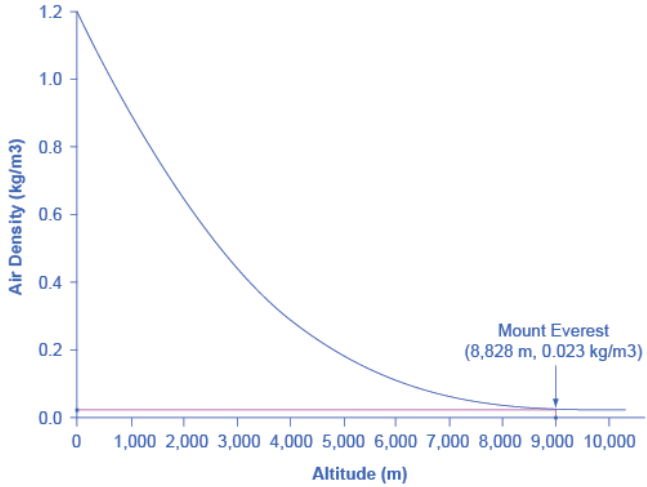


Figure 2. Altitude–Air-Density Relationship

Altitude–to–Air-Density Relationship

Altitude (meters)	Air Density (kg/cubic meters)
0	1.200
500	1.093
1,000	0.831
1,500	0.678
2,000	0.569
2,500	0.484
3,000	0.415
3,500	0.357
4,000	0.307
4,500	0.231
5,000	0.182
5,500	0.142
6,000	0.100
6,500	0.085
7,000	0.066
7,500	0.051
8,000	0.041
8,500	0.025
9,000	0.022
9,500	0.019
10,000	0.014

The length-weight relationship and the altitude–air-density relationship in these two figures represent averages. If you were to collect actual data on air pressure at different altitudes, the same altitude in different geographic locations would have slightly different air density, depending on factors like how far you were from the equator, local weather conditions, and the humidity in the air. Similarly, in measuring the height and weight of children for the previous line graph, children of a particular height would

have a range of different weights, some above average and some below. In the real world, this sort of variation in data is common. The task of a researcher is to organize that data in a way that helps to understand typical patterns. The study of statistics, especially when combined with computer statistics and spreadsheet programs, is a great help in organizing this kind of data, plotting line graphs, and looking for typical underlying relationships. For most economics and social science majors, a statistics course will be required at some point.

One common line graph is called a time series, in which the horizontal axis shows time and the vertical axis displays another variable. Thus, a time-series graph shows how a variable changes over time. Figure 3 shows the unemployment rate in the United States since 1975, where unemployment is defined as the percentage of adults who want jobs and are looking for a job, but cannot find one. The points for the unemployment rate in each year are plotted on the graph, and a line then connects the points, showing how the unemployment rate has moved up and down since 1975. With a graph like this, it is easy to spot the times of high unemployment and of low unemployment.

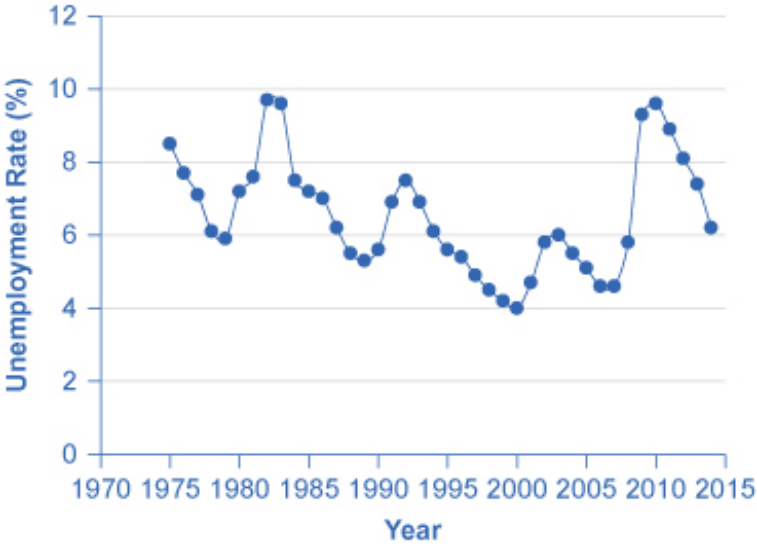


Figure 3. U.S. Unemployment Rate, 1975–2014

Pie Graphs

A pie graph (sometimes called a pie chart) is used to show how an overall total is divided into parts. A circle represents a group as a whole. The slices of this circular "pie" show the relative sizes of subgroups.

Figure 4 shows how the U.S. population was divided among children, working-age adults, and the elderly in 1970, 2000, and what is projected for 2030. The information is first conveyed with numbers in the table, below, and then in three pie charts.

U.S. Age Distribution, 1970, 2000, and 2030 (projected)

Year	Total Population	19 and Under	20–64 years	Over 65
1970	205.0 million	77.2 (37.6%)	107.7 (52.5%)	20.1 (9.8%)
2000	275.4 million	78.4 (28.5%)	162.2 (58.9%)	34.8 (12.6%)
2030	351.1 million	92.6 (26.4%)	188.2 (53.6%)	70.3 (20.0%)

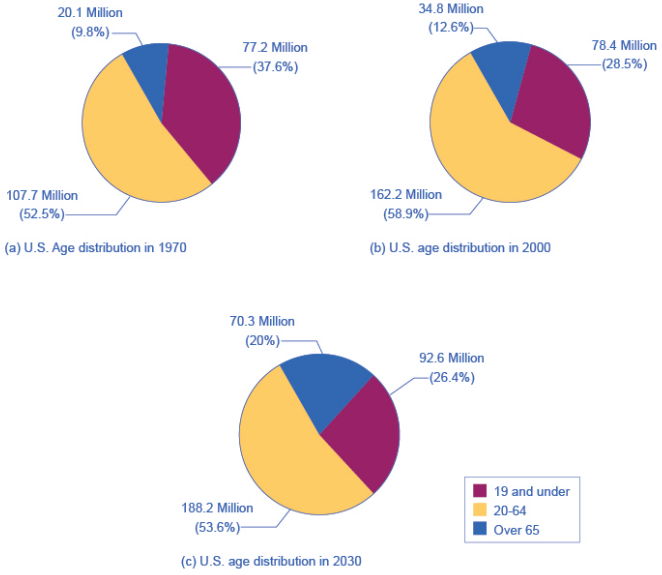


Figure 4. Pie Graphs of the U.S. Age Distribution (numbers in millions)

In a pie graph, each slice of the pie represents a share of the total, or a percentage. For example, 50% would be half of the pie and 20% would be one-fifth of the pie. The three pie graphs in Figure 4 show that the share of the U.S. population 65 and over is growing. The pie graphs allow you to get a feel for the relative size of the different age groups from 1970 to 2000 to 2030, without requiring you to slog through the specific numbers and percentages in the table. Some common examples of how pie graphs are used include dividing the population into groups by age, income level, ethnicity, religion, occupation; dividing different firms into categories by size, industry, number of employees; and dividing up government spending or taxes into its main categories.

Bar Graphs

A bar graph uses the height of different bars to compare quantities. The table, below, lists the 12 most populous countries

in the world. Figure 5 provides this same data in a bar graph. The height of the bars corresponds to the population of each country. Although you may know that China and India are the most populous countries in the world, seeing how the bars on the graph tower over the other countries helps illustrate the magnitude of the difference between the sizes of national populations.

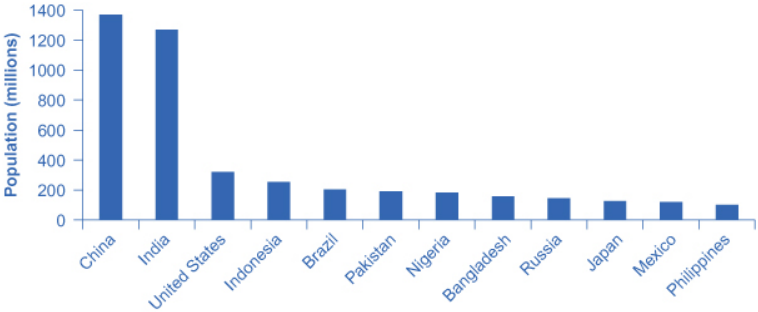


Figure 5. Leading Countries of the World by Population, 2015 (in millions)

Leading 12 Countries of the World by Population

Country	Population
China	1,369
India	1,270
United States	321
Indonesia	255
Brazil	204
Pakistan	190
Nigeria	184
Bangladesh	158
Russia	146
Japan	127
Mexico	121
Philippines	101

Bar graphs can be subdivided in a way that reveals information similar to that we can get from pie charts. Figure 6 offers three bar graphs based on the information from Figure 4 about the U.S. age distribution in 1970, 2000, and 2030. Figure 6 (a) shows three bars for each year, representing the total number of persons in each age bracket for each year. Figure 6 (b) shows just one bar for each year, but the different age groups are now shaded inside the bar. In Figure 6 (c), still based on the same data, the vertical axis measures percentages rather than the number of persons. In this case, all three bar graphs are the same height, representing 100 percent of the population, with each bar divided according to the percentage of population in each age group. It is sometimes easier for a reader to run his or her eyes across several bar graphs, comparing the shaded areas, rather than trying to compare several pie graphs.

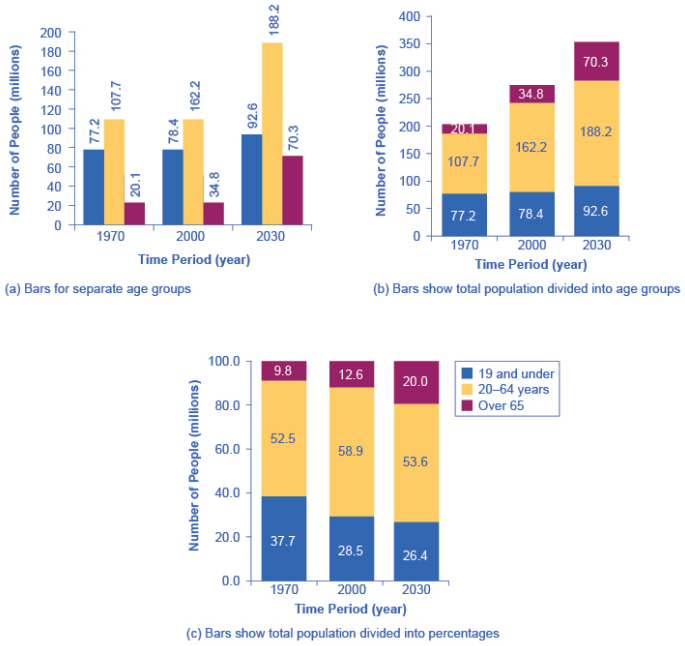


Figure 6. U.S. Population with Bar Graphs

Figure 5 and Figure 6 show how the bars can represent countries or years, and how the vertical axis can represent a numerical or a percentage value. Bar graphs can also compare size, quantity, rates, distances, and other quantitative categories.

Comparing Line Graphs, Pie Charts, and Bar Graphs

Now that you are familiar with pie graphs, bar graphs, and line graphs, how do you know which graph to use for your data? Pie graphs are often better than line graphs at showing how an overall group is divided. However, if a pie graph has too many slices, it can become difficult to interpret.

Bar graphs are especially useful when comparing quantities. For example, if you are studying the populations of different countries, as in Figure 5, bar graphs can show the relationships between the population sizes of multiple countries. Not only can it show these relationships, but it can also show breakdowns of different groups within the population.

A line graph is often the most effective format for illustrating a relationship between two variables that are both changing. For example, time-series graphs can show patterns as time changes, like the unemployment rate over time. Line graphs are widely used in economics to present continuous data about prices, wages, quantities bought and sold, the size of the economy.

Self Check: Graphs in Economics

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does

not count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the three Readings in this section.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

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22. Problem Set: Math in Economics

Test your understanding of the learning outcomes in this module by working through the following problems. These problems aren't graded, but they give you a chance to practice before taking the quiz.

If you'd like to try a problem again, you can click the link that reads, "Try another version of this question."

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23. Problem Set: Graphs in Economics

Test your understanding of the learning outcomes in this module by working through the following problems. These problems aren't graded, but they give you a chance to practice before taking the quiz.

If you'd like to try a problem again, you can click the link that reads, "Try another version of these questions."

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24. Putting It Together: Economic Thinking

Summary

The goal of this module was to introduce you to the basic questions and tools of economics. You learned how to:

- Explain what economics is and why it is important
- Explain how economists use economic models
- Use mathematics in common economic applications
- Use graphs in common economic applications

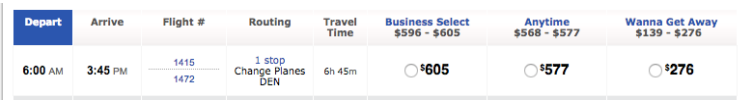
The Cost of Waiting in Line

Given your new understanding of economic concepts, let's revisit the example at the beginning of this module: the experience of taking a flight and feeling like others have special privileges that you don't have.

In our example, you waited in line at the security checkpoint for much longer than those who went through the express line. Let's assume that you waited in line for one hour and 10 minutes, while those with express access were able to get through security in just 10 minutes. What is the cost of one hour of your time? What is the cost of a ticket that gets you into the the express lane? Did you make the right choice?

Let's return to the concept of opportunity cost. Remember, opportunity cost indicates what must be given up to obtain something that's desired.

You chose to wait in line rather than buying a ticket that would allow you to use the express lane. It may not have seemed like a choice, but you did choose to buy a less expensive ticket—instead of paying more for one would have gotten you into the express line. How much more money would you have to pay for that ticket?



Depart	Arrive	Flight #	Routing	Travel Time	Business Select $596 - $605	Anytime $568 - $577	Wanna Get Away $139 - $276
6:00 AM	3:45 PM	1415 1472	1 stop Change Planes DEN	6h 45m	$605	$577	$276

On a flight from Los Angeles to Baltimore, the Business Select fare is $605. This is the fare that permits access to the express security lane. The lowest fare is $276. The difference is:

$$\$605 - \$276 = \$329$$

In other words, you chose to wait in line for one hour in order to save the $329 that you would have had to spend for a Business Select ticket. When we think of this in terms of opportunity cost, you now have some way to measure your decision: you have a firm number that can be compared against the cost of an alternative.

The Full Cost of Your Time

Let's consider monetary costs alone. If you had worked at a job for one more hour—instead of waiting in the security line—you could have earned an additional $20. That choice would have meant earning more money, but you would have had to spend far more for a Business Select ticket than you made in an hour. Since the $329 cost of that ticket is so much greater than the $20 you might have earned, the decision to wait in line for an hour (as opposed to working one hour more) makes good sense when comparing the monetary cost.

But remember, *opportunity cost is the value of the next best alternative*, and there are likely ways that you spend your time that you value more than money. Perhaps getting through security more quickly will enable you to sit down in a quiet café, enjoy a cup

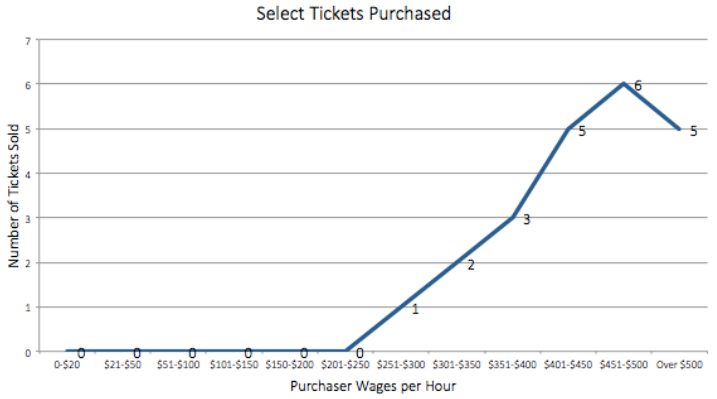
of tea, and avoid the stress you feel when you are rushed. There is a real value that you have given up.

Or, what if you are struggling to stay caught up on your schoolwork and an hour of study makes the difference between getting a good grade on an important test or not? If it's a test that has a big impact on your grade or academic record, then an hour might be incredibly valuable.

In other words, for any individual, the opportunity cost may simply be the lost money from work, or it may be peace of mind, or it may be an hour of study time—or something altogether different. Whichever one of the alternatives has the greatest value to you is your opportunity cost for one hour in line.

Does It Ever Make Sense to Buy Time?

Obviously an hour of time has a different opportunity cost for every individual. Let's take a minute to look at a graph of hourly wages and see if it helps us think about the opportunity cost.



On any flight, passengers with a higher hourly wage are more likely to purchase a Select ticket that permits them to bypass security lines and board early. For some groups of passengers, the

time is more valuable than the money. Still, you will note that some passengers are willing to spend more than their hourly wage to avoid waiting in line.

The definition of opportunity cost is quite specific: it's the value of the next best alternative. However, every individual values time, money, convenience, peace of mind, and other factors differently.

25. Glossary: Economic Thinking

circular flow diagram a diagram indicating that the economy consists of households and firms interacting in a goods-and-services market and a labor market

direct relationship a relationship between two variables such that both either increase or decrease together; *also called a "positive relationship"*

division of labor the way in which the work required to produce a good or service is divided into tasks performed by different workers

economic model is a simplified version of reality that allows us to observe, understand, and make predictions about economic behavior

economics is the study of how humans make choices under conditions of scarcity in an attempt to satisfy their unlimited wants

economies of scale when the average cost of producing each individual unit declines as total output increases

function a relationship or expression involving one or more variables

goods-and-services market a market in which firms are sellers of what they produce, and households are buyers

independent relationship a relationship between two independent variables such that when one changes, the other does not change, and vice versa; *also called a "constant relationship"*

intercept the point on a graph where a line crosses the vertical axis or horizontal axis

interception point the point on a graph where two lines cross

inverse relationship a relationship between two variables such that

when one increases, the other decreases, or vice versa; *also called "negative relationship"*

labor market the market in which households sell their labor as workers to businesses or other employers

macroeconomics the branch of economics that focuses on broad issues such as growth, unemployment, inflation, and trade balance

microeconomics the branch of economics that focuses on actions of particular agents within the economy, like households, workers, and businesses

monetary policy policy that involves altering the level of interest rates, the availability of credit in the economy, and the extent of borrowing

negative slope indicates that two variables are negatively related; when one variable increases, the other decreases, and when one variable decreases, the other increases

opportunity cost is the value of the next best alternative

positive slope indicates that two variables are positively related; when one variable increases, so does the other, and when one variable decreases, the other also decreases

productive resources the inputs used in the production of goods and services to make a profit: land, economic capital, labor, and entrepreneurship; *also called "factors of production"*

scarcity exists when human wants for goods and services exceed the available supply

slope the change in the vertical axis divided by the change in the horizontal axis

slope of zero indicates that there is a constant relationship between two variables: when one variable changes, the other does not change

specialization when workers or firms focus on particular tasks for which they are well suited within the overall production process

variable a quantity that can assume a range of values

x-axis the horizontal line on a graph

y-axis the vertical line on a graph

26. Why It Matters: Choice in a World of Scarcity

Why use economic thinking to explain choice in a world of scarcity?

As you now know, the study of economics is about choices that are made by individuals and entities, given the fact that we can never have enough. You might not argue that you don't have enough time or money, for instance, but why might you want to think about that in economic terms? Let's look at one situation in which the choices you make today—with limited time and money—have an impact on the choices available to you in the future.

It's generally true that the higher educational degree a person has,

the higher the salary he or she will earn. So why aren't more people pursuing higher degrees? The short answer: choices and trade-offs.

In 2012, the annual salary for a full-time U.S. worker over age twenty-five with a master's degree was $67,600. Compare that to annual earnings for a full-time worker over twenty-five with no higher than a bachelor's degree: $55,432 a year. What about those with no higher than a high school diploma? They earn just $33,904 in a year. In other words, says the Bureau of Labor Statistics (BLS), earning a bachelor's degree boosted salaries 63 percent above what you would have earned if you had stopped your education after high school. A master's degree yields a salary almost double that of a high school diploma.

What are your educational goals? Do you plan to complete a bachelor's degree? A master's degree? Given the salary data, shouldn't everyone pursue a master's degree? When you made your own educational plans and goals, perhaps you were motivated by the potential for financial returns later on—i.e., the expectation that a higher degree would lead to a higher-paid job or career. But what other factors did you consider? Perhaps you also thought about the time and cost of education and the other things you like to do when you aren't studying. Other people, it turns out, also think about these things when deciding whether or not to pursue college.

Considering salary data alone, you might expect a lot of people to choose to attend college and at least earn a bachelor's degree. In fact, in 2012, the BLS reported that while nearly 88 percent of the U.S. population had a high school diploma, only 31 percent had a bachelor's degree, and only 8 percent had earned a master's degree.

For the majority of Americans, the time, money, and effort required to earn a degree is too great, in spite of the resulting salary benefits. In recognition of these barriers, state and federal governments have created programs such as the Pell Grant program to help students pay the financial costs of going to college. However, these programs don't cover the opportunity costs that are often the most pressing concern for students. For example,

the opportunity cost of lost income that could be used to support a student's family might be a significant factor.

So, now that you're in college, how can you make the best decision about which level of education to pursue? Perhaps more important, how can you be realistic about your scarce resources and develop a plan that provides the greatest benefit to you?

In this module we will look more closely at the idea of choices and trade-offs, revisit the concept of opportunity cost, and learn how to calculate it. This will help you assign dollar amounts to your choices and understand why your decision to pursue a college degree—in spite of the opportunity costs—is one of the most important decisions you can make toward improving your financial future.

Learning Outcomes

- Explain the cost of choices and trade-offs
- Illustrate society's trade-offs by using a production possibilities frontier (or curve)
- Explain the assumption of economic rationality by individuals and firms
- Define marginal analysis
- Differentiate between positive and normative statements

27. Outcome: The Cost of Choices

What you'll learn to do: explain the cost of choices and trade-offs

In the previous module we introduced the concepts of scarcity, monetary cost, and opportunity cost. This section focuses on the actual calculation of those costs, which becomes important when you are trying to understand trade-offs in very concrete terms.

The specific things you'll learn in this section include the following:

- Explain how budget constraints impact choices
- Calculate the opportunity cost of an action

Learning Activities

The learning activities for this section include the following:

- Reading: Budget Constraints and Choices
- Reading: Calculating Opportunity Cost
- Self Check: The Cost of Choices

28. Reading: Budget Constraints and Choices

Budget Constraint Framework

For most of us, the idea of scarcity and trade-offs is something

we experience in a very real way when it comes to our own budget constraints. Most of us have a limited amount of money to spend on the things we need and want. Another kind of budget constraint is time. For instance, as a student, you only have twenty-four hours in the day to study, eat, sleep, and check Facebook. An hour spent studying economics is an hour that can't be used for sleep or play (or something else). As a result, you have to make choices and trade-offs.

In economics, a **budget constraint** refers to all possible combinations of goods that someone can afford, given the prices of goods, when all income (or time) is spent.

Take the following example of someone who must choose between two different goods: Charlie has $10 in spending money each week that he can allocate between bus tickets for getting to work and the burgers he eats for lunch. Burgers cost $2 each, and bus tickets are 50 cents each. Figure 1, below, shows Charlie's budget constraint ($10) and all the possible combinations of burgers and bus tickets he can afford if he spends all his money.

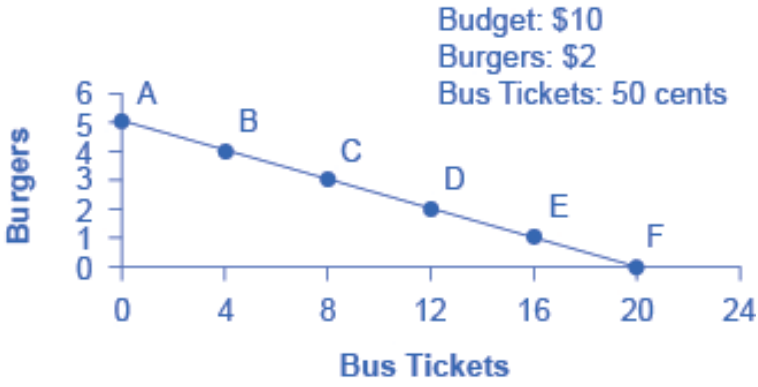


Figure 1. *Charlie's budget constraint*

The vertical axis in the figure shows burger purchases, and the horizontal axis shows bus ticket purchases. If Charlie spends all his

money on burgers, he can afford five per week. ($10 per week/$2 per burger = 5 burgers per week.) But if he does this, he won't be able to afford any bus tickets. This choice (zero bus tickets and 5 burgers) is shown by point A in the figure. Alternatively, if Charlie spends all his money on bus tickets, he can afford 20 per week. ($10 per week/$0.50 per bus ticket = 20 bus tickets per week.) Then, however, he will not be able to afford any burgers. This alternative choice (20 bus tickets and zero burgers) is shown by point F. The slope of the budget constraint is determined by the relative price of burgers and bus tickets.

If Charlie is like most people, he will choose some combination that includes both bus tickets and burgers—that is, he will choose one of the points along the budget-constraint line that connects points A and F. Each point inside or on the budget constraint shows a combination of burgers and bus tickets that Charlie can afford. (A point inside the curve is definitely an option—it just means that Charlie isn't spending all his money.) Keep in mind that the curve represents the *maximum* number of burgers and bus tickets he can buy. Any point outside the constraint is not affordable, because it would cost more money than Charlie has in his budget.

The budget constraint clearly shows the trade-off Charlie faces in choosing between burgers and bus tickets. Suppose he is currently at point D, where he can afford 12 bus tickets and 2 burgers. What would it cost Charlie for one more burger? It would be natural to answer $2, but that's not the way economists think. Instead, they ask: How many bus tickets would Charlie have to give up to get one more burger, while staying within his budget? The answer is four bus tickets. That is the true cost to Charlie of one more burger.

A budget-constraint diagram like the one above, with just two goods—burgers and bus tickets—is simple and not very realistic. After all, in an economy like ours (and Charlie's), people choose from thousands of goods. However, economists use graphs and models to illustrate that every choice has an **opportunity cost**, which is the point that carries over to the real world.

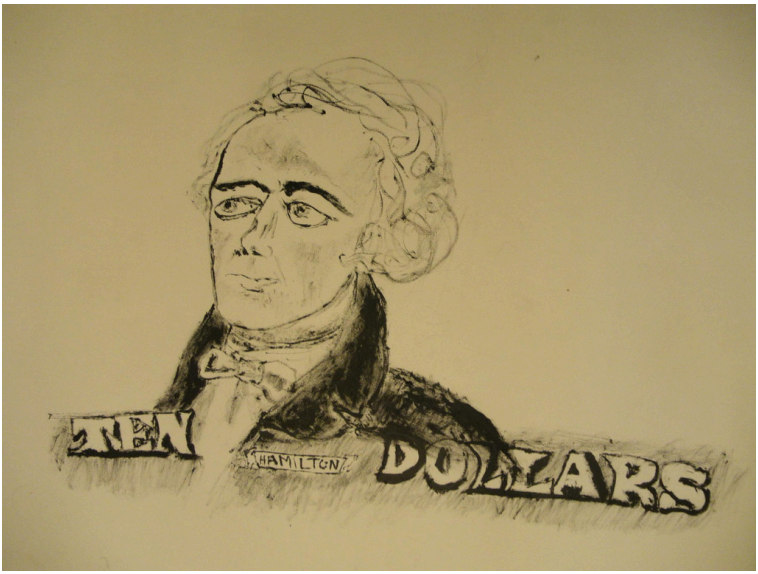
Sunk Costs

In the budget constraint framework, all decisions involve what will happen next: What quantities of goods will you consume? How many hours will you work? How much will you save? Choices made or costs in the past are not taken into account. The budget constraint framework assumes that **sunk costs**—costs incurred in the past that can't be recovered—should not affect the current decision.

Suppose you pay $8 to see a movie, but after watching the first thirty minutes, you decide that it's awful. Should you stick it out and watch the rest because you paid for the ticket, or should you leave? The money you spent on the ticket is a sunk cost, and unless the theater manager is feeling generous, you won't get a refund. But staying for the rest of the movie means paying an opportunity cost in time. Your choice is whether to spend the next ninety minutes suffering through a rotten movie or do something—anything—else. The lesson of sunk costs is to forget about the money and time that is irretrievably gone and to focus, instead, on the costs and benefits of current and future options. A sunk cost is water under the bridge, so to speak.

For people and organizations alike, dealing with sunk costs can be frustrating and difficult. For one thing, it often means admitting an earlier error of judgment. Many companies find it hard to give up on a new product that's doing poorly because they've invested so much time and money in the product development and launch. But the lesson of sunk costs is to ignore them and make decisions based on what will happen in the future.

29. Reading: Calculating Opportunity Cost



It makes intuitive sense that Charlie can buy only a limited number of bus tickets and burgers with a limited budget. Also, the more burgers he buys, the fewer bus tickets he can buy. With a simple example like this, it isn't too hard to determine what he can do with his very small budget, but when budgets and constraints are more complex, it's important to know how to solve equations that demonstrate budget constraints and opportunity cost.

Very simply, when Charlie is spending his full budget on burgers and tickets, his budget is equal to the total amount that he spends on burgers plus the total amount that he spends on bus tickets. For example, if Charlie buys four bus tickets and four burgers with his $10 budget (point B on the graph below), the equation would be

[latex]\$10=\left(\$2\times4\right)+\left(\$.50\times4\right)[/latex]

You can see this on the graph of Charlie's budget constraint, Figure 1, below.

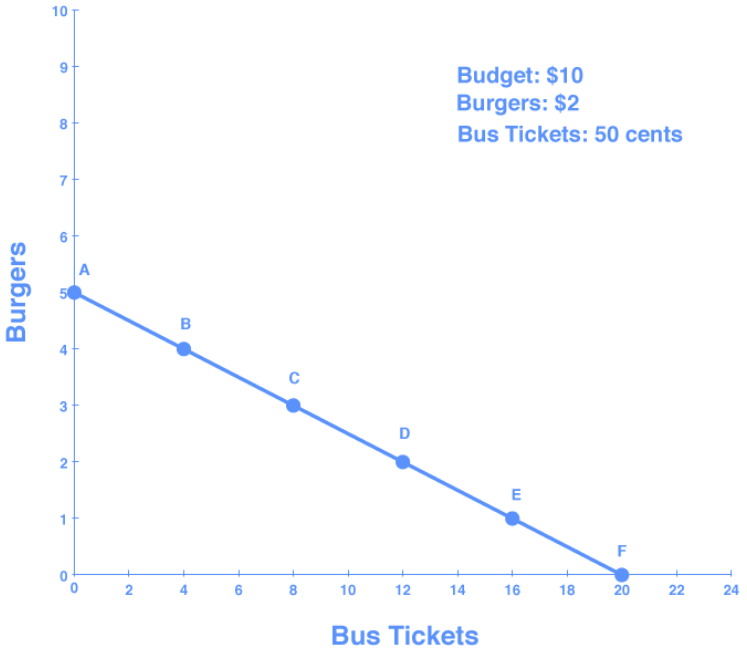


Figure 1. Charlie's Budget Constraint

If we want to answer the question "How many burgers and bus tickets can Charlie buy?" then we need to use the budget constraint equation.

Step 1. The equation for any budget constraint is the following:

[latex]\text{Budget }={P}_{1}\times{Q}_{1}+{P}_{2}\times{Q}_{2}+\dots+{P}_{n}\times{Q}_{n}[/latex]

where P and Q are the price and respective quantity of any number, n, of items purchased and Budget is the amount of income one has to spend.

Step 2. Apply the budget constraint equation to the scenario.

In Charlie's case, this works out to be

[latex]\begin{array}{l}\text{Budget}={P}_{1}\times{Q}_{1}+{P}_{2}\times{Q}_{2}\\\text{Budget}=\$10\\\,\,\,\,\,\,\,\,\,\,\,\,\,\,{P}_{1}=\$2\left(\text{the price of a burger}\right)\\\,\,\,\,\,\,\,\,\,\,\,\,\,\,{Q}_{1}=\text{quantity of burgers}\left(\text{variable}\right)\\\,\,\,\,\,\,\,\,\,\,\,\,\,\,{P}_{2}=\$0.50\left(\text{the price of a bus ticket}\right)\\\,\,\,\,\,\,\,\,\,\,\,\,\,\,{Q}_{2}=\text{quantity of tickets}\left(\text{variable}\right)\end{array}[/latex]

For Charlie, this is

[latex]{\$10}={\$2}\times{Q}_{1}+{\$0.50}\times{Q}_{2}[/latex]

Step 3. Simplify the equation.

At this point we need to decide whether to solve for [latex]{Q}_{1}[/latex] or [latex]{Q}_{2}[/latex].

Remember, [latex]{Q}_{1} = \text{quantity of burgers}[/latex]. So, in this equation [latex]{Q}_{1}[/latex] represents the number of burgers Charlie can buy depending on how many bus tickets he wants to purchase in a given week. [latex]{Q}_{2}=\text{quantity of tickets}[/latex]. So, [latex]{Q}_{2}[/latex] represents the number of bus tickets Charlie can buy depending on how many burgers he wants to purchase in a given week.

We are going solve for [latex]{Q}_{1}[/latex].

[latex]\begin{array}{l}\,10=2Q_{1}+0.50Q_{2}\\\,\,\,\,\,\,10-2Q_{1}=0.50Q_{2}\\\,\,\,\,\,\,\,\,\,\,\,\,\,\,\,\,\,\,\,

burgers Charlie can buy depending on how many bus tickets he wants to purchase in a given week.

For example, say he wants 8 bus tickets in a given week. [latex]{Q}_{2}[/latex] represents the number of bus tickets Charlie buys, so we plug in 8 for [latex]{Q}_{2}[/latex], which gives us

[latex]\begin{array}{l}{Q}_{1}={5}-\left(\frac{1}{4}\right)8\\{Q}_{1}={5}-2\\{Q}_{1}=3\end{array}[/latex]

This means Charlie can buy 3 burgers that week (point C on the graph, above).

Let's try one more. Say Charlie has a week when he walks everywhere he goes so that he can splurge on burgers. He buys 0 bus tickets that week. [latex]{Q}_{2}[/latex] represents the number of bus tickets Charlie buys, so we plug in 0 for [latex]{Q}_{2}[/latex], giving us

[latex]{Q}_{1}={5}-\left(\frac{1}{4}\right)0\\{Q}_{1}={5}[/latex]

So, if Charlie doesn't ride the bus, he can buy 5 burgers that week (point A on the graph).

If you plug other numbers of bus tickets into the equation, you get the results shown in Table 1, below, which are the points on Charlie's budget constraint.

Table 1.

Point	Quantity of Burgers (at $2)	Quantity of Bus Tickets (at 50 cents)
A	5	0
B	4	4
C	3	8
D	2	12
E	1	16
F	0	20

Step 4. Graph the results.

If we plot each point on a graph, we can see a line that shows us the number of burgers Charlie can buy depending on how many bus tickets he wants to purchase in a given week.

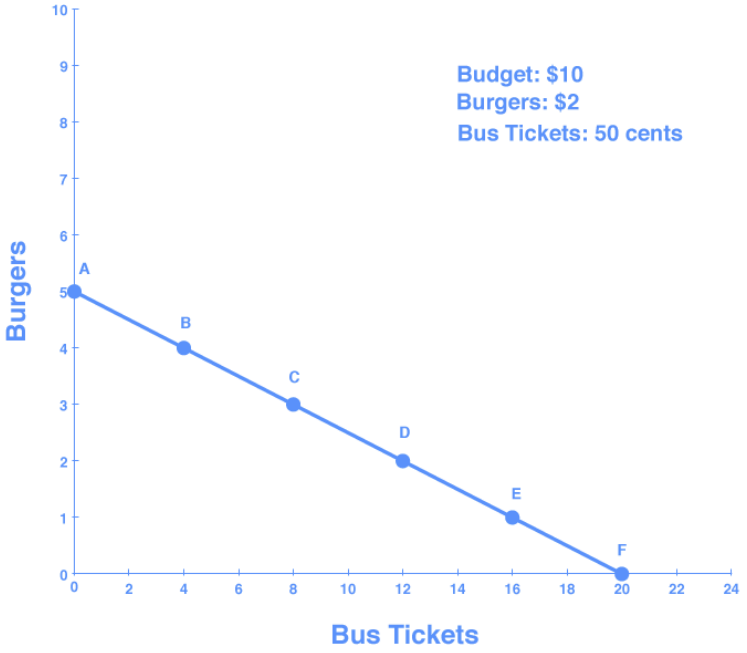


Figure 2. Charlie's Budget Constraint

We can make two important observations about this graph. First, the slope of the line is negative (the line slopes downward). Remember in the last module when we discussed graphing, we noted that when when X and Y have a negative, or inverse, relationship, X and Y move in opposite directions—that is, as one rises, the other falls. This means that the only way to get more of one good is to give up some of the other.

Second, the slope is defined as the change in the number of burgers (shown on the vertical axis) Charlie can buy for every incremental change in the number of tickets (shown on the

horizontal axis) he buys. If he buys one less burger, he can buy four more bus tickets. The slope of a budget constraint always shows the opportunity cost of the good that is on the horizontal axis. If Charlie has to give up lots of burgers to buy just one bus ticket, then the slope will be steeper, because the opportunity cost is greater.

Let's look at this in action and see it on a graph. What if we change the price of the burger to $1? We will keep the price of bus tickets at 50 cents. Now, instead of buying 4 more tickets for every burger he gives up, Charlie can only buy 2 tickets for every burger he gives up. Figure 3, below, shows Charlie's new budget constraint (and the change in slope).

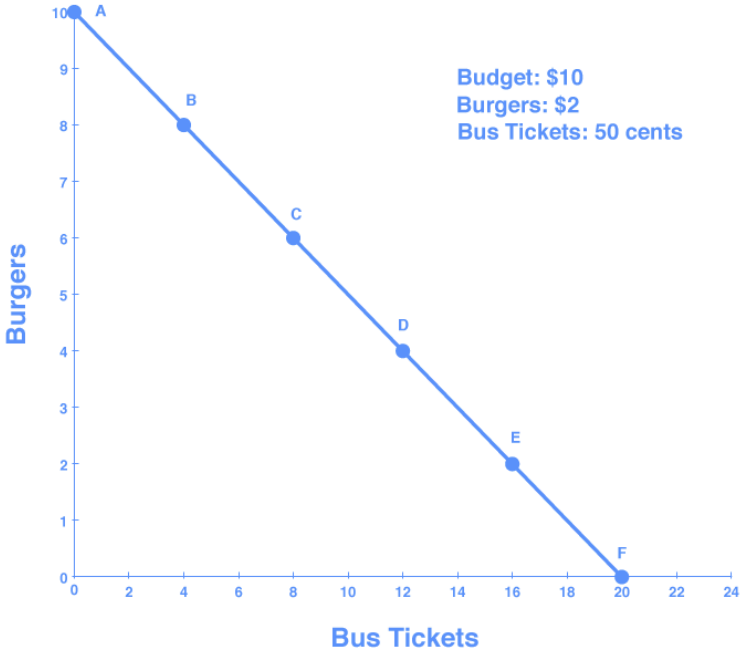


Figure 3. Charlie's New Budget Constraint

Self Check: The Cost of Choices

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

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30. Outcome: The Production Possibilities Frontier

What you'll learn to do: illustrate society's trade-offs by using a production possibilities frontier (or curve)

Now that we understand positive and normative statements, let's return to how individuals and societies make choices. Here we're going to focus on production and the tradeoffs involved in producing one thing versus another.

First we'll consider the example of a student, whose limited time means that doing one thing necessitates doing less of another thing. You'll learn how to show these choices and consequences graphically. A single individual making choices between two different production options is the simplest scenario, so it's important to understand this case before moving on to more complex ones.

Next, we'll explore the idea of production options on a much bigger scale—on the level of what an entire society can produce—and use what's known as the **production possibilities curve** (also called the **production possibilities frontier**) to see the different choices.

The production possibilities curve is a diagram that shows the possible combinations of two products or services that could potentially be produced within a society. For example, a country could choose to spend all of its income on defense or on education. The curve represents points where the country could maximize the use of its resources by choosing to produce a combination of defense and education, devoting all its resources to just defense, or devoting them just to education. In this section you'll gain some

first-hand experience with economic models and graphing tools, too.

The specific things you'll learn in this section include the following:

- Explain the production possibilities frontier
- Identify the impact of society's production choices

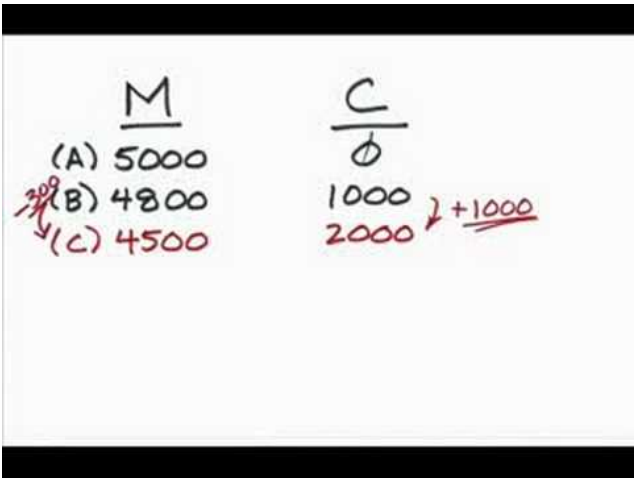
Learning Activities

The learning activities for this section include the following:

- Video: Society's Production Possibilities Curve
- Reading: The Production Possibilities Frontier
- Reading: Productive Efficiency and Allocative Efficiency
- Self Check: the Production Possibilities Frontier

31. Video: Society's Production Possibilities Curve

Now that you understand the choices made by a single individual, we'll take a look at the production possibilities for a society.



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To help you practice graphing, the data table used in the video is shown below.

	Military	Civilian
A)	5,000	0
B)	4,800	1,000
C)	4,500	2,000
D)	4,000	3,000
E)	3,300	4,000
F)	2,000	5,000
G)	0	6,000

32. Reading: The Production Possibilities Frontier

Overview

Let's review the production possibilities frontier and focus more specifically on the shape of the curve.

As a reminder, the **production possibilities frontier (PPF)** is an economic model that shows the possible combinations of two products or services that could potentially be produced by a society. Remember, an economic model is a simplified version of reality that allows us to observe, understand, and make predictions about economic behavior. With the PPF model, we're focused on a society's production choices and trade-offs.

Because society has limited resources (e.g., labor, land, capital, and raw materials) at any given moment, there's a limit to the quantities of goods and services it can produce. Suppose a society desires two products: health care and education. This situation is illustrated by the production possibilities frontier in Figure 1.

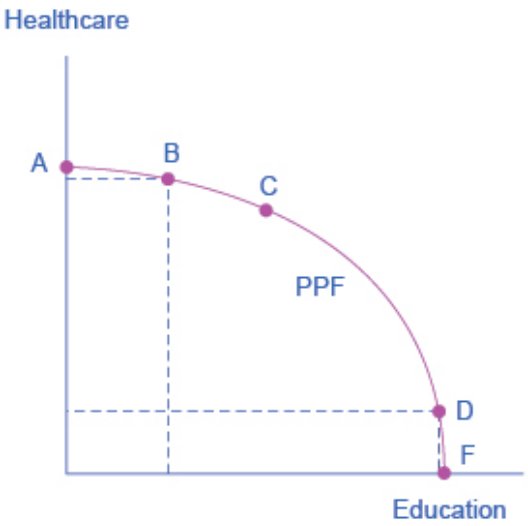


Figure 1. *Health Care vs. Education Production Possibilities Frontier.*

Figure 1 shows a trade-off between devoting resources to health care and to education. Health care is shown on the vertical axis, and education is shown on the horizontal axis. If the society were to allocate all of its resources to health care, it could produce at point A. But it would not have any resources to produce education. If it were to allocate all of its resources to education, it could produce at point F. Alternatively, the society could choose to produce any combination of health care and education shown on the production possibilities frontier.

Suppose society has chosen to operate at point B, and it's considering producing more education. Because the PPF is downward sloping from left to right, the only way society can obtain more education is by giving up some health care. That's the trade-off that society faces. Suppose it considers moving from point B to point C. What would be the opportunity cost for the additional

education? The opportunity cost would be the health care that society has to give up.

Do you remember Charlie choosing combinations of burgers and bus tickets within his budget constraint? In effect, the production possibilities frontier plays the same role for society as the budget constraint plays for Charlie. Society can choose any combination of the two goods on or inside the PPF, but it doesn't have enough resources to produce outside the PPF. Just as with Charlie's budget constraint, the opportunity cost is shown by the *slope* of the production possibilities frontier.

Difference between Budget Constraint and PPF

There are differences between a budget constraint and a production possibilities frontier. A budget constraint model shows the purchase choices that an individual or society can make given a specific budget and specific purchase prices. The production possibilities frontier shows the possible combinations of two products or services that could potentially be produced by a society. Budgets and prices are more precise. If you think about it, a society's "possibilities of production" are vastly more complicated and have a great degree of variability. For this reason, a PPF is not as precise.

Consider the PPF graph above. There are no numbers on the axes of the PPF because we don't know the exact amount of resources this imaginary economy has, nor do we know how many resources it takes to produce health care and how many resources it takes to produce education. If this were a real-world example, some data would be available, but there's no single way to measure "amounts" of education and health care. That said, you could probably think of ways to measure *improvements* in education, such as more years of school completed, fewer high-school dropouts, and higher scores on standardized tests. Similarly, you could

probably measure improvements in health care according to things like longer life expectancy, lower levels of infant mortality, fewer outbreaks of disease, and so on. These types of measures in a PPF are useful, but do not have the same level of accuracy as a budget constraint model.

Whether or not we have actual numbers, conceptually we can measure the opportunity cost of additional education as society moves from point B to point C on the PPF. The additional education is measured by the horizontal distance between B and C. The foregone health care is given by the vertical distance between B and C. The slope of the PPF between B and C is (approximately) the vertical distance (the "rise") over the horizontal distance (the "run"). This is the opportunity cost of the additional education.

The Law of Diminishing Returns and the Curved Shape of the PPF

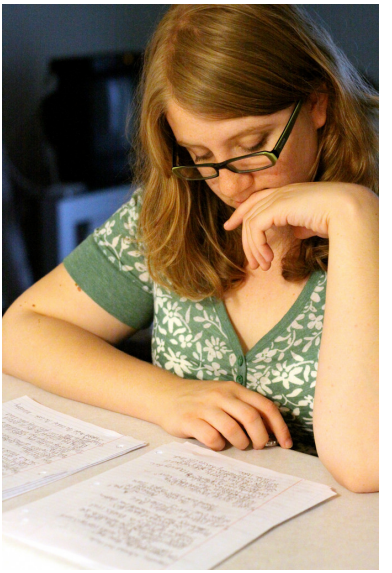
The budget constraints presented earlier in this module, showing individual choices about what quantities of goods to consume, were all straight lines. The reason for these straight lines was that the slope of the budget constraint was determined by the relative prices of the two goods in the *budget constraint*. However, the production possibilities frontier for health care and education was drawn as a curved line. Why does the PPF have a different shape?

To understand why the PPF is curved, start by considering point A at the top left-hand side of the PPF. At point A, all available resources are devoted to health care and none is left for education. This situation would be extreme and even ridiculous. For example, children are seeing a doctor every day, whether they're sick or not, but not attending school. People are having cosmetic surgery on every part of their bodies, but no high school or college education exists. Now imagine that some of these resources are diverted from health care to education, so that the economy is at point B instead of

point A. Diverting some resources away from A to B causes relatively little reduction in health because the last few marginal dollars going into health-care services are not producing much additional gain in health. However, putting those marginal dollars into education, which is completely without resources at point A, can produce relatively large gains. For this reason, the shape of the PPF from A to B is relatively flat, representing a relatively small drop-off in health and a relatively large gain in education.

Now consider the other end, at the lower right, of the production possibilities frontier. Imagine that society starts at choice D, which is devoting nearly all resources to education and very few to health care, and it moves to point F, which is devoting *all* spending to education and none to health care. For the sake of concreteness, you can imagine that in the movement from D to F, the last few doctors must become high school science teachers, the last few nurses must become school librarians rather than dispensers of vaccinations, and the last few emergency rooms are turned into kindergartens. The gains to education from adding these last few resources to education are very small. However, the opportunity cost lost to health will be fairly large, and thus the slope of the PPF between D and F is steep, showing a large drop in health for only a small gain in education.

The lesson is not that society is likely to make an extreme choice like devoting no resources to education at point A or no resources to health at point F. Instead, the lesson is that the gains from committing additional marginal resources to education depend on how much is already being spent. If, on the one hand, very few resources are currently committed to education, then an increase in resources used can bring relatively large gains. On the other hand, if a large number of resources is already committed to education, then committing additional resources will bring relatively smaller gains.



If you've ever pulled an all-nighter, you're probably familiar with the law of diminishing returns: as the night wears on and you get tired, every additional hour you study is a little less productive than the one before.

This pattern is so common that it has been given a name: the **law of diminishing returns.** This law asserts that as additional increments of resources are devoted to a certain purpose, the marginal benefit from those additional increments will decline. For example, after not spending much at all on crime reduction, when a government spends a certain amount more, the gains in crime reduction could be relatively large. But additional increases after that typically cause relatively smaller reductions in crime, and paying for enough police and security to reduce crime to zero would be tremendously expensive.

The curve of the production possibilities frontier shows that as additional resources are added to education, moving from left to right along the horizontal axis, the initial gains are fairly large, but those gains gradually diminish. Similarly, as additional resources are

added to health care, moving from bottom to top on the vertical axis, the initial gains are fairly large but again gradually diminish. In this way, the law of diminishing returns produces the outward-bending shape of the production possibilities frontier.

33. Reading: Productive Efficiency and Allocative Efficiency

Efficiency

The study of economics does not presume to tell a society what choice it should make along its production possibilities frontier. In a market-oriented economy with a democratic government, the choice will involve a mixture of decisions by individuals, firms, and government. However, economics can point out that some choices are unambiguously better than others. This observation is based on the idea of efficiency. In everyday parlance, *efficiency* refers to lack of waste. An inefficient washing machine operates at high cost, while an efficient washing machine operates at lower cost, because

it's not wasting water or energy. An inefficient organization operates with long delays and high costs, while an efficient organization is focused, meets deadlines, and performs within budget.

The production possibilities frontier can illustrate two kinds of efficiency: productive efficiency and allocative efficiency. Figure 1, below, illustrates these ideas using a production possibilities frontier between health care and education.

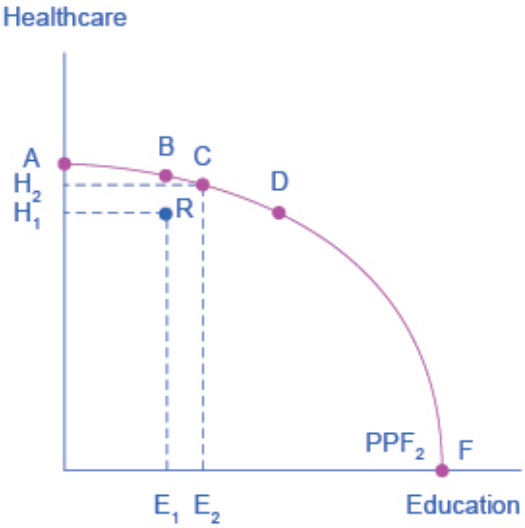


Figure 1. Productive and Allocative Efficiency.

Productive efficiency means that, given the available inputs and technology, it's impossible to produce more of one good without decreasing the quantity of another good that's produced. All choices along the PPF in Figure 1, such as points A, B, C, D, and F, display productive efficiency. As a firm moves from any one of these choices to any other, either health care increases and education decreases

or vice versa. However, any choice inside the production possibilities frontier is productively inefficient and wasteful because it's possible to produce more of one good, the other good, or some combination of both goods.

For example, point R is productively inefficient because it is possible at choice C to have more of both goods: education on the horizontal axis is higher at point C than point R (E_2 is greater than E_1), and health care on the vertical axis is also higher at point C than point R (H_2 is greater than H_1).

Any time a society is producing a combination of goods that falls *along* the PPF, it is achieving productive efficiency. When the combination of goods produced falls *inside* the PPF, then the society is productively inefficient.

Allocative efficiency means that the particular mix of goods a society produces represents the combination that society most desires. For example, often a society with a younger population has a preference for production of education, over production of health care. If the society is producing the quantity or level of education that the society demands, then the society is achieving allocative efficiency. Determining "what a society desires" can be a controversial question and is often discussed in political science, sociology, and philosophy classes, as well as in economics.

At the most basic level, allocative efficiency means that producers supply the quantity of each product that consumers demand. Only one of the productively efficient choices will be the allocative efficient choice for society as a whole. For example, in order to achieve allocative efficiency, a society with a young population will invest more in education. As the population ages, the society will shift resources toward health care because the older population requires more health care than education.

In the graph (Figure 1), above, a society with a younger population might achieve allocative efficiency at point D, while a society with an older population that required more health care might achieve allocative efficiency at point B.

Why Society Must Choose

Every economy faces two situations in which it may be able to expand the consumption of all goods. In the first case, a society may discover that it has been using its resources inefficiently, in which case by improving efficiency and producing on the production possibilities frontier, it can have more of all goods (or at least more of some and less of none). In the second case, as resources grow over a period of years (e.g., more labor and more capital), the economy grows. As it does, the production possibilities frontier for a society will tend to shift outward, and society will be able to afford more of all goods.

However, improvements in productive efficiency take time to discover and implement, and economic growth happens only gradually. So, a society must choose between trade-offs in the present—as opposed to years down the road. For government, this process often involves trying to identify where additional spending could do the most good and where reductions in spending would do the least harm. At the individual and firm level, the market economy coordinates a process in which firms seek to produce goods and services in the quantity, quality, and price that people want. But for both the government and the market economy, in the short term, increases in production of one good typically mean offsetting decreases somewhere else in the economy.

The PPF and Comparative Advantage

While every society must choose how much of each good it should produce, it doesn't need to produce every single good it consumes. Often, how much of a good a country decides to produce depends on how expensive it is to produce it versus buying it from a different country. As we saw earlier, the curve of a country's PPF gives us information about the trade-off between devoting resources to producing one good versus another. In particular, its slope gives the opportunity cost of producing one more unit of the good in the x-axis in terms of the other good (in the y-axis). Countries tend to have different opportunity costs of producing a specific good, either because of different climates, geography, technology, or skills.

Suppose two countries, the U.S. and Brazil, need to decide how much they will produce of two crops: sugar cane and wheat. Due to its climate, Brazil can produce a lot of sugar cane per acre but not much wheat. Conversely, the U.S. can produce a lot of wheat per acre, but not much sugar cane. Clearly, Brazil has a lower

opportunity cost of producing sugar cane (in terms of wheat) than the U.S. The reverse is also true; the U.S. has a lower opportunity cost of producing wheat than Brazil. This can be illustrated by the PPF of each country, shown in Figure 2, below.

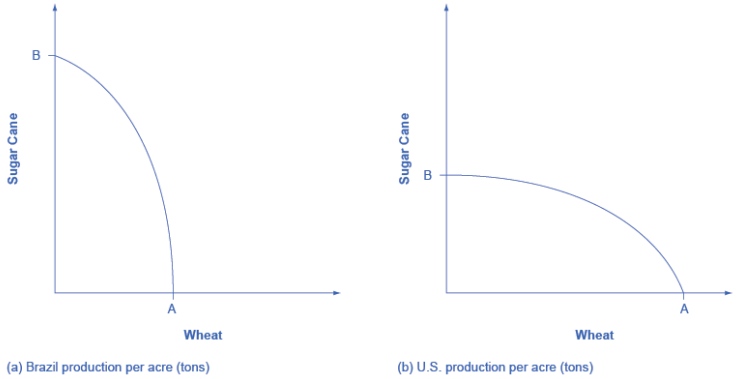


Figure 2. Brazil and U.S. PPFs

When a country can produce a good at a lower opportunity cost than another country, we say that this country has a **comparative advantage** in that good. In our example, Brazil has a comparative advantage in sugar cane, and the U.S. has a comparative advantage in wheat. One can easily see this with a simple observation of the extreme production points in the PPFs. If Brazil devoted all of its resources to producing wheat, it would be producing at point A. If, however, it devoted all of its resources to producing sugar cane instead, it would be producing a much larger amount, at point B. By moving from point A to point B, Brazil would give up a relatively small quantity in wheat production to obtain a large production in sugar cane. The opposite is true for the U.S. If the U.S. moved from point A to B and produced only sugar cane, this would result in a large opportunity cost in terms of foregone wheat production.

The slope of the PPF gives the opportunity cost of producing an additional unit of wheat. While the slope is not constant throughout

the PPFs, it is quite apparent that the PPF in Brazil is much steeper than in the U.S., and therefore the opportunity cost of wheat is generally higher in Brazil. In the module on International Trade you will learn that countries' differences in comparative advantage determine which goods they will choose to produce and trade. When countries engage in trade, they specialize in the production of the goods in which they have comparative advantage and trade part of that production for goods in which they don't have comparative advantage in. With trade, goods are produced where the opportunity cost is lowest, so total production increases, benefiting both trading parties.

Self Check: The Production Possibilities Frontier

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the two Readings in this section.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

An interactive or media element has been excluded from this version of the text. You can view it online here: https://pressbooks.ccconline.org/accmacro/?p=85

34. Outcome: Economic Rationality

What you'll learn to do: explain the assumption of economic rationality

Economists assume that human decision-making is predictable and rational. They believe that, when making choices, people basically try to avoid costs and maximize benefits to themselves. In this section, you'll learn more about the principle of economic rationality and the role it plays in economic models.

The specific things you'll learn in this section include the following:

- Define rationality in an economic context
- Provide examples of rational decision-making

Learning Activities

The learning activities for this section include the following:

- Reading: Rationality and Self-Interest
- Reading: Rationality in Action
- Self Check: Economic Rationality

35. Reading: Rationality and Self-Interest

If you say that someone is behaving "rationally," you probably mean that he or she is acting in a thoughtful, clear-headed way (as opposed to *irrationally*, which suggests that someone is acting emotionally or illogically). In the context of economics, the term *rationality* has a very specific meaning. It refers to an assumption that economists make about how people behave—remember that this is the starting point of all economics—*in the face of scarcity*. There simply aren't enough resources to satisfy all needs and wants. Charlie has only $10, he's hungry, and he needs to get to work. What will he do? An economist predicts that Charlie will behave in a predictable, rational manner, balancing costs against benefits to arrive at an action that maximizes his personal happiness or utility: As a result, he will choose a certain number of burgers and a certain number of bus tickets.

Economists assume that people will make choices in their own self-interest. They will choose those things that provide the greatest

personal benefit, and they'll avoid or forego those that aren't as personally valuable and compelling. That's what we mean by the **assumption of rationality**.

Do economists really believe that we only think of ourselves and don't ever try to benefit others? Not at all. The assumption that individuals are purely self-interested doesn't imply that individuals are greedy and selfish. People clearly derive satisfaction from helping others, so "self-interest" can also include pursuing things that benefit other people. The assumption of rationality—also called the **theory of rational behavior**—is primarily a simplification that economists make in order to create a useful model of human decision-making.

36. Reading: Rationality in Action

If you consider your own personal choices, you will probably find that they are quite complex. You are balancing what you want right now with options you want to have in the future. You probably value the people around you—friends, family, neighbors—and you may consider the impact that your choices have on them.

Setting aside the messy realm of personal choices for the time being, let's take a look at how decisions are made by consumers and by businesses in a world of economic rationality.

Rationality and Consumers

When a consumer is thinking about buying a product, what does he or she want? The theory of rational behavior would say that the consumer wants to maximize benefit and minimize cost.

Let's look at a simple example. When a new movie is released, will you see it in the theater, or will you wait for it to be released on Netflix or on TV? If we consider only the monetary costs of your choice, a movie ticket might cost $10 and you will only be able to see that movie one time. If you wait, you can probably watch it as part of your monthly Netflix or cable subscription without spending any more than you would spend without watching the movie. Why would you pay $10 to watch the movie in the theater? You might want to see it right away, when it is only showing in the theater. You might want the theater experience, with the big screen and high-quality image and sound. You will make a decision that is economically rational, based on the following consideration: "Is the benefit and enjoyment that I get from seeing the movie in a theater worth the $10 cost?"

As a consumer, you are making an economically rational decision about the costs and benefits.

Since we will build upon this later in the course, it's important to understand that this assumption creates a link between the cost of a product and the degree to which a consumer will want to buy it. As the cost of the product increases, it becomes less likely that the consumer will decide that the benefits of the purchase outweigh the costs.

Rationality and Businesses

Businesses also have predictable behavior, but rather than seeking to maximize happiness or pleasure, they seek to maximize profits. When economists assume that businesses have a goal of maximizing profits, they can make predictions about how companies will react to changing business conditions.

For example, if wages in the United States increase, how will U.S. companies react? The rational reaction may be to move those jobs that can be performed elsewhere to countries with lower wages.

This prediction is based on an oversimplification, and it might not hold true in every case—individual businesses would obviously need to understand the full cost of moving certain work out of the country before doing so. But the decision would be made according to the impact on profit and would still be rational. If a company stands to earn more profit by moving some jobs overseas, then that's the result that economists would predict.

Rationality suggests that consumers will act to maximize self-interest and businesses will act to maximize profits. Both are taking into account the benefits of a choice, given the costs.

Self Check: Economic Rationality

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the two Readings in this section.

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37. Outcome: Marginal Analysis

What you'll learn to do: define marginal analysis

Economists recognize that very few choices in the real world are "all or nothing." Most of the time, people have the choice to do a little more or a little less of something: Should you eat one more muffin? Should you study economics for another hour? Should you spend a little less money on gas? Economists use the word *marginal* to mean "additional" or "extra," and they use the term *marginal analysis* to describe how people make choices by comparing the benefits and costs of doing a bit more or a bit less.

The specific things you'll learn in this section include the following:

- Define marginal cost
- Define marginal benefit

Learning Activities

The learning activities for this section include the following:

- Reading: Marginal Analysis
- Self Check: Marginal Analysis

38. Reading: Marginal Analysis

A Little More or a Little Less

The budget constraint framework helps to illustrate that most choices in the real world are not about getting all of one thing or all of another—we rarely decide "all burgers" or "all bus tickets." Options usually fall somewhere on a continuum, and the choice usually involves marginal decision-making and marginal analysis.

Marginal decision-making means considering a little more or a little less than what we already have. We decide by using **marginal analysis**, which means comparing the costs and benefits of a little more or a little less.

It's natural for people to compare costs and benefits, but often we look at total costs and total benefits, when the best choice requires comparing how costs and benefits change from one option to another. In short, you might think of marginal analysis as "change

analysis." Marginal analysis is used throughout economics. This subtle concept is easier to grasp with examples.

Marginal Cost

Generally speaking, **marginal cost** is the difference (or change) in cost of a different choice. From a consumer's point of view, marginal cost is the additional cost of one more item purchased. From a business's point of view, marginal cost is the additional cost of one more item produced.

Suppose you typically spend a week at the beach for vacation, but this year you earned an annual bonus from your job. Should you rent a beach house for one week or two? A one-week rental costs $2,000. A two-week rental costs $3,600. Holding everything else constant, which option is better? If you stay for two weeks, the cost is significantly higher: $3,600 versus $2,000. But consider the cost by week. The first week costs $2,000. The difference in cost between one week and two is $3,600 – $2,000, or $1,600. Thus, while the marginal cost of the first week's rental is $2,000, the marginal cost of the second week's rental is $1,600. This illustrates the key rule of marginal analysis: Marginal cost = the change in total cost from one option to another.

Consider another example. Imagine that you're out getting ice cream with your friends or family. You can choose whether to buy one, two, or three scoops of ice cream. One scoop costs $3.00, two scoops cost $5.00, and three scoops cost $7.00. This information is shown in the following table.

Scoops of Ice Cream	1	2	3
Total Cost	$3	$5	$7

What is the marginal cost of each scoop of ice cream? The marginal cost of the first scoop of ice cream is $3.00 because you have to pay

$3.00 more to get one scoop of ice cream than you do to get zero scoops of ice cream. The marginal cost of the second scoop of ice cream is $2.00 because you only need to pay two more dollars to get two scoops than you need to pay to get one scoop. The marginal cost of the third scoop is also $2.00 because you would need to pay an additional two dollars to get that third scoop.

Scoops of Ice Cream	1	2	3
Marginal Cost	$3	$2	$2

Marginal costs sometimes go up and sometimes go down, but to get the clearest view of your options, you should always try to make decisions based on marginal costs, rather than total costs.

Marginal Benefit

Generally speaking, **marginal benefit** is the difference (or change) in what you receive from a different choice. From a consumer's point of view, marginal benefit is the additional satisfaction of one more item purchased. From a business' point of view, marginal benefit is the additional revenues received from selling one more item.

Suppose you're considering membership at the local recreation center. The basic membership gives access to the swimming pool, while the full membership gives access to the swimming pool and the weight room. What is the difference between the two memberships? Since both give access to the pool, the marginal benefit of full membership is access to the weight room.

The amount of benefit a person receives from a particular good or service is subjective; one person may get more satisfaction or happiness from a particular good or service than another. For example, you might enjoy ice cream more than your friend who is allergic to dairy. The amount of benefit you get can also change. For

example, you might enjoy the ice cream more on a hot day than on a cold day. This doesn't make it any less real, however.

Economic Rationality Revisited

How, then, do you decide on a choice? The answer is that you compare, to the best of your ability, the marginal benefits with the marginal costs. An economically rational decision is one in which the marginal benefits of a choice are greater than the marginal costs of the choice.

If we return to the recreation center example above, suppose that the basic membership is $30 per month, while the full membership is $40 per month. An economically rational decision-maker would ask, Is the marginal benefit (access to the weight room) worth the marginal cost (an extra $10 per month)? For some people, the answer will be yes. For others, it will be no. Either way, marginal analysis is an important part of economic rationality and good decision-making.

Self Check: Marginal Analysis

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the Reading in this section.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

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39. Outcome: Positive and Normative Statements

What you'll learn to do: differentiate between positive and normative statements

What choices does society have about how it uses its resources?—"What is possible?" we might ask. Also, what is the right thing to do with the resources we have?—"What *should* we choose," we might ask. These are very different questions that lead to very different kinds of responses and statements.

In this section we are going to consider the difference between positive and normative statements and their role in economics. **Positive statements** are objective. **Normative statements** are subjective. Good economists are careful to differentiate between the two. In this section, we will learn to differentiate between descriptions of the world as it is and the world as it should be.

The specific things you'll learn in this section include the following:

- Define positive and normative statements
- Provide examples of positive and normative statements

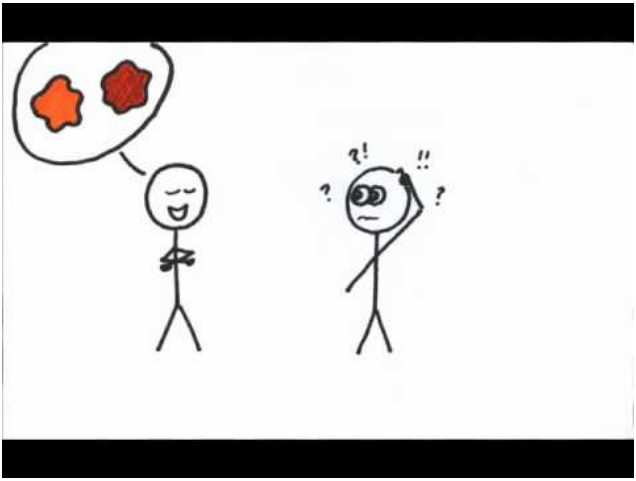
Learning Activities

The learning activities for this section include the following:

- Video: Positive and Normative Analysis

- Reading: Positive and Normative Statements
- Self Check: Positive and Normative Statements

40. Video: Positive and Normative Analysis



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41. Reading: Positive and Normative Statements

Economics seeks to describe economic behavior as it actually exists, and it relies on a distinction between **positive statements**, which describe the world as it is, and **normative statements**, which describe how the world should be.

Positive Statements

Two kinds of assertions in economics can be subjected to testing.

One is the hypothesis. Another testable assertion is a statement of fact, such as "It's raining," or "Microsoft is the largest producer of computer operating systems in the world." Like hypotheses, such assertions can be shown to be correct or incorrect. A statement of fact or a hypothesis is a positive statement.

Normative Statements

Although people often disagree about positive statements, such disagreements can ultimately be resolved through investigation. There is another category of assertions, however, for which investigation can never resolve differences. A normative statement is one that makes a value judgment. Such a judgment is the opinion of the speaker; no one can "prove" that the statement is or is not correct. Here are some examples of normative statements in economics:

- We ought to do more to help the poor.
- People in the United States should save more for retirement.
- Corporate profits are too high.

These statements are based on the values of the person who makes them and can't be proven false.

Because people have different values, normative statements often provoke disagreement. An economist whose values lead him or her to conclude that we should provide more help for the poor will disagree with one whose values lead to a conclusion that we should not. Because no test exists for these values, these two economists will continue to disagree, unless one persuades the other to adopt a different set of values. Many of the disagreements among economists are based on such differences in values and therefore are unlikely to be resolved.

Self Check: Positive and Normative Statements

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

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42. Problem Sets: Budget Constraints and Opportunity Cost

Test your understanding of the learning outcomes in this module by working through the following problems. These problems aren't graded, but they give you a chance to practice before taking the quiz.

If you'd like to try a problem again, you can click the link that reads, "Try another version of these questions."

Use the information provided in the first question for all of the questions in this problem set.

https://www.myopenmath.com/multiembedq.php?id=92586-92658-92659-92661-92663-92664-92665-92666-92667&sameseed=1&theme=oea&iframe_resize_id=mom3

43. Problem Set: Marginal Analysis

Test your understanding of the learning outcomes in this module by working through the following problems. These problems aren't graded, but they give you a chance to practice before taking the quiz.

If you'd like to try a problem again, you can click the link that reads, "Try another version of this question."

Farmer's Market

https://www.myopenmath.com/multiembedq.php?id=92668&theme=oea&iframe_resize_id=mom1

Midterm Grades

https://www.myopenmath.com/multiembedq.php?id=92669-92670-92671&sameseed=1&theme=oea&iframe_resize_id=mom2

44. Putting It Together: Choice in a World of Scarcity

Summary

In this module you learned that the study of economics is about how choices are made by individuals and entities, given the fact that we can never have enough of the things we want. You learned how to:

- Explain the cost of choices and trade-offs
- Illustrate society's trade-offs by using a production possibilities frontier (or curve)
- Explain the assumption of economic rationality by individuals and firms
- Define marginal analysis
- Differentiate between positive and normative statements

The Challenging Budget Constraints of a Student

We began this module with a discussion of the annual salaries of full-time U.S. workers with different levels of education. Let's return to the very real economic issues that face most students when making decisions about their education.

First, we discussed the cost of choices and trade-offs and used the budget constraint model to demonstrate those costs. Each term, students make a trade-off between taking more credits in school and buying necessary items. Let's create a budget constraint model for Camila, a community college student who is struggling to cover the cost of education. First, let's assume that each credit hour costs

$75. Camila wants to take 12 to 16 credits but also needs to pay for gas to drive between school, work, and other family responsibilities. Gas costs $3 per gallon. If she has a budget during the course of the academic term that allows her to spend a total of $1,500 on course credits and gas, what are Camila's options?

We can use the budget constraint equation to answer this question.

Step 1. Apply the budget constraint equation to the scenario.

In Camila's case, this works out to be

[latex]\begin{array}{l}\text{Budget}={P}_{1}\times{Q}_{1}+{P}_{2}\times{Q}_{2}\\\text{Budget}=1500\\\,\,\,\,\,\,\,\,\,\,\,\,\,\,\,{P}_{1}=3\left(\text{price for a gallon of gas}\right)\\\,\,\,\,\,\,\,\,\,\,\,\,\,\,\,{Q}_{1}=\text{gallons of gas}\left(\text{variable}\right)\\\,\,\,\,\,\,\,\,\,\,\,\,\,\,\,{P}_{2}=75\left(\text{price per credit hour}\right)\\\,\,\,\,\,\,\,\,\,\,\,\,\,\,\,{Q}_{2}=\text{number of credit hours}\left(\text{variable}\right)\end{array}[/latex]

For Camila, this is

[latex]{1500}={3}\times{Q}_{1}+{75}\times{Q}_{2}[/latex]

Step 2. Simplify the equation.

At this point we need to decide whether to solve for [latex]{Q}_{1}[/latex] or [latex]{Q}_{2}[/latex].

Remember, Camila was hoping to take at least 12 credit hours, so we know the value for [latex]{Q}_{2}[/latex]. We will solve for [latex]{Q}_{1}[/latex] because, in this equation, it represents the number of gallons of gas Camila can pay for, depending on how many credit hours she takes during the academic term.

We are going solve for [latex]{Q}_{1}[/latex]. First we will write the equation with the variables on the left to make solving easier: [latex]3Q_1+75Q_2=1500[/latex].

[latex]\begin{array}{lll}3Q_1+75Q_2=1500\\\\\,\,\,\,\,\,\,\,\,\,\,\,\,\,\,

frac{3Q_1}{3}=\frac{1500}{3}-
\frac{-75Q_2}{3}\,\,\,\,\,\,\,\,\,\,\normalsize\text{divide
everything by
3}\\\\\\,\,\,\,\,\,\,\,\,\,

Table 1. Camila's Budget Constraint

Point	Number of Credit Hours	Gallons of Gas
A	0	500
B	1	475
C	2	450
D	3	425
E	4	400
F	5	375
G	6	350
H	7	325
I	8	300
J	9	275
K	10	250
L	11	225
M	12	200
N	13	175
O	14	150
P	15	125
Q	16	100

Step 4. Graph the results.

If we plot each point on a graph, as below, we can see a line that shows us the number of credit hours that Camila can fund while still paying for gas.

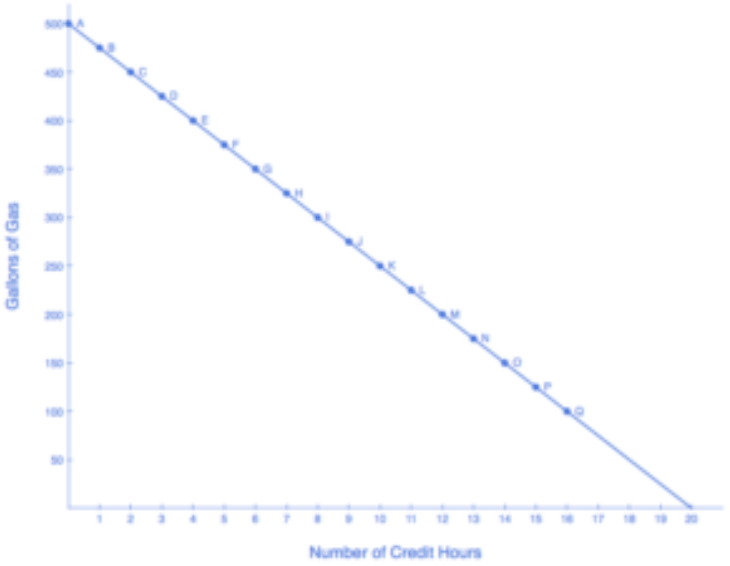


Figure 1. Camila's Budget Constraint

Education and the Production Possibilities Curve

As state legislators allocate funding, they often make independent decision about the funding amount and approach for education and the funding amount and approach for corrections (or prisons). Economists recognize that these are not independent decisions. The production possibilities curve demonstrates that if society invests more in prisons, there are will be a reduction in the resources available to invest in education.

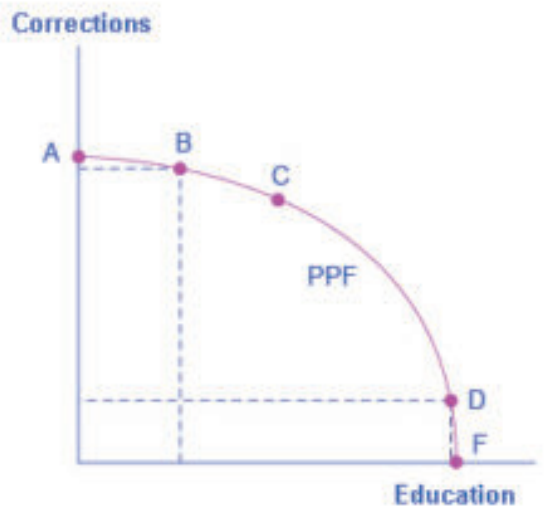


Figure 2. Education vs. Corrections Production Possibilities Frontier

The graph above demonstrates the trade-off between devoting resources to corrections and to education. If the society were to allocate all of its resources to corrections, it could produce at point A, but it would not have any resources to produce education. If it were to allocate all of its resources to education, it could produce at point F. Alternatively, society could choose to produce any combination of corrections and education shown on the production possibilities frontier.

Sometimes legislators don't recognize the direct trade-off between investing in education and investing in prisons, but inevitably economists will point out the connection, and the press will jump in and question the legislators' decision. In a world of scarcity, more spending in one necessarily means less to spend in others.

Should Society Invest in Prisons or Education?

As we consider the trade-offs between investments in prisons and education, is there a definitive "right" answer? Consider the following analysis by the Center on Budget and Policy Priorities:

> Even as states spend more on corrections, they are underinvesting in educating children and young adults, especially those in high-poverty neighborhoods. At least 30 states are providing less general funding per student this year for K–12 schools than before the recession, after adjusting for inflation; in 14 states the reduction exceeds 10 percent. Higher education cuts have been even deeper: the average state has cut higher education funding per student by 23 percent since the recession hit, after adjusting for inflation. Eleven states spent more of their general funds on corrections than on higher education in 2013. And some of the states with the biggest education cuts in recent years also have among the nation's highest incarceration rates.
>
> This is not sound policy. State economies would be much stronger over time if states invested more in education and other areas that can boost long-term economic growth and less in maintaining extremely high prison populations. The economic health of many low-income neighborhoods, which face disproportionately high incarceration rates, could particularly improve if states reordered their spending in such a way. States could use the freed-up funds in a number of ways, such as expanding access to high-quality preschool, reducing class sizes in high-poverty schools, and revising

> state funding formulas to invest more in high-poverty neighborhoods.[1]

While the analysis cited is thorough and logical, the report above includes a range of positive and normative statements. If you reread the analysis with that in mind, you will find examples of both.

Positive Statements

- At least 30 states are providing less general funding per student this year for K–12 schools than before the recession, after adjusting for inflation; in 14 states the reduction exceeds 10 percent.
- Higher education cuts have been even deeper: the average state has cut higher education funding per student by 23 percent since the recession hit, after adjusting for inflation.
- Eleven states spent more of their general funds on corrections than on higher education in 2013. And some of the states with the biggest education cuts in recent years also have among the nation's highest incarceration rates.

Normative Statements

- Even as states spend more on corrections, they are underinvesting in educating children and young adults, especially those in high-poverty neighborhoods.
- This is not sound policy.

1. http://www.cbpp.org/sites/default/files/atoms/files/10-28-14sfp.pdf

- State economies would be much stronger over time if states invested more in education and other areas that can boost long-term economic growth and less in maintaining extremely high prison populations.

As you can see, your experience as a student affords you an important view into the trade-offs that are core to economics.

45. Glossary: Choice in a World of Scarcity

allocative efficiency when the mix of goods being produced represents the mix that society most desires

assumption of rationality the assumption that people will make choices in their own self-interest, choosing things that provide the greatest personal benefit and foregoing those that aren't as personally valuable and compelling; *also called the theory of rational behavior*

budget constraint all possible combinations of goods that someone can afford, given the prices of goods, when all income (or time) is spent

comparative advantage the ability of a group or country to produce a good or service at a lower opportunity cost than another group or country

law of diminishing returns as additional increments of resources are devoted to a certain purpose, the marginal benefit from those additional increments will decline

marginal analysis comparing the costs and benefits of a little more or a little less

marginal benefit is the difference (or change) in what you receive from a different choice

marginal cost the difference (or change) in cost of a different choice

normative statements are subjective; they describe the world as it ought to be

opportunity cost is the value of the next best alternative

positive statements are objective; they describe the world as it is

production possibilities frontier (or curve) a diagram that shows the productively efficient combinations of two products that an economy can produce given the resources it has available

productive efficiency when it's impossible to produce more of one good (or service) without decreasing the quantity produced of another good (or service)

sunk costs costs that are incurred in the past and can't be recovered

46. Discussion: Is Economics a Science?

Is economics a science? Why, or why not? As part of your response and explanation, include the definitions of "science" and "economics" as you understand them.

PART III

LESSON 2: SUPPLY AND DEMAND

47. Why It Matters: Supply and Demand

Why analyze how buyers and sellers interact in a free and competitive market to determine prices and quantities of goods?

Do you pay attention to the cost of a cup of coffee? Most people recognize that when they make coffee at home it's cheaper than buying a cup of coffee that someone else has made. You've probably also noticed that some coffee places are more expensive than others—a cup of coffee at Starbucks usually costs more than one at a gas station, for instance. Regardless of where you decide to buy coffee, the price can change dramatically.

Figure 1. Coffee Prices. *Source: Trading Economics*

While retailers make decisions about how much they will mark up the coffee drinks they sell, the underlying coffee prices all around

the world are driven by supply and demand. Brazil accounts for 33 percent of all coffee production in the world, and in 2011 the country experienced a drought. Coffee trees had already been weakened by environmental factors, and the drought had a significant impact on production levels.

How did individuals react to this kind of shortage? Did the shortage have an impact on price? Take a look at the graph in Figure 1, above. You can see from the sharp spike in 2011 that a shortage in the supply of coffee did indeed have an impact on price. But what do we know about the demand for coffee during that time? Did coffee consumption levels fall? To answer these questions, we need to know more about how buyers and sellers interact in the marketplace. In short, we need to understand supply and demand.

In this section you'll learn about these key economic factors and the laws that govern them. Understanding supply and demand is not only essential to the study of economics—it may also help you be a better-informed consumer and make knowledgeable decisions about everything from your next cup of Joe to your next job.

Learning Outcomes

- Describe and differentiate between the major economic systems
- Explain the determinants of demand
- Explain the determinants of supply
- Define and graphically illustrate market equilibrium, surplus, and shortage

48. Outcome: Economic Systems

What you'll learn to do: describe and differentiate between major economic systems

Think about what a complex system a modern economy is. It includes all production of goods and services, all buying and selling, all employment. The economic life of every individual is interrelated, at least to a small extent, with the economic lives of thousands or even millions of other individuals. Who organizes and coordinates this system? Who insures that, for example, the number of televisions a society produces is the same as the amount it needs and wants? Who insures that the right number of employees works in the electronics industry? Who insures that televisions are produced in the best way possible? How does it all get done?

The answer to these important questions depends on the kind of economic system a society uses.

In this section, you'll learn about the basic organizing principles of different types of economies. Understanding the characteristics of a competitive market, in particular, is an important foundation for understanding the mechanisms of supply and demand.

The specific things you'll learn in this section include the following:

- Define and give an example of a market economy
- Define and give an example of a planned economy
- Define and give an example of a command economy
- Define and explain the characteristics of a competitive market

Learning Activities

The learning activities for this section include the following:

- Reading: Economic Systems
- Self Check: Economic Systems

49. Reading: Economic Systems

Legoland, Billund, Denmark: Picture of a Planned Economy?

Types of Economies

In the modern world today, there is a range of economic systems, from market economies to planned (or command) economies.

Market Economies

A **market** is any situation that brings together buyers and sellers of goods or services. Buyers and sellers can be either individuals

or businesses. In a **market economy**, economic decision-making happens through markets. Market economies are based on private enterprise: the means of production (resources and businesses) are owned and operated by private individuals or groups of private individuals. Businesses supply goods and services based on demand. Which goods and services are supplied depends on what is demanded by consumers or other businesses. A person's income is based on his or her ability to convert resources (especially labor) into something that society values. The more society values the person's output, the higher the income they will earn (think Lady Gaga or LeBron James).

Examples of free-market economies include Hong Kong, Singapore, Australia, and the United States.

Free Markets

In a **market economy**, decisions about what products are available and at what prices are determined through the interaction of supply and demand. A **competitive market** is one in which there is a large number of buyers and sellers, so that no one can control the market price. A **free market** is one in which the government does not intervene in any way. A free and competitive market economy is the ideal type of market economy, because what is supplied is exactly what consumers demand.

Price controls are an example of a market that is not free. When government intervenes, the market outcomes will be different from those that would occur in a free and competitive market model. When markets are less than perfectly competitive (e.g., monopolistic), the market outcomes will also differ.

Planned (or Command) Economies

Command economies operate very differently. In a **command economy**, economic effort is devoted to goals passed down from a ruler or ruling class. Ancient Egypt was a good example: A large part of economic life was devoted to building pyramids (like the one at the left), for the pharaohs. Medieval manor life is another example: The lord provided the land for growing crops and protection in the event of war. In return, vassals provided labor and soldiers to do the lord's bidding. In the last century, communism emphasized command economies.

In a command economy, resources and businesses are owned by the government. The government decides what goods and services will be produced and what prices will be charged for them. The government decides what methods of production will be used and how much workers will be paid. Some necessities like health care and education are provided for free, as long as the state determines that you need them. Currently, North Korea and Cuba have command economies.

The primary distinction between a free and command economy is the degree to which the government determines what can be produced and what prices will be charged. In a free market, these determinations are made by the collective decisions of the market itself (which is comprised of producers and consumers). Producers

and consumers make rational decisions about what will satisfy their self-interest and maximize profits, and the market responds accordingly. In a planned economy, the government makes most decisions about what will be produced and what the prices will be, and the market must follow that plan.

Most economies in the real world are mixed; they combine elements of command and market systems. The U.S. economy is positioned toward the market-oriented end of the spectrum. Many countries in Europe and Latin America, while primarily market-oriented, have a greater degree of government involvement in economic decisions than in the U.S. economy. China and Russia, while they are closer now to having a market-oriented system than several decades ago, remain closer to the command-economy end of the spectrum.

The following Crash Course video provides additional information about the broad economic choices that countries make when they decide between planned and market economies. The narrators talk fast, so you'll need to listen closely and possibly watch the video a second time!

A YouTube element has been excluded from this version of the text. You can view it online here: https://pressbooks.ccconline.org/accmacro/?p=118

Economic systems determine the following:

- What to produce?
- Who to produce it?
- Who gets it?

In a planned economy, government controls the factors of production:

- In a true communist economy, there is no private property–everyone owns the factors of production. This type of planned economy is called a *command economy*
- In a socialist economy, there is some private property and some private control of industry.

In a free-market (capitalist) economy, individuals own the factors of production:

- Businesses produce products.
- Consumers choose the products they prefer causing the companies that product them to make more profit.

Even in free markets, governments will

- Maintain the rule of law
- Create public goods and services such as roads and education
- Step in when the market gets things wrong (e.g., setting minimum wage, establishing environmental standards)

In reality, economies are neither completely free-market nor completely planned. Neither exists in "pure" form, since all societies and governments regulate their economies to varying degrees. Throughout this course we will consider a number of ways in which the U.S. government influences and controls the economy.

Self Check: Economic Systems

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the Reading in this section.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

An interactive or media element has been excluded from this version of the text. You can view it online here: https://pressbooks.ccconline.org/accmacro/?p=118

50. Outcome: Demand

What you'll learn to do: explain the determinants of demand

Imagine that the price of Ben & Jerry's ice cream decreases by 25 percent during the next summer. What do you think will happen to the amount of Ben & Jerry's ice cream that people will want to buy? Clearly, the demand for ice cream will increase. By the same token, if the price of the ice cream were to rise by 25 percent, then the demand for the ice cream would fall. In this section, you will examine the law of demand and see why this simple concept is essential to understanding economics.

The specific things you'll learn in this section include the following:

- Explain the law of demand
- Explain a demand curve
- Create a demand curve using a data set
- Describe the differences between changes in demand and changes in the quantity demanded
- Explain the impact of factors that change demand

Learning Activities

The learning activities for this section include the following:

- Video: The Law of Demand
- Reading: What Is Demand?
- Video: Change in Demand vs. Quantity Demanded

- Reading: Factors Affecting Demand
- Worked Example: Shift in Demand
- Reading: Summary of Factors That Change Demand
- Simulation: Demand for Food Trucks
- Self Check: Demand

51. Reading: What Is Demand?

Demand for Goods and Services

Economists use the term **demand** to refer to the amount of some good or service consumers are willing and able to purchase at each price. Demand is based on needs and wants—a consumer may be able to differentiate between a need and a want, but from an economist's perspective, they are the same thing. Demand is also based on ability to pay. If you can't pay for it, you have no effective demand.

What a buyer pays for a unit of the specific good or service

is called the **price**. The total number of units purchased at that price is called the **quantity demanded**. A rise in the price of a good or service almost always decreases the quantity of that good or service demanded. Conversely, a fall in price will increase the quantity demanded. When the price of a gallon of gasoline goes up, for example, people look for ways to reduce their consumption by combining several errands, commuting by carpool or mass transit, or taking weekend or vacation trips closer to home. Economists call this inverse relationship between price and quantity demanded the **law of demand**. The law of demand assumes that all other variables that affect demand are held constant.

An example from the market for gasoline can be shown in the form of a table or a graph. (Refer back to "Reading: Creating and Interpreting Graphs" in module 0 if you need a refresher on graphs.) A table that shows the quantity demanded at each price, such as Table 1, is called a **demand schedule**. Price in this case is measured in dollars per gallon of gasoline. The quantity demanded is measured in millions of gallons over some time period (for example, per day or per year) and over some geographic area (like a state or a country).

Table 1. Price and Quantity Demanded of Gasoline

Price (per gallon)	Quantity Demanded (millions of gallons)
$1.00	800
$1.20	700
$1.40	600
$1.60	550
$1.80	500
$2.00	460
$2.20	420

A **demand curve** shows the relationship between price and quantity demanded on a graph like Figure 1, below, with quantity on the

horizontal axis and the price per gallon on the vertical axis. *Note that this is an exception to the normal rule in mathematics that the independent variable (x) goes on the horizontal axis and the dependent variable (y) goes on the vertical. Economics is different from math!*

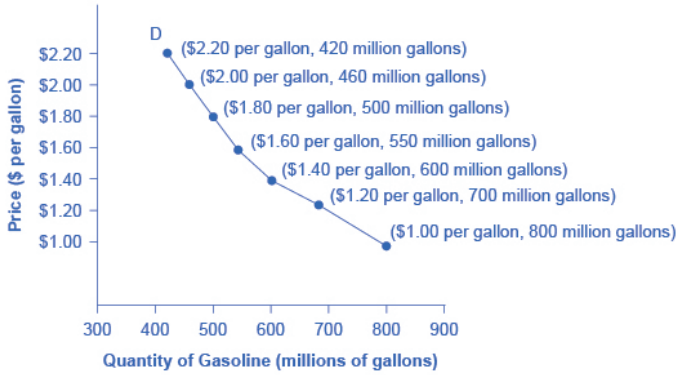


Figure 1. A Demand Curve for Gasoline

The demand schedule (Table 1) shows that as price rises, quantity demanded decreases, and vice versa. These points can then be graphed, and the line connecting them is the demand curve (shown by line D in the graph, above). The downward slope of the demand curve again illustrates the law of demand—the inverse relationship between prices and quantity demanded.

The demand schedule shown by Table 1 and the demand curve shown by the graph in Figure 1 are two ways of describing the same relationship between price and quantity demanded.

Demand curves will look somewhat different for each product. They may appear relatively steep or flat, or they may be straight or curved. Nearly all demand curves share the fundamental similarity that they slope down from left to right. In this way, demand curves embody the law of demand: As the price increases, the quantity

demanded decreases, and conversely, as the price decreases, the quantity demanded increases.

Demand vs. Quantity Demanded

In economic terminology, *demand* is not the same as *quantity demanded*. When economists talk about demand, they mean the relationship between a range of prices and the quantities demanded at those prices, as illustrated by a demand curve or a demand schedule. When economists talk about quantity demanded, they mean only a certain point on the demand curve, or one quantity on the demand schedule. In short, demand refers to the curve and quantity demanded refers to the (specific) point on the curve.

Demand Video

A YouTube element has been excluded from this version of the text. You can view it online here:
https://pressbooks.ccconline.org/accmacro/?p=122

The law of demand states that, other things being equal,

- More of a good will be bought the lower its price
- Less of a good will be bought the higher its price

Ceteris paribus means "other things being equal."

52. Video: Change in Demand vs. Change in Quantity Demanded

https://youtu.be/aTSwcXJ700c

A change in price does not move the demand curve. It only shows a difference in the quantity demanded.

The demand curve will move left or right when there is an underlying change in demand at all prices.

53. Reading: Factors Affecting Demand

Introduction

We defined demand as the amount of some product that a consumer is *willing* and *able* to purchase at each *price*. This suggests at least two factors, in addition to price, that affect demand. "Willingness to purchase" suggests a desire to buy, and it depends on what economists call tastes and preferences. If you neither need nor want something, you won't be willing to buy it. "Ability to purchase" suggests that income is important. Professors are usually able to afford better housing and transportation than students, because they have more income. The prices of related goods can also affect demand. If you need a new car, for example, the price

of a Honda may affect your demand for a Ford. Finally, the size or composition of the population can affect demand. The more children a family has, the greater their demand for clothing. The more driving-age children a family has, the greater their demand for car insurance and the less for diapers and baby formula.

These factors matter both for demand by an individual and demand by the market as a whole. Exactly how do these various factors affect demand, and how do we show the effects graphically? To answer those questions, we need the *ceteris paribus* assumption.

The *Ceteris Paribus* Assumption

A *demand curve* or a *supply curve* (which we'll cover later in this module) is a relationship between two, and only two, variables: quantity on the horizontal axis and price on the vertical axis. The assumption behind a demand curve or a supply curve is that no relevant economic factors, other than the product's price, are changing. Economists call this assumption ***ceteris paribus***, a Latin phrase meaning "other things being equal." Any given demand or supply curve is based on the *ceteris paribus* assumption that all else is held equal. (You'll recall that economists use the *ceteris paribus* assumption to simplify the focus of analysis.) Therefore, a demand curve or a supply curve is a relationship between two, and only two, variables *when all other variables are held equal*. If all else is not held equal, then the laws of supply and demand will not necessarily hold.

Ceteris paribus is typically applied when we look at how changes in price affect demand or supply, but *ceteris paribus* can also be applied more generally. In the real world, demand and supply depend on more factors than just price. For example, a consumer's demand depends on income, and a producer's supply depends on the cost of producing the product. How can we analyze the effect on demand or supply if multiple factors are changing at the same time—say price rises and income falls? The answer is that we

examine the changes one at a time, and assume that the other factors are held constant.

For example, we can say that an increase in the price reduces the amount consumers will buy (assuming income, and anything else that affects demand, is unchanged). Additionally, a decrease in income reduces the amount consumers can afford to buy (assuming price, and anything else that affects demand, is unchanged). This is what the *ceteris paribus* assumption really means. In this particular case, after we analyze each factor separately, we can combine the results. The amount consumers buy falls for two reasons: first because of the higher price and second because of the lower income.

The Effect of Income on Demand

Let's use income as an example of how factors other than price affect demand. Figure 1 shows the initial demand for automobiles as D_0. At point Q, for example, if the price is $20,000 per car, the quantity of cars demanded is 18 million. D_0 also shows how the quantity of cars demanded would change as a result of a higher or lower price. For example, if the price of a car rose to $22,000, the quantity demanded would decrease to 17 million, at point R.

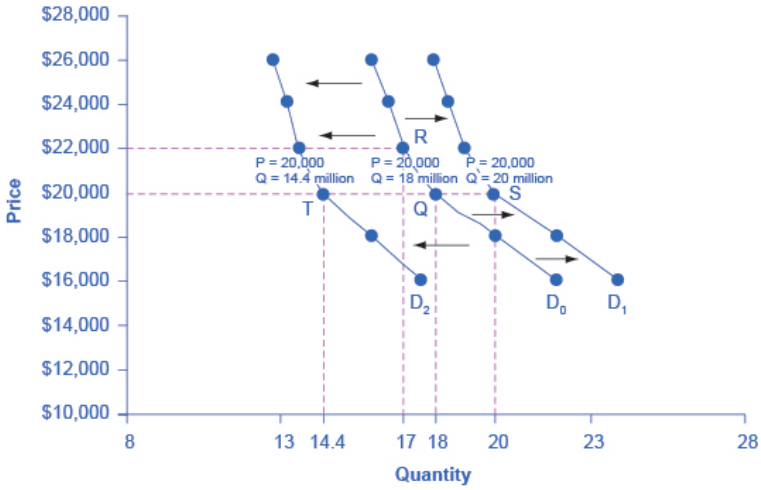


Figure 1. Shifts in Demand: A Car Example

The original demand curve D_0, like every demand curve, is based on the *ceteris paribus* assumption that no other economically relevant factors change. Now imagine that the economy expands in a way that raises the incomes of many people, making cars more affordable. How will this affect demand? How can we show this graphically?

Return to Figure 1. The price of cars is still $20,000, but with higher incomes, the quantity demanded has now increased to 20 million cars, shown at point S. As a result of the higher income levels, the demand curve shifts to the right to the new demand curve D_1, indicating an increase in demand. Table 1, below, shows clearly that this increased demand would occur at every price, not just the original one.

Table 1. Price and Demand Shifts: A Car Example

Price	Decrease to D_2	Original Quantity Demanded D_0	Increase to D_1
$16,000	17.6 million	22.0 million	24.0 million
$18,000	16.0 million	20.0 million	22.0 million
$20,000	14.4 million	18.0 million	20.0 million
$22,000	13.6 million	17.0 million	19.0 million
$24,000	13.2 million	16.5 million	18.5 million
$26,000	12.8 million	16.0 million	18.0 million

Now, imagine that the economy slows down so that many people lose their jobs or work fewer hours, reducing their incomes. In this case, the decrease in income would lead to a lower quantity of cars demanded at every given price, and the original demand curve D_0 would shift left to D_2. The shift from D_0 to D_2 represents such a decrease in demand: At any given price level, the quantity demanded is now lower. In this example, a price of $20,000 means 18 million cars sold along the original demand curve, but only 14.4 million sold after demand fell.

When a demand curve shifts, it does not mean that the quantity demanded by every individual buyer changes by the same amount. In this example, not everyone would have higher or lower income and not everyone would buy or not buy an additional car. Instead, a shift in a demand curve captures a pattern for the market as a whole: Increased demand means that at every given price, the quantity demanded is higher, so that the demand curve shifts to the right from D_0 to D_1. And, decreased demand means that at every given price, the quantity demanded is lower, so that the demand curve shifts to the left from D_0 to D_2.

We just argued that higher income causes greater demand at every price. This is true for most goods and services. For some—luxury cars, vacations in Europe, and fine jewelry—the effect of a rise in income can be especially pronounced. A product whose demand rises when income rises, and vice versa, is called a **normal**

good. A few exceptions to this pattern do exist, however. As incomes rise, many people will buy fewer generic-brand groceries and more name-brand groceries. They are less likely to buy used cars and more likely to buy new cars. They will be less likely to rent an apartment and more likely to own a home, and so on. A product whose demand falls when income rises, and vice versa, is called an **inferior good**. In other words, when income increases, the demand curve shifts to the left.

Other Factors That Shift Demand Curves

Income is not the only factor that causes a shift in demand. Other things that change demand include tastes and preferences, the composition or size of the population, the prices of related goods, and even expectations. A change in any one of the underlying factors that determine what quantity people are willing to buy at a given price will cause a shift in demand. Graphically, the new demand curve lies either to the right (an increase) or to the left (a decrease) of the original demand curve. Let's look at these factors.

Changing Tastes or Preferences

From 1980 to 2012, the per-person consumption of chicken by Americans rose from 33 pounds per year to 81 pounds per year, and consumption of beef fell from 77 pounds per year to 57 pounds per year, according to the U.S. Department of Agriculture (USDA). Changes like these are largely due to shifts in taste, which change the quantity of a good demanded at every price: That is, they shift the demand curve for that good—rightward for chicken and leftward for beef.

Changes in the Composition of the Population

The proportion of elderly citizens in the United States population

is rising. It rose from 9.8 percent in 1970 to 12.6 percent in 2000 and will be a projected (by the U.S. Census Bureau) 20 percent of the population by 2030. A society with relatively more children, like the United States in the 1960s, will have greater demand for goods and services like tricycles and day care facilities. A society with relatively more elderly persons, as the United States is projected to have by 2030, has a higher demand for nursing homes and hearing aids. Similarly, changes in the size of the population can affect the demand for housing and many other goods. Each of these changes in demand will be shown as a shift in the demand curve.

Changes in the Prices of Related Goods

The demand for a product can also be affected by changes in the prices of related goods such as substitutes or complements. A **substitute** is a good or service that can be used in place of another good or service. As electronic books, like this one, become more available, you would expect to see a decrease in demand for traditional printed books. A lower price for a substitute decreases demand for the other product. For example, in recent years as the price of tablet computers has fallen, the quantity demanded has increased (because of the law of demand). Since people are purchasing tablets, there has been a decrease in demand for laptops, which can be shown graphically as a leftward shift in the demand curve for laptops. A higher price for a substitute good has the reverse effect.

Other goods are **complements** for each other, meaning that the goods are often used together, because consumption of one good tends to enhance consumption of the other. Examples include breakfast cereal and milk; notebooks and pens or pencils, golf balls and golf clubs; gasoline and sport utility vehicles; and the five-way combination of bacon, lettuce, tomato, mayonnaise, and bread. If the price of golf clubs rises, since the quantity of golf clubs

demanded falls (because of the law of demand), demand for a complement good like golf balls decreases, too. Similarly, a higher price for skis would shift the demand curve for a complement good like ski resort trips to the left, while a lower price for a complement has the reverse effect.

Changes in Expectations About Future Prices or Other Factors That Affect Demand

While it is clear that the price of a good affects the quantity demanded, it is also true that expectations about the future price (or expectations about tastes and preferences, income, and so on) can affect demand. For example, if people hear that a hurricane is coming, they may rush to the store to buy flashlight batteries and bottled water. If people learn that the price of a good like coffee is likely to rise in the future, they may head for the store to stock up on coffee now. These changes in demand are shown as shifts

in the curve. Therefore, a **shift in demand** happens when a change in some economic factor (other than the current price) causes a different quantity to be demanded at every price.

54. Worked Example: Shift in Demand

Shift in Demand Due to Income Increase

A shift in demand means that at any price (and at every price), the quantity demanded will be different than it was before. Following is a graphic illustration of a shift in demand due to an income increase.

Step 1. Draw the graph of a demand curve for a normal good

like pizza. Pick a price (like P_0). Identify the corresponding Q_0. An example is shown in Figure 1.

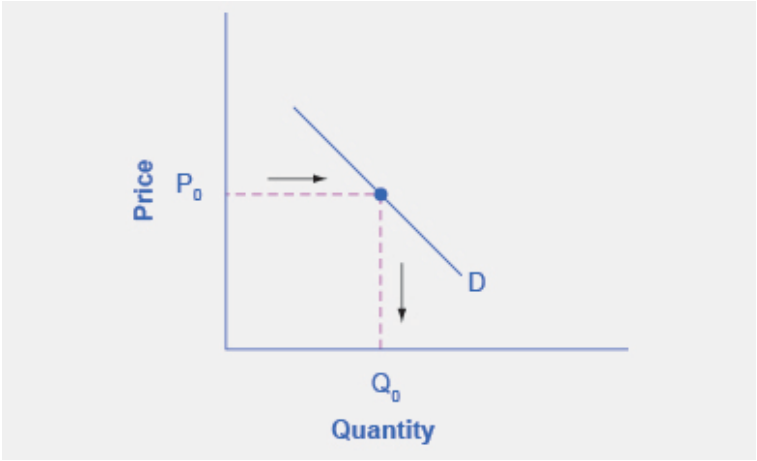


Figure 1. Demand Curve. *A demand curve can be used to identify how much consumers would buy at any given price.*

Step 2. Suppose income increases. As a result of the change, are consumers going to buy more or less pizza? The answer is more. Draw a dotted horizontal line from the chosen price, through the original quantity demanded, to the new point with the new Q_1. Draw a dotted vertical line down to the horizontal axis and label the new Q_1. An example is provided in Figure 2.

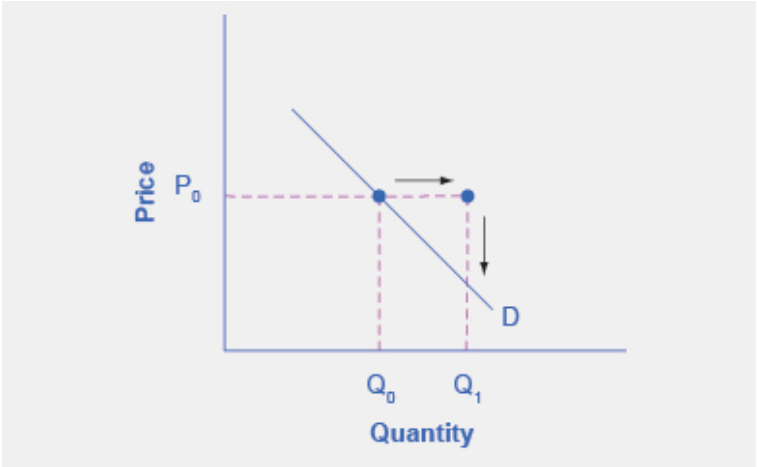


Figure 2. Demand Curve with Income Increase. *With an increase in income, consumers will purchase larger quantities, pushing demand to the right.*

Step 3. Now, shift the curve through the new point. You will see that an increase in income causes an upward (or rightward) shift in the demand curve, so that at any price, the quantities demanded will be higher, as shown in Figure 3.

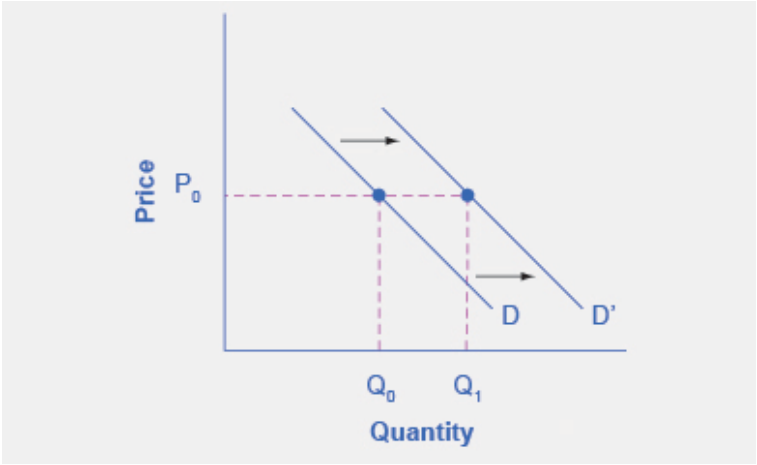
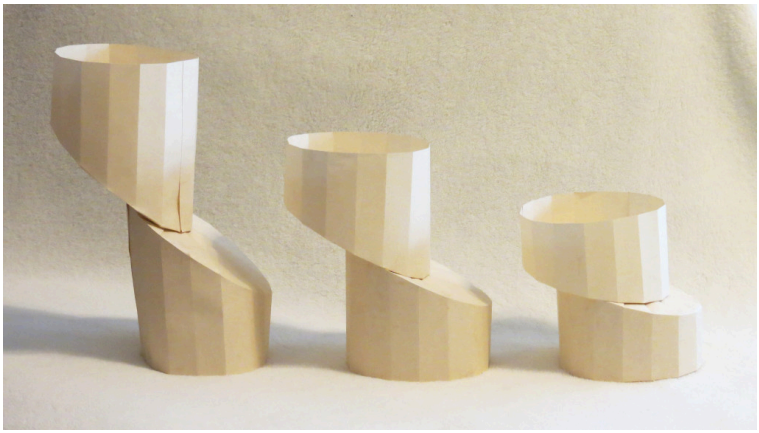


Figure 3. Demand Curve Shifted Right. *With an increase in income, consumers will purchase larger quantities, pushing demand to the right, and causing the demand curve to shift right.*

55. Reading: Summary of Factors That Change Demand



Six factors that can shift demand curves are summarized in Figure 1, below. The direction of the arrows indicates whether the demand curve shifts represent an increase in demand or a decrease in demand. Notice that a change in the price of the good or service itself is not listed among the factors that can shift a demand curve. A change in the price of a good or service causes a movement along a specific demand curve, and it typically leads to some change in the quantity demanded, but it does not shift the demand curve.

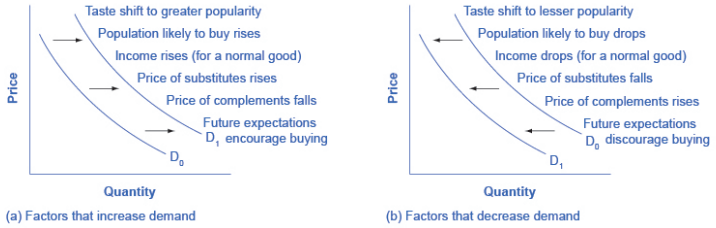


Figure 1. Factors That Shift Demand Curves *(a) A list of factors that can cause an increase in demand from D0 to D1. (b) The same factors, if their direction is reversed, can cause a decrease in demand from D0 to D1.*

56. Simulation: Demand for Food Trucks

Try It

Play the simulation below multiple times to see how different choices lead to different outcomes. All simulations allow unlimited attempts so that you can gain experience applying the concepts.

An interactive or media element has been excluded from this version of the text. You can view it online here: https://pressbooks.ccconline.org/accmacro/?p=132

57. Self Check: Demand

Check Your Understanding

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the four Readings in this section.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

An interactive or media element has been excluded from this version of the text. You can view it online here: https://pressbooks.ccconline.org/accmacro/?p=134

58. Outcome: Supply

What you'll learn to do: explain the determinants of supply

So far you've learned about the role of demand in economics—which is the consumer side of the story. In this section, you'll learn about the producer side of economics to see what factors impact the amount of goods supplied in a market. For example, suppose the global price of petroleum falls significantly. What do you think will happen to the supply of gasoline? How are supply and price connected? In this section you'll examine the law of supply and see why this counterpart to "demand" is also essential to understanding economics.

The specific things you'll learn in this section include the following:

- Explain the law of supply
- Explain a supply curve
- Create a supply curve using a data set
- Describe the differences between changes in supply and changes in quantity supplied
- Explain the impact of factors that change supply

Learning Activities

The learning activities for this section include the following:

- Video: The Law of Supply
- Reading: What Is Supply?

- Reading: Factors Affecting Supply
- Worked Example: Shift in Supply
- Reading: Summary of Factors That Change Supply
- Simulation: Supply of Food Trucks
- Self Check: Supply

59. Reading: What Is Supply?

Supply of Goods and Services

When economists talk about **supply**, they mean the amount of some good or service a producer is willing to supply at each price. Price is what the producer receives for selling one unit of a good or service. A rise in price almost always leads to an increase in the quantity supplied of that good or service, while a fall in price will decrease the quantity supplied. When the price of gasoline rises, for example, it encourages profit-seeking firms to take several actions: expand exploration for oil reserves; drill for more oil; invest in more pipelines and oil tankers to bring the oil to plants where it can be refined into gasoline; build new oil refineries; purchase additional pipelines and trucks to ship the gasoline to gas stations; and open

more gas stations or keep existing gas stations open longer hours. Economists call this positive relationship between price and quantity supplied—that a higher price leads to a higher quantity supplied and a lower price leads to a lower quantity supplied—the **law of supply**. The law of supply, like the law of demand, assumes that all other variables that affect supply (to be explained in the next reading) are held equal.

Supply vs. Quantity Supplied

In economic terminology, supply is not the same as quantity supplied. When economists refer to supply, they mean the relationship between a range of prices and the quantities supplied at those prices, a relationship that can be illustrated with a supply curve or a supply schedule. When economists refer to **quantity supplied**, they mean only a certain point on the supply curve, or one quantity on the supply schedule. In short, supply refers to the curve, and quantity supplied refers to the (specific) point on the curve.

Figure 1, below, illustrates the law of supply, again using the market for gasoline as an example. Like demand, supply can be illustrated using a table or a graph. A **supply schedule** is a table—like Table 1, below—that shows the quantity supplied at a range of different prices. Again, price is measured in dollars per gallon of gasoline, and quantity demanded is measured in millions of gallons. A **supply curve** is a graphic illustration of the relationship between price, shown on the vertical axis, and quantity, shown on the horizontal axis. You can see from this curve (Figure 1) that as the price rises, quantity supplied also increases and vice versa. The supply schedule and the supply curve are just two different ways of showing the same information. Notice that the horizontal and vertical axes on the graph for the supply curve are the same as for the demand curve.

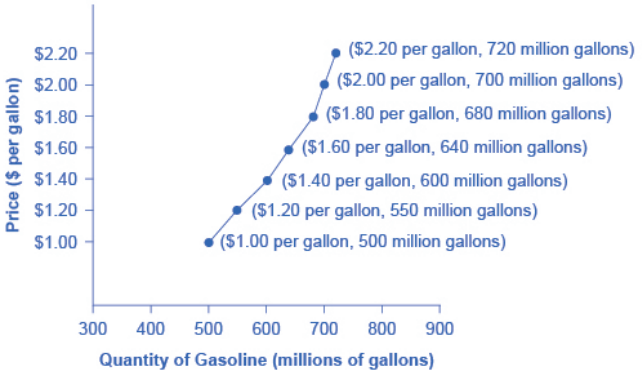


Figure 1. A Supply Curve for Gasoline

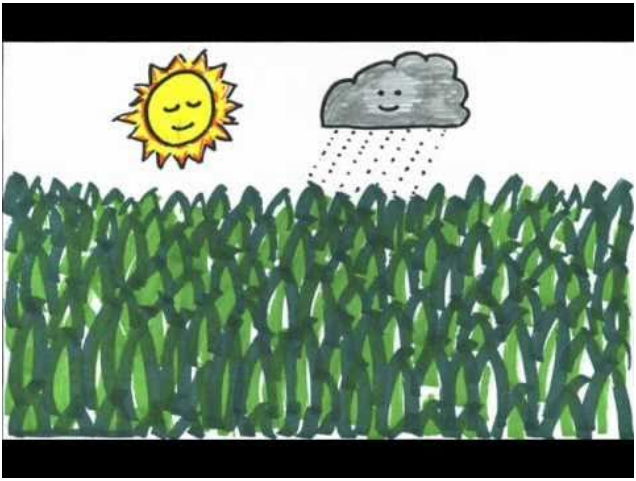
Table 1. Price and Supply of Gasoline

Price (per gallon)	Quantity Supplied (millions of gallons)
$1.00	500
$1.20	550
$1.40	600
$1.60	640
$1.80	680
$2.00	700
$2.20	720

The shape of supply curves will vary somewhat according to the product: steeper, flatter, straighter, or curved. Nearly all supply curves, however, share a basic similarity: They slope up from left to right and illustrate the law of supply. As the price rises, say, from $1.00 per gallon to $2.20 per gallon, the quantity supplied increases from 500 gallons to 720 gallons. Conversely, as the price falls, the quantity supplied decreases.

The Law of Supply Video

The law of supply states that more of a good will be provided the higher its price; less will be provided the lower its price, *ceteris paribus*. There is a direct relationship between price and quantity supplied.



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60. Reading: Factors Affecting Supply

How Production Costs Affect Supply

A supply curve shows how quantity supplied will change as the price rises and falls, assuming *ceteris paribus*, so that no other economically relevant factors are changing. If other factors relevant to supply do change, then the entire supply curve will shift. Just as a shift in demand is represented by a change in the quantity demanded at every price, a **shift in supply** means a change in the quantity supplied at every price.

In thinking about the factors that affect supply, remember what

motivates firms: profits, which are the difference between revenues and costs. Goods and services are produced using combinations of labor, materials, and machinery, or what we call **inputs** (also called **factors of production)**. If a firm faces lower costs of production, while the prices for the good or service the firm produces remain unchanged, a firm's profits go up. When a firm's profits increase, it's more motivated to produce **output** (goods or services), since the more it produces the more profit it will earn. So, when costs of production fall, a firm will tend to supply a larger quantity at any given price for its output. This can be shown by the supply curve shifting to the right.

Take, for example, a messenger company that delivers packages around a city. The company may find that buying gasoline is one of its main costs. If the price of gasoline falls, then the company will find it can deliver packages more cheaply than before. Since lower costs correspond to higher profits, the messenger company may now supply more of its services at any given price. For example, given the lower gasoline prices, the company can now serve a greater area, and increase its supply.

Conversely, if a firm faces higher costs of production, then it will earn lower profits at any given selling price for its products. As a result, a higher cost of production typically causes a firm to supply a smaller quantity at any given price. In this case, the supply curve shifts to the left.

Consider the supply for cars, shown by curve S_0 in Figure 1, below. Point J indicates that if the price is $20,000, the quantity supplied will be 18 million cars. If the price rises to $22,000 per car, *ceteris paribus*, the quantity supplied will rise to 20 million cars, as point K on the S_0 curve shows. The same information can be shown in table form, as in Table 1.

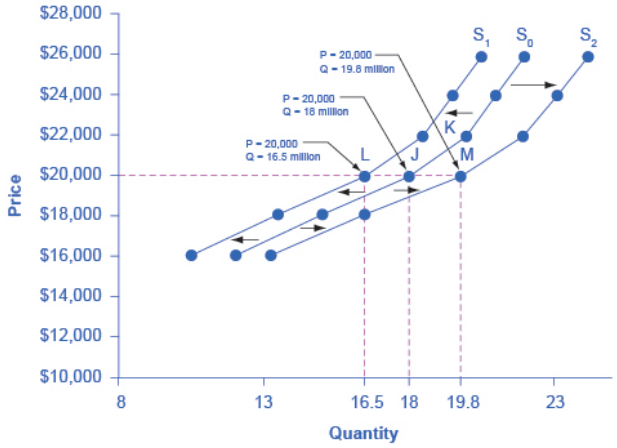


Figure 1. Shifts in Supply: A Car Example

Table 1. Price and Shifts in Supply: A Car Example

Price	**Decrease to S_1**	**Original Quantity Supplied S_0**	**Increase to S_2**
$16,000	10.5 million	12.0 million	13.2 million
$18,000	13.5 million	15.0 million	16.5 million
$20,000	16.5 million	18.0 million	19.8 million
$22,000	18.5 million	20.0 million	22.0 million
$24,000	19.5 million	21.0 million	23.1 million

Now imagine that the price of steel—an important component in vehicle manufacturing—rises, so that producing a car has become more expensive. At any given price for selling cars, car manufacturers will react by supplying a lower quantity. This can be shown graphically as a leftward shift of supply, from S_0 to S_1, which indicates that at any given price, the quantity supplied decreases. In this example, at a price of $20,000, the quantity supplied decreases

from 18 million on the original supply curve (S_0) to 16.5 million on the supply curve S_1, which is labeled as point L.

Conversely, if the price of steel decreases, producing a car becomes less expensive. At any given price for selling cars, car manufacturers can now expect to earn higher profits, so they will supply a higher quantity. The shift of supply to the right, from S_0 to S_2, means that at all prices, the quantity supplied has increased. In this example, at a price of $20,000, the quantity supplied increases from 18 million on the original supply curve (S_0) to 19.8 million on the supply curve S_2, which is labeled M.

Other Factors That Affect Supply

In the example above, we saw that changes in the prices of inputs in the production process will affect the cost of production and thus the supply. Several other things affect the cost of production, too, such as changes in weather or other natural conditions, new technologies for production, and some government policies.

The cost of production for many agricultural products will be

affected by changes in natural conditions. For example, the area of northern China that typically grows about 60 percent of the country's wheat output experienced its worst drought in at least fifty years in the second half of 2009. A drought decreases the supply of agricultural products, which means that at any given price, a lower quantity will be supplied; conversely, especially good weather would shift the supply curve to the right.

When a firm discovers a new technology that allows it to produce at a lower cost, the supply curve will shift to the right, as well. For instance, in the 1960s a major scientific effort nicknamed the Green Revolution focused on breeding improved seeds for basic crops like wheat and rice. By the early 1990s, more than two-thirds of the wheat and rice in low-income countries around the world was grown with these Green Revolution seeds—and the harvest was twice as high per acre. A technological improvement that reduces costs of production will shift supply to the right, so that a greater quantity will be produced at any given price.

Government policies can affect the cost of production and the supply curve through taxes, regulations, and subsidies. For example, the U.S. government imposes a tax on alcoholic beverages that collects about $8 billion per year from producers. Taxes are treated as costs by businesses. Higher costs decrease supply for the reasons discussed above. Other examples of policy that can affect cost are the wide array of government regulations that require firms to spend money to provide a cleaner environment or a safer workplace; complying with regulations increases costs.

A government subsidy, on the other hand, is the opposite of a tax. A **subsidy** occurs when the government pays a firm directly or reduces the firm's taxes if the firm carries out certain actions. From the firm's perspective, taxes or regulations are an additional cost of production that shifts supply to the left, leading the firm to produce a lower quantity at every given price. Government subsidies reduce the cost of production and increase supply at every given price, shifting supply to the right.

61. Worked Example: Shift in Supply

Shift in Supply Due to Production-Cost Increase

We know that a supply curve shows the minimum price a firm will accept to produce a given quantity of output. What happens to the supply curve when the cost of production goes up? Following is an example of a shift in supply due to an increase in production cost.

Step 1. Draw a graph of a supply curve for pizza. Pick a quantity (like Q_0). If you draw a vertical line up from Q_0 to the supply curve, you will see the price the firm chooses. An example is shown in Figure 1.

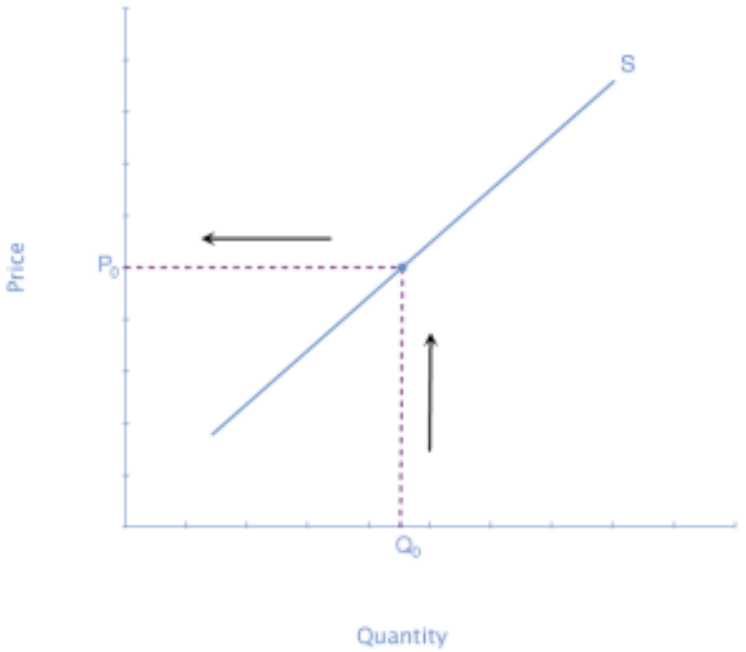


Figure 1. Supply Curve*. The supply curve can be used to show the minimum price a firm will accept to produce a given quantity of output.*

Step 2. Why did the firm choose that price and not some other? One way to think about this is that the price is composed of two parts. The first part is the average cost of production: in this case, the cost of the pizza ingredients (dough, sauce, cheese, pepperoni, and so on), the cost of the pizza oven, the rent on the shop, and the wages of the workers. The second part is the firm's desired profit, which is determined, among other factors, by the profit margins in that particular business. If you add these two parts together, you get the price the firm wishes to charge. The quantity Q_0 and associated price P_0 give you one point on the firm's supply curve, as shown in Figure 2.

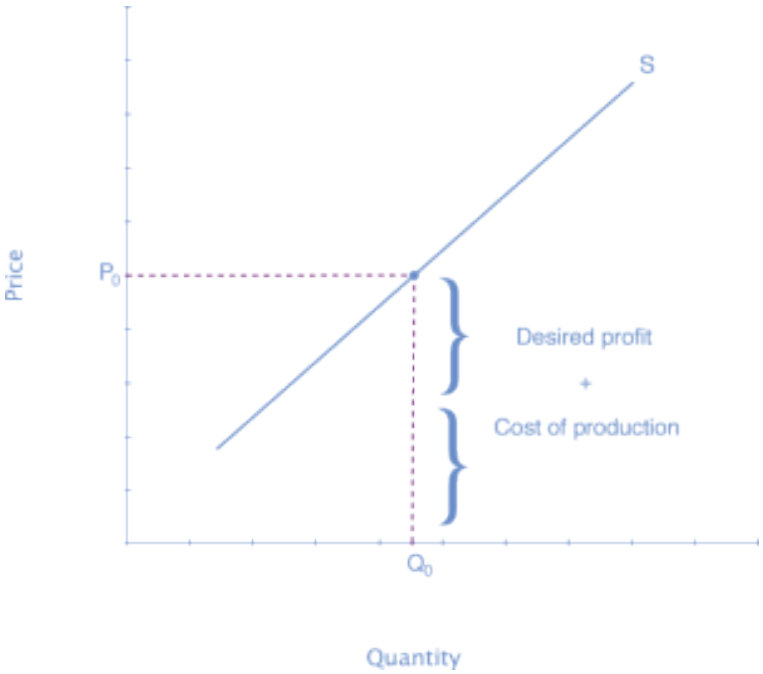


Figure 2. Setting Prices*. The cost of production and the desired profit equal the price a firm will set for a product.*

Step 3. Now, suppose that the cost of production goes up. Perhaps cheese has become more expensive by $0.75 per pizza. If that is true, the firm will want to raise its price by the amount of the increase in cost ($0.75). Draw this point on the supply curve directly above the initial point on the curve, but $0.75 higher, as shown in Figure 3.

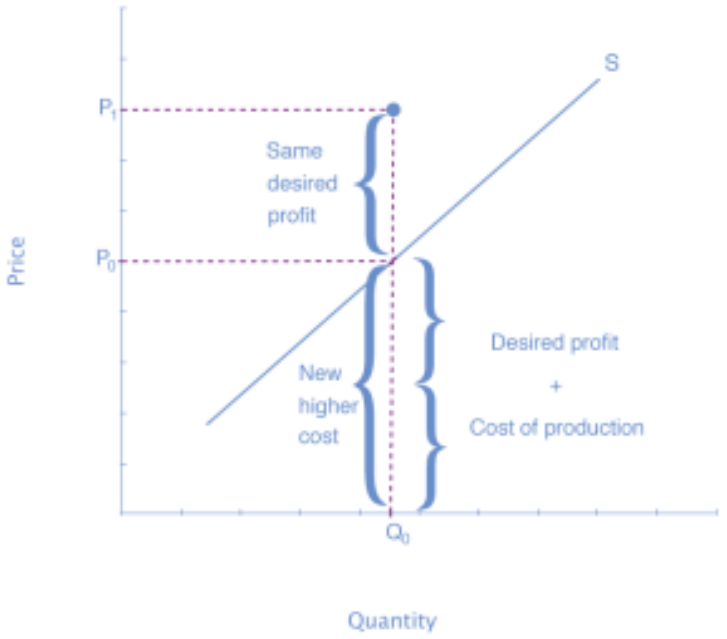


Figure 3. Increasing Costs Lead to Increasing Price. *Because the cost of production plus the desired profit equal the price a firm will set for a product, if the cost of production increases, the price for the product will also need to increase.*

Step 4. Shift the supply curve through this point. You will see that an increase in cost causes a leftward shift of the supply curve so that at any price, the quantities supplied will be smaller, as shown in Figure 4.

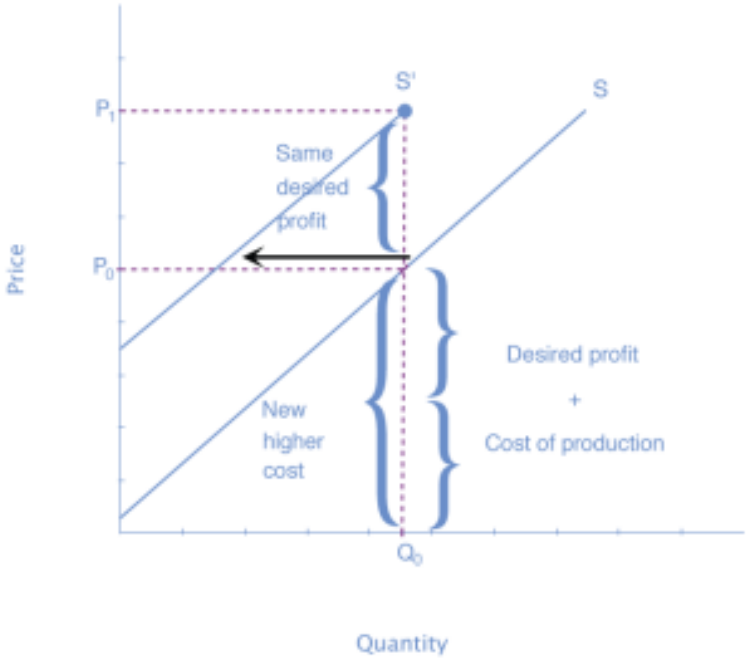


Figure 4. Supply Curve Shifted Left*. When the cost of production increases, the supply curve shifts leftward to a new price level.*

62. Reading: Summary of Factors That Change Supply

Changes in the cost of inputs, natural disasters, new technologies, and the impact of government decisions all affect the cost of production. In turn, these factors affect how much firms are willing to supply at any given price.

Figure 1, below, summarizes factors that change the supply of goods and services. Notice that a change in the price of the product itself is not among the factors that shift the supply curve. Although a change in price of a good or service typically causes a change in quantity supplied or a movement along the supply curve for that specific good or service, it does not cause the supply curve itself to shift.

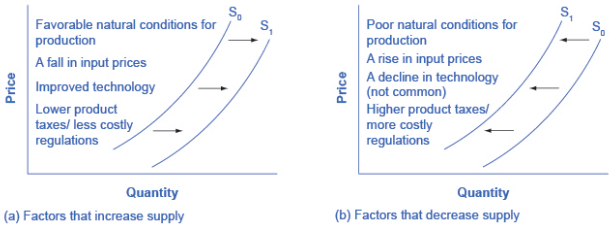


Figure 1. Factors That Shift Supply Curves. *(a) A list of factors that can cause an increase in supply from S0 to S1. (b) The same factors, if their direction is reversed, can cause a decrease in supply from S0 to S1.*

Because demand and supply curves appear on a two-dimensional diagram with only price and quantity on the axes, an unwary visitor to the land of economics might be fooled into believing that economics is about only four topics: demand, supply, price, and quantity. However, demand and supply are really "umbrella" concepts: demand covers all the factors that affect demand, and supply covers all the factors that affect supply. Factors other than price that affect demand and supply are included by using shifts in the demand or the supply curve. In this way, the two-dimensional demand and supply model becomes a powerful tool for analyzing a wide range of economic circumstances.

63. Simulation: Supply of Food Trucks

Try It

Play the simulation below multiple times to see how different choices lead to different outcomes. All simulations allow unlimited attempts so that you can gain experience applying the concepts.

An interactive or media element has been excluded from this version of the text. You can view it online here: https://pressbooks.ccconline.org/accmacro/?p=146

64. Self Check: Supply

Check Your Understanding

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the three Readings in this section.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

An interactive or media element has been excluded from this version of the text. You can view it online here: https://pressbooks.ccconline.org/accmacro/?p=148

65. Outcome: Equilibrium

What you'll learn to do: explain and graphically illustrate market equilibrium, surplus, and shortage

In this section, you'll learn how supply and demand interact to determine the price in a market.

The specific things you'll learn in this section include the following:

- Define and explain equilibrium price and quantity
- Create a graph that illustrates equilibrium price and quantity
- Define and explain surpluses and shortages
- Create a graph that illustrates surpluses and shortages
- Describe how disequilibrium can create surpluses and shortages; explain how markets eliminate them

Learning Activities

The learning activities for this section include the following:

- Reading: Equilibrium, Surplus, and Shortage
- Video: Market Equilibrium
- Reading: Changes in Equilibrium
- Worked Example: Supply and Demand
- Simulation: Food Trucks and Changes in Equilibrium
- Self Check: Equilibrium

66. Video: Market Equilibrium

https://youtu.be/W5nHpAn6FvQ?t=1s

Equilibrium occurs at the point where quantity supplied = quantity demanded.

67. Reading: Changes in Equilibrium

The Four-Step Process

Let's begin this discussion with a single economic event. It might be an event that affects demand, like a change in income, population, tastes, prices of substitutes or complements, or expectations about future prices. It might be an event that affects supply, like a change in natural conditions, input prices, technology, or government policies that affect production. How does an economic event like one of these affect equilibrium price and quantity? We'll investigate this question using a four-step process.

Step 1. Draw a demand and supply model before the economic change took place. Creating the model requires four standard pieces of information: the law of demand, which tells us the slope of the demand curve; the law of supply, which gives us the slope of the

supply curve; the shift variables for demand; and the shift variables for supply. From this model, find the initial equilibrium values for price and quantity.

Step 2. Decide whether the economic change being analyzed affects demand or supply. In other words, does the event refer to something in the list of demand factors or supply factors?

Step 3. Decide whether the effect on demand or supply causes the curve to shift to the right or to the left, and sketch the new demand or supply curve on the diagram. In other words, does the event increase or decrease the amount consumers want to buy or producers want to sell?

Step 4. Identify the new equilibrium, and then compare the original equilibrium price and quantity to the new equilibrium price and quantity.

Newspapers and the Internet

According to the Pew Research Center for People and the Press, more and more people, especially younger people, are getting their news from online and digital sources. The majority of U.S. adults now own smartphones or tablets, and most of those Americans say they use them in part to get the news. From 2004 to 2012, the share of Americans who reported getting their news from digital sources increased from 24 percent to 39 percent. How has this trend affected consumption of print news media and radio and television news? Figure 1 and the text below illustrate the four-step analysis used to answer this question.

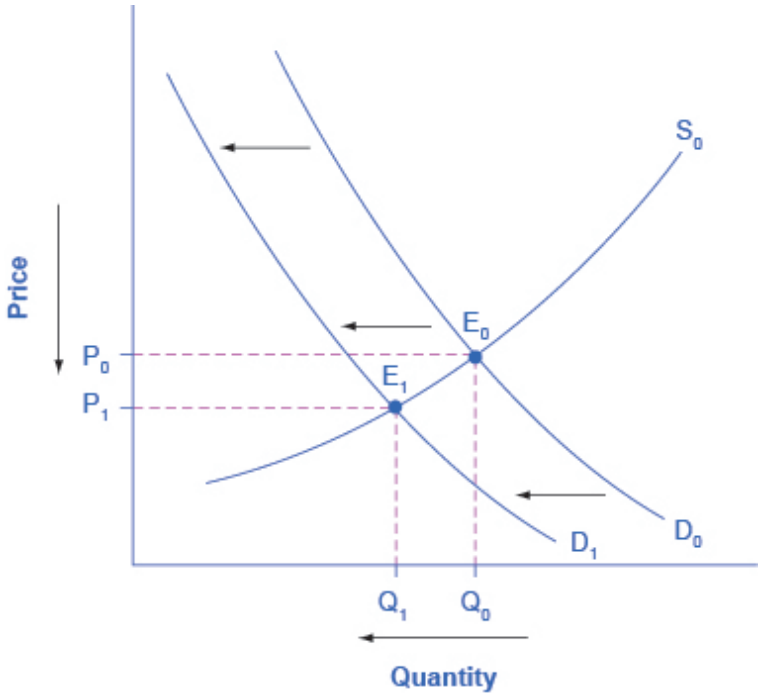


Figure 1. The Print News Market: A Four-Step Analysis

Step 1. Develop a demand and supply model to think about what the market looked like before the event. The demand curve D0 and the supply curve S0 show the original relationships. In this case, the analysis is performed without specific numbers on the price and quantity axis.

Step 2. Did the change described affect supply or demand? A change in tastes, from traditional news sources (print, radio, and television) to digital sources, caused a change in demand for the former.

Step 3. Was the effect on demand positive or negative? A shift to digital news sources will tend to mean a lower quantity demanded of traditional news sources at every given price, causing the demand

curve for print and other traditional news sources to shift to the left, from D0 to D1.

Step 4. Compare the new equilibrium price and quantity to the original equilibrium price. The new equilibrium (E1) occurs at a lower quantity and a lower price than the original equilibrium (E0).

The decline in print news reading predates 2004. Print newspaper circulation peaked in 1973 and has declined since then due to competition from television and radio news. In 1991, 55 percent of Americans indicated that they got their news from print sources, while only 29 percent did so in 2012. Radio news has followed a similar path in recent decades, with the share of Americans getting their news from radio declining from 54 percent in 1991 to 33 percent in 2012. Television news has held its own during the last fifteen years, with the market share staying in the mid to upper fifties. What does this suggest for the future, given that two-thirds of Americans under thirty years old say they don't get their news from television at all?

68. Simulation: Food Trucks and Changes in Equilibrium

Try It

Play the simulation below multiple times to see how different choices lead to different outcomes. All simulations allow unlimited attempts so that you can gain experience applying the concepts.

An interactive or media element has been excluded from this version of the text. You can view it online here: https://pressbooks.ccconline.org/accmacro/?p=160

69. Self Check: Equilibrium

Check Your Understanding

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the three Readings in this section.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

An interactive or media element has been excluded from this version of the text. You can view it online here: https://pressbooks.ccconline.org/accmacro/?p=162

70. Problem Set: Supply and Demand 1

Test your understanding of the learning outcomes in this module by working through the following problems. These problems aren't graded, but they give you a chance to practice before taking the quiz.

If you'd like to try a problem again, you can click the link that reads, "Try another version of these questions."

Use the information provided in the first question for all of the questions in this problem set.

An interactive or media element has been excluded from this version of the text. You can view it online here: https://pressbooks.ccconline.org/accmacro/?p=164

71. Problem Set: Supply and Demand 2

Test your understanding of the learning outcomes in this module by working through the following problems. These problems aren't graded, but they give you a chance to practice before taking the quiz.

If you'd like to try a problem again, you can click the link that reads, "Try another version of these questions."

Use the information provided in the first question for all of the questions in this problem set.

An interactive or media element has been excluded from this version of the text. You can view it online here: https://pressbooks.ccconline.org/accmacro/?p=166

72. Problem Set: Supply and Demand 3

Test your understanding of the learning outcomes in this module by working through the following problems. These problems aren't graded, but they give you a chance to practice before taking the quiz.

If you'd like to try a problem again, you can click the link that reads, "Try another version of these questions."

Use the information provided in the first question for all of the questions in this problem set.

An interactive or media element has been excluded from this version of the text. You can view it online here: https://pressbooks.ccconline.org/accmacro/?p=168

73. Putting It Together: Supply and Demand

Summary

The goal of this module was to explain how demand and supply for a good or service determine prices and quantities bought and sold. In the process, you learned what factors influence demand and what factors influence supply. You learned how to:

- Describe and differentiate between the major economic systems
- Explain the determinants of demand
- Explain the determinants of supply
- Define and graphically illustrate market equilibrium, surplus, and shortage

Synthesis

You'll remember that we started this module by considering changes in global coffee prices. Let's focus specifically on the drought of 2014.

***Figure 1. Coffee Prices**. Source: Trading Economics*

Now that we understand more about supply and demand, we can answer a few important questions: How does a drought impact supply? What impact will the quantity supplied have on the equilibrium price?

In 2014, the coffee regions of Brazil experienced a serious drought. The lack of rain in Brazil's coffee-growing region delayed the tree-flowering period, which spans October and November. When the trees don't flower, they don't produce coffee. Weather conditions also affect the pollination of coffee trees that have already flowered: Drought makes the blooms very delicate, which can cause them to fall off the tree. In 2014, the combined impact of these consequences meant a 13 percent drop in production from the previous year, to only 48 million 60-kilogram bags.[1]

1. http://www.wallstreetdaily.com/2014/10/21/coffee-prices-brazil-drought/

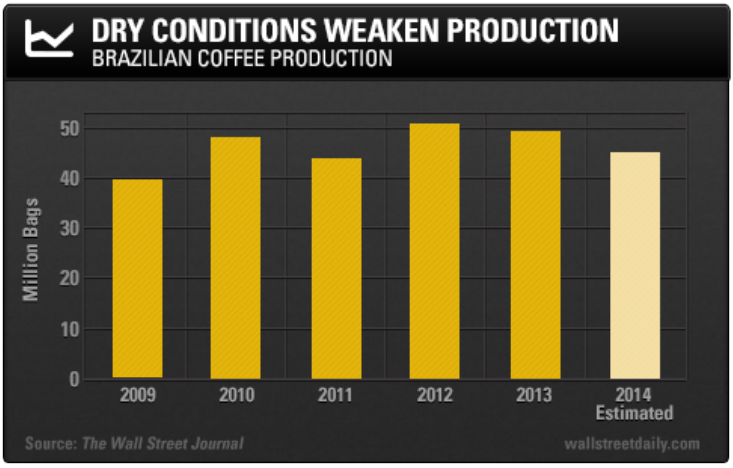


Figure 2

These are poor natural conditions for coffee growers, and they cause a reduction in the supply. Graphically, such a reduction means a shift to the left in the supply curve (shown in Figure 3, below), indicating that suppliers are providing less coffee at every price.

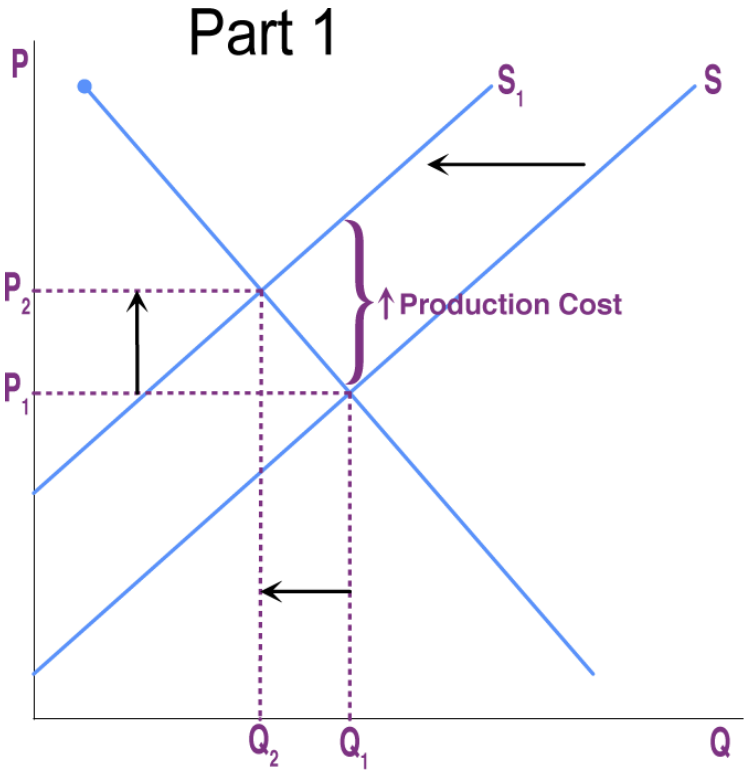


Figure 3

We can see that this shift in the supply curve will change the quantity supplied and the equilibrium price. At the original price (P1), the decrease in supply causes a shortage—more people want coffee at that low price than the suppliers are able to provide. This drives up the price to a new equilibrium level (P2). In short, a leftward shift in the supply curve causes a movement up the demand curve, resulting in a lower equilibrium quantity (Q2) and a higher equilibrium price (P2).

This impact is clear in an economic model like the graph above, but does it really affect consumers? Absolutely!—during this period, Starbucks raised its prices by 8 percent, and Folgers raised its prices

by 9 percent. Coffee retailers were able to limit some of the impact of the rising coffee prices by drawing down their stock of green beans that were purchased before the drought and passing on some of the cost on to their customers as a higher price.[2]

It's very common to see the impact of drought and other natural factors on supply, equilibrium quantity, and equilibrium price. The following video provides a brief example in the United States.

A YouTube element has been excluded from this version of the text. You can view it online here: https://pressbooks.ccconline.org/accmacro/?p=170

Will raising the price of coffee cause consumers to drink less coffee? How much of an impact does a price change have on demand? Now

2. http://www.barrons.com/articles/rise-in-coffee-prices-nearing-peak-1444457073

that you understand the basic principles of supply and demand, we're ready to take on these questions in the next module.

74. Glossary: Supply and Demand

ceteris paribus other things being equal

command economy an economy where economic decisions are passed down from government authority and where resources are owned by the government; also called a "planned economy"

competitive market a large market in which there is a large number of buyers and sellers, so that no one can control the market price

free market a market in which the government does not intervene in any way

complements goods that are often used together, so consumption of one good tends to enhance consumption of the other

demand the amount of a good or service that consumers are willing and able to purchase at each price

demand curve a graphic representation of the relationship between price and quantity of a certain good or service demanded, with quantity on the horizontal axis and the price on the vertical axis

demand schedule a table that shows a range of prices for a certain good or service and the quantity demanded at each price

equilibrium when the quantity demanded is equal to the quantity supplied

equilibrium price the price where quantity demanded is equal to quantity supplied

equilibrium quantity the quantity at which quantity demanded and quantity supplied are equal for a certain price level

inferior good a product whose demand falls when income rises, and vice versa

inputs the combination of labor, materials, and machinery used to produce goods and services; *also called "factors of production"*

law of demand states that more of a good will be demanded (bought)

the lower its price, and less of a good will be demanded (bought) the higher its price, ceteris paribus (other things being equal)

law of supply states that more of a good will be provided the higher its price; less will be provided the lower its price, *ceteris paribus* (other things being equal)

market interaction between potential buyers and sellers; a combination of demand and supply

market economy an economy in which economic decisions are decentralized, resources are owned by private individuals, and businesses supply goods and services based on demand

normal good a product whose demand rises when income rises, and vice versa

outputs goods or services

price what a buyer pays for a unit of a specific good or service

quantity demanded the total number of units of a good or service that consumers are willing to purchase at a given price

quantity supplied the total number of units of a good or service that producers are willing to sell at a given price

shift in demand when a change in some economic factor (other than price) causes a different quantity to be demanded at every price

shift in supply when a change in some economic factor (other than price) causes a different quantity to be supplied at every price

shortage at the existing price, the quantity demanded exceeds the quantity supplied; *also called "excess demand"*

subsidy when the government pays a firm directly or reduces the firm's taxes if the firm carries out certain actions

substitute a good that can replace another to some extent, so greater consumption of one good tends to mean less of the other

supply the amount of a good or service that a producer is willing to supply at each price

supply curve a line that shows the relationship between price and quantity supplied on a graph, with quantity supplied on the horizontal axis and price on the vertical axis

supply schedule a table that shows a range of prices for a good or service and the quantity supplied at each price

surplus at the existing price, the quantity supplied exceeds the quantity demanded; *also called* "*excess supply*"

75. Discussion: Supply and Demand

A key skill in economics is the ability to use the theory of supply and demand to analyze specific markets. In this week's discussion, you get a chance to demonstrate your ability to analyze the effects of several "shocks" to the market for coffee. Choose one of the three scenarios below.

Scenario 1: Suppose that, as part of an international trade agreement, the U.S. government reduces the tariff on imported coffee. Will this affect the supply or the demand for coffee? Why? Which determinant of demand or supply is being affected? Show graphically with before- and after-curves on the same axes. How will this change the equilibrium price and quantity of coffee? Explain your reasoning.

Scenario 2: Suppose the National Institutes of Health publishes a study finding that coffee drinking reduces the probability of getting colon cancer. How do you imagine this will affect the market for coffee? Why? Which determinant of demand or supply is being affected? Show graphically with before- and after-curves on the same axes. How will this change the equilibrium price and quantity of coffee? Explain your reasoning.

Scenario 3: Combine parts 1 and 2. Suppose that the U.S. government reduces the tariff on imported coffee, and a reputable study is published indicating that coffee drinkers have lower rates of colon cancer. What will the combined impact be on the equilibrium price and quantity of coffee? Explain your reasoning and show graphically. Make sure you think this through carefully!

PART IV

LESSON 3: CHANGES IN THE MARKET AND MARKET INTERVENTION

76. Reading: Equilibrium, Surplus, and Shortage

Demand and Supply

In order to understand market equilibrium, we need to start with the laws of demand and supply. Recall that the law of demand says that as price decreases, consumers demand a higher quantity. Similarly, the law of supply says that when price decreases, producers supply a lower quantity.

Because the graphs for demand and supply curves both have price on the vertical axis and quantity on the horizontal axis, the demand curve and supply curve for a particular good or service can appear on the same graph. Together, demand and supply determine

the price and the quantity that will be bought and sold in a market. These relationships are shown as the demand and supply curves in Figure 1, which is based on the data in Table 1, below.

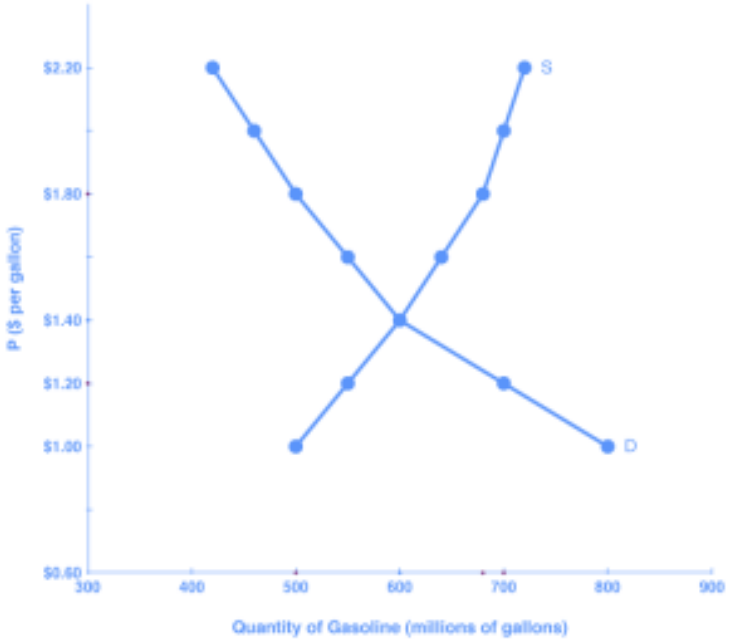


Figure 1. Demand and Supply for Gasoline

Table 1. Price, Quantity Demanded, and Quantity Supplied

Price (per gallon)	Quantity demanded (millions of gallons)	Quantity supplied (millions of gallons)
$1.00	800	500
$1.20	700	550
$1.40	**600**	**600**
$1.60	550	640
$1.80	500	680
$2.00	460	700
$2.20	420	720

If you look at either Figure 1 or Table 1, you'll see that, at most prices, the amount that consumers want to buy (which we call quantity demanded) is different from the amount that producers want to sell (which we call quantity supplied). What does it mean when the quantity demanded and the quantity supplied aren't the same? Answer: a surplus or a shortage.

Surplus or Excess Supply

Let's consider one scenario in which the amount that producers want to sell doesn't match the amount that consumers want to buy. Suppose that a market produces *more* than the quantity demanded. Let's use our example of the price of a gallon of gasoline. Imagine that the price of a gallon of gasoline were $1.80 per gallon. This price is illustrated by the dashed horizontal line at the price of $1.80 per gallon in Figure 2, below.

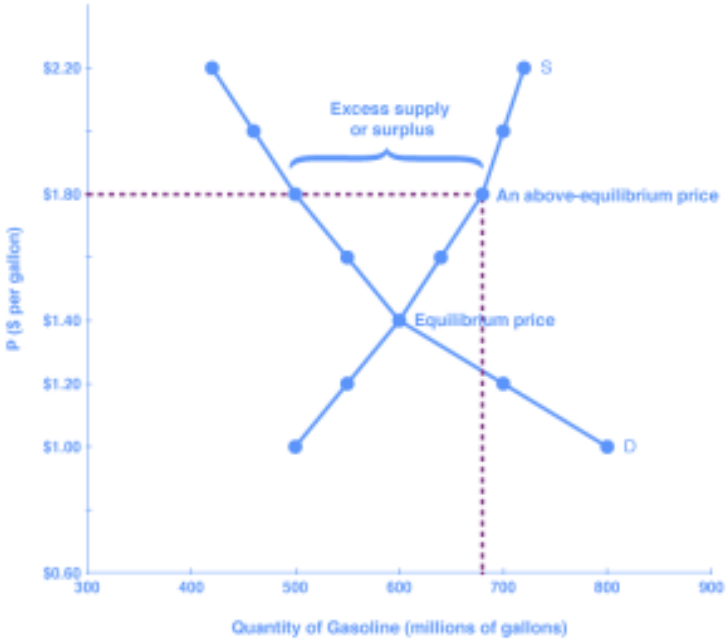


Figure 2. Demand and Supply for Gasoline: Surplus

At this price, the quantity demanded is 500 gallons, and the quantity of gasoline supplied is 680 gallons. You can also find these numbers in Table 1, above. Now, compare quantity demanded and quantity supplied at this price. Quantity supplied (680) is greater than quantity demanded (500). Or, to put it in words, the amount that producers want to sell is greater than the amount that consumers want to buy. We call this a situation of **excess supply** (since Qs > Qd) or a **surplus**. Note that whenever we compare supply and demand, it's in the context of a specific price—in this case, $1.80 per gallon.

With a surplus, gasoline accumulates at gas stations, in tanker trucks, in pipelines, and at oil refineries. This accumulation puts

pressure on gasoline sellers. If a surplus remains unsold, those firms involved in making and selling gasoline are not receiving enough cash to pay their workers and cover their expenses. In this situation, some producers and sellers will want to cut prices, because it is better to sell at a lower price than not to sell at all. Once some sellers start cutting prices, others will follow to avoid losing sales. These price reductions will, in turn, stimulate a higher quantity demanded.

How far will the price fall? Whenever there is a surplus, the price will drop until the surplus goes away. When the surplus is eliminated, the quantity supplied just equals the quantity demanded—that is, the amount that producers want to sell exactly equals the amount that consumers want to buy. We call this **equilibrium**, which means "balance." In this case, the equilibrium occurs at a price of $1.40 per gallon and at a quantity of 600 gallons. You can see this in Figure 2 (and Figure 1) where the supply and demand curves cross. You can also find it in Table 1 (the numbers in **bold**).

Equilibrium: Where Supply and Demand Intersect

When two lines on a diagram cross, this intersection usually means something. On a graph, the point where the supply curve (S) and the demand curve (D) intersect is the **equilibrium**. The **equilibrium price** is the only price where the desires of consumers and the desires of producers agree—that is, where the amount of the product that consumers want to buy (quantity demanded) is equal to the amount producers want to sell (quantity supplied). This mutually desired amount is called the **equilibrium quantity**. At any other price, the quantity demanded does not equal the quantity supplied, so the market is not in equilibrium at that price.

If you have only the demand and supply schedules, and no graph,

you can find the equilibrium by looking for the price level on the tables where the quantity demanded and the quantity supplied are equal (again, the numbers in **bold** in Table 1 indicate this point).

Finding Equilibrium with Algebra

We've just explained two ways of finding a market equilibrium: by looking at a table showing the quantity demanded and supplied at different prices, and by looking at a graph of demand and supply. We can also identify the equilibrium with a little algebra if we have equations for the supply and demand curves.

Let's practice solving a few equations that you will see later in the course. Right now, we are only going to focus on the math. Later you'll learn why these models work the way they do, but let's start by focusing on solving the equations.

Suppose that the demand for soda is given by the following equation:

[latex]Qd=16−2P[/latex]

where Qd is the amount of soda that consumers want to buy (i.e., quantity demanded), and *P* is the price of soda.

Suppose the supply of soda is

[latex]Qs=2+5P[/latex]

where Qs is the amount of *t* that producers will supply (i.e., quantity supplied).

Finally, suppose that the soda market operates at a point where supply equals demand, or

[latex]Qd=Qs[/latex]

We now have a system of three equations and three unknowns (Qd, Qs, and P), which we can solve with algebra. Since [latex]Qd=Qs[/latex], we can set the demand and supply equation equal to each other:

[latex]\begin{array}{c}\,\,Qd=Qs\\16-2P=2+5P\ end{array}[/latex]

Step 1: Isolate the variable by adding 2P to both sides of the equation, and subtracting 2 from both sides.

[latex]\begin{array}{l}\,16-2P=2+5P\\-2+2P=-2+2P\\ \,14=7P\end{array}[/latex]

Step 2: Simplify the equation by dividing both sides by 7.

[latex]\begin{array}{l}\underline{14}=\underline{7P}\ \\\,\,\,\,7\,\,\,\,\,\,\,\,\,\,\,\,\,\,\,7\\\,\,\,\,\,\,\,\,2=P\ end{array}[/latex]

The price of each soda will be $2. Now we want to understand the amount of soda that consumers want to buy, or the quantity demanded, at a price of $2.

Remember, the formula for quantity demanded is the following:

[latex]Qd=16-2P[/latex]

Taking the price of $2, and plugging it into the demand equation, we get

[latex]\begin{array}{l}Qd=16−2(2)\\Qd=16−4\\Qd=12 \end{array}[/latex]

So, if the price is $2 each, *consumers* will purchase 12. How much will producers supply, or what is the quantity supplied? Taking the price of $2, and plugging it into the equation for quantity supplied, we get the following:

[latex]\begin{array}{l}Qs=2+5P\\Qs=2+5(2)\\Qs=2+10\\Qs=12\end{array}[/latex]

Now, if the price is $2 each, *producers* will supply 12 sodas. This means that we did our math correctly, since [latex]Qd=Qs[/latex] and both Qd and Qs are equal to 12.

Shortage or Excess Demand

Let's return to our gasoline problem. Suppose that the price is $1.20 per gallon, as the dashed horizontal line at this price in Figure 3, below, shows. At this price, the quantity demanded is 700 gallons, and the quantity supplied is 550 gallons.

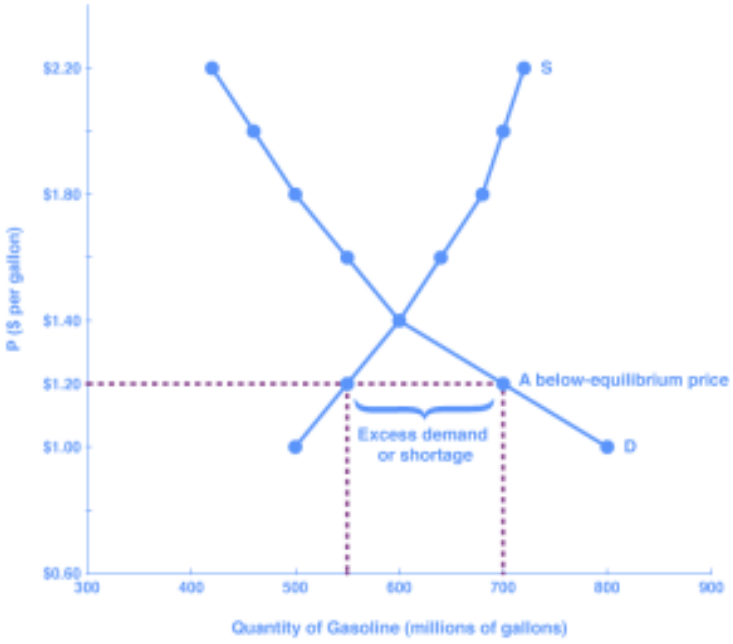


Figure 3. Demand and Supply for Gasoline: Shortage

Quantity supplied (550) is less than quantity demanded (700). Or, to put it in words, the amount that producers want to sell is less than the amount that consumers want to buy. We call this a situation of **excess demand** (since Qd > Qs) or a **shortage**.

In this situation, eager gasoline buyers mob the gas stations, only to find many stations running short of fuel. Oil companies and gas stations recognize that they have an opportunity to make higher profits by selling what gasoline they have at a higher price. These price increases will stimulate the quantity supplied and reduce the quantity demanded. As this occurs, the shortage will decrease. How far will the price rise? The price will rise until the shortage is

eliminated and the quantity supplied equals quantity demanded. In other words, the market will be in equilibrium again. As before, the equilibrium occurs at a price of $1.40 per gallon and at a quantity of 600 gallons.

Generally any time the price for a good is *below* the equilibrium level, incentives built into the structure of demand and supply will create pressures for the price to rise. Similarly, any time the price for a good is *above* the equilibrium level, similar pressures will generally cause the price to fall.

As you can see, the quantity supplied or quantity demanded in a free market will correct over time to restore balance, or equilibrium.

Equilibrium and Economic Efficiency

Equilibrium is important to create both a balanced market and an efficient market. If a market is at its equilibrium price and quantity, then it has no reason to move away from that point, because it's balancing the quantity supplied and the quantity demanded. However, if a market is not at equilibrium, then economic pressures arise to move the market toward the equilibrium price and equilibrium quantity. This happens either because there is more supply than what the market is demanding or because there is more demand than the market is supplying. This balance is a natural function of a free-market economy.

Also, a competitive market that is operating at equilibrium is an efficient market. Economist typically define efficiency in this way: when it is impossible to improve the situation of one party without imposing a cost on another. Conversely, if a situation is inefficient, it becomes possible to benefit at least one party without imposing costs on others.

Efficiency in the demand and supply model has the same basic meaning: The economy is getting as much benefit as possible from its scarce resources, and all the possible gains from trade have been

achieved. In other words, the optimal amount of each good and service is being produced and consumed.

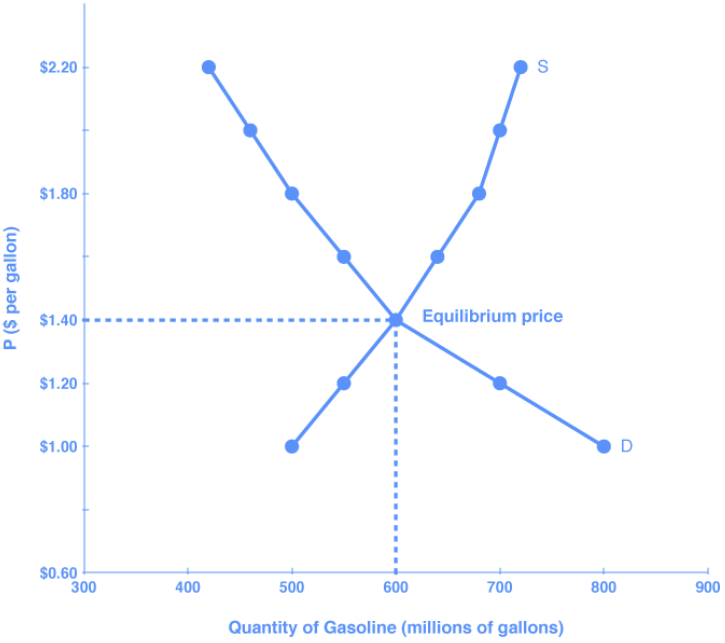


Figure 4. Demand and Supply for Gasoline: Equilibrium

77. Reading: Shift in both Supply and Demand

Supply and Demand

The example we just considered showed a shift to the left in the demand curve, as a change in consumer preferences reduced demand for newspapers. Often changes in an economy affect both the supply and the demand curves, making it more difficult to assess the impact on the equilibrium price. Let's review one such example.

First, consider the following questions:

1. Suppose postal workers are successful in obtaining a pay raise from the U.S. Postal Service. Will this affect the supply or the

demand for first-class mail? Why? Which determinant of demand or supply is being affected? Show graphically with before and after curves on the same axes. How will this change the equilibrium price and quantity of first-class mail?

2. How do you imagine the invention of email and text messaging affected the market for first-class mail? Why? Which determinant of demand or supply is being affected? Show graphically with before and after curves on the same axes. How will this change the equilibrium price and quantity of first-class mail?
3. Suppose that postal workers get a pay raise *and* email and text messaging become common. What will the combined impact be on the equilibrium price and quantity of first-class mail?

In order to complete a complex analysis like this it's helpful to tackle the parts separately and then combine them, while thinking about possible interactions between the two parts that might affect the overall outcome.

Part 1: A Pay Raise for Postal Workers

A pay raise for postal workers would represent an increase in the cost of production for the Postal Service. Production costs are a factor that influences supply; thus, the pay raise should decrease the supply of first-class mail, shifting the supply curve vertically by the amount of the pay raise. Intuitively, all else held constant, the Postal Service would like to charge a higher price that incorporates the higher cost of production. That is not to say the higher price will stick. From the graph (Figure 1), it should be clear that at that higher price, the quantity supplied is greater than the quantity demanded—thus there would be a surplus, indicating that the price the Postal Service desires is not an equilibrium price. Or to put it differently, at the original price (P1), the decrease in supply causes

a shortage driving up the price to a new equilibrium level (P2). Note that the price doesn't rise by the full amount of the pay increase. In short, a leftward shift in the supply curve causes a movement up the demand curve, resulting in a lower equilibrium quantity (Q2) and a higher equilibrium price (P2).

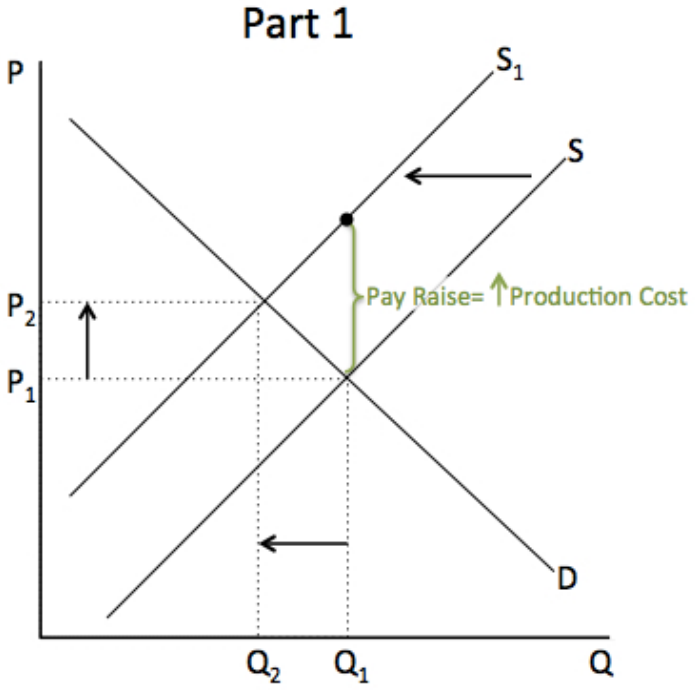


Figure 1

Part 2: The Effect of Email and Text Messaging

Since many people find email and texting more convenient than sending a letter, we can assume that tastes and preferences for first-class mail will decline. This decrease in demand is shown by a leftward shift in the demand curve and a movement along the

supply curve, which creates a surplus in first-class mail at the original price (shown as P2). The shortage causes a decrease in the equilibrium price (to P3) and a decrease in the equilibrium quantity (to Q3). Intuitively, less demand for first-class mail leads to a lower equilibrium quantity and (ceteris paribus) a lower equilibrium price.

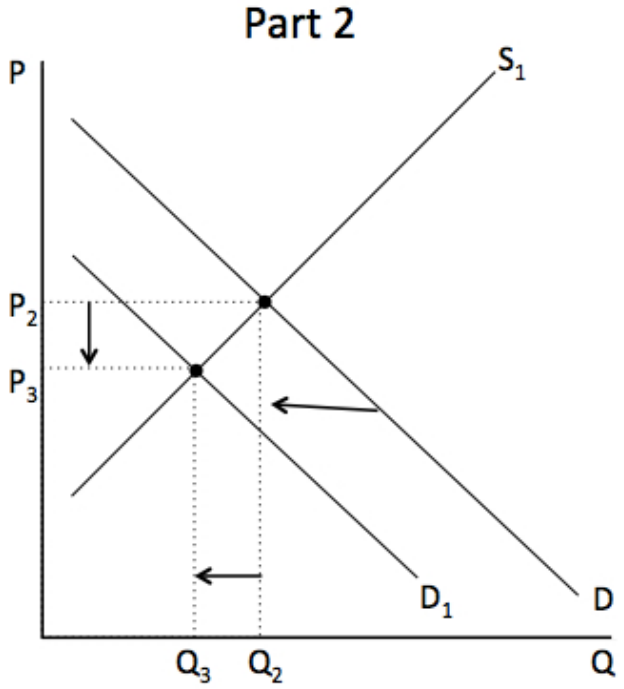


Figure 2

Part 3: Combining Factors

Parts 1 and 2 are straightforward, but when we put them together it becomes more complex. Think about it this way: In Part 1, the equilibrium quantity fell due to decreased supply. In Part 2, the equilibrium quantity also fell, this time due to the decreased

demand. So putting the two parts together, we would expect to see the final equilibrium quantity (Q3) to be smaller than the original equilibrium quantity (Q1). So far, so good.

Now consider what happens to the price. In Part 1, the equilibrium price increased due to the reduction in supply. But in Part 2, the equilibrium price decreased due to the decrease in demand! What will happen to the equilibrium price? The net effect on price can't be determined without knowing which curve shifts more, demand or supply. The equilibrium price could increase, decrease, or stay the same. You just can't tell from graphical analysis alone.

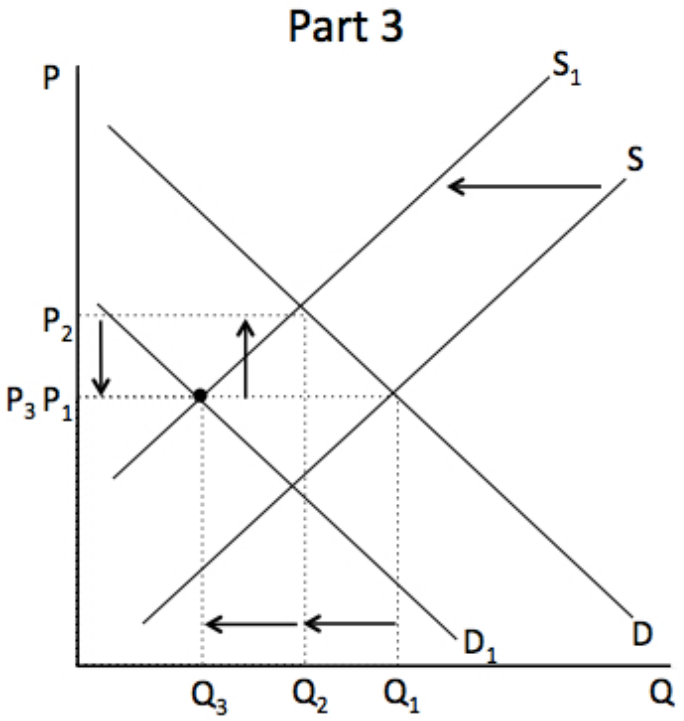


Figure 3

78. Outcome: Price Ceilings

What you'll learn to do: analyze the consequences of the government setting a binding price ceiling

In this outcome, we will learn what happens when prices are held below a certain level. Governments typically set a price ceiling to protect consumers by making necessary products affordable, but in this section you'll see how this sometimes backfires by creating a market shortage or other unintended consequences.

The specific things you'll learn to do in this section include:

- Identify the market's equilibrium price and quantity under a price ceiling
- Compute and graph the market shortage resulting from a price ceiling

LEARNING ACTIVITIES

The learning activities for this section include:

- Reading: Price Ceilings
- Self Check: Price Ceilings

Take time to review and reflect on each of these activities in order to improve your performance on the assessment for this section.

79. Reading: Price Ceilings

Demand and Supply Model

Controversy sometimes surrounds the prices and quantities established by demand and supply, especially for products that are considered necessities. In some cases, discontent over prices turns into public pressure on politicians, who may then pass legislation to prevent a certain price from climbing "too high" or falling "too low."

The demand and supply model shows how people and firms will react to the incentives provided by these laws to control prices, in ways that will often lead to undesirable consequences. Alternative policy tools can often achieve the desired goals of price control laws, while avoiding at least some of their costs and tradeoffs.

Price Ceilings

Laws that government enacts to regulate prices are called *Price Controls*. Price controls come in two flavors. A *price ceiling* keeps a price from rising above a certain level (the "ceiling"), while a *price floor* keeps a price from falling below a certain level (the "floor"). This section uses the demand and supply framework to analyze price ceilings. The next section discusses price floors.

In many markets for goods and services, demanders outnumber suppliers. Consumers, who are also potential voters, sometimes unite behind a political proposal to hold down a certain price. In some cities, for example, renters have pressed political leaders to pass rent control laws, a price ceiling that usually works by stating that rents can be raised by only a certain maximum percentage each year.

Rent control becomes a politically hot topic when rents begin to rise rapidly. Everyone needs an affordable place to live. Perhaps a change in tastes makes a certain suburb or town a more popular place to live. Perhaps locally-based businesses expand, bringing higher incomes and more people into the area. Changes of this sort can cause a change in the demand for rental housing, as Figure 3.21 illustrates. The original equilibrium (E_0) lies at the intersection of supply curve S_0 and demand curve D_0, corresponding to an equilibrium price of $500 and an equilibrium quantity of 15,000 units of rental housing. The effect of greater income or a change in tastes is to shift the demand curve for rental housing to the right, as shown by the data in Table 3.7 and the shift from D_0 to D_1 on the graph. In this market, at the new equilibrium E_1, the price of a rental unit would rise to $600 and the equilibrium quantity would increase to 17,000 units.

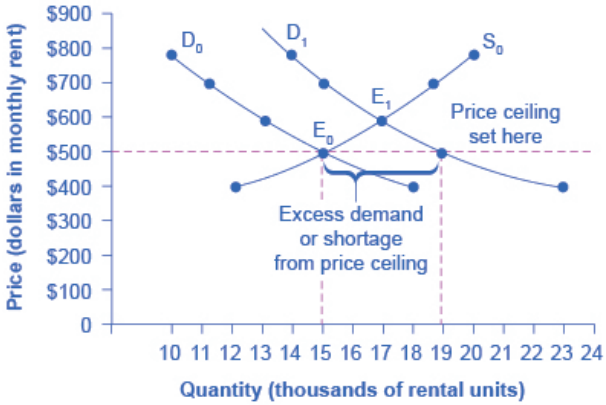


Figure 3.21. *A Price Ceiling Example—Rent Control The original intersection of demand and supply occurs at E_0. If demand shifts from D_0 to D_1, the new equilibrium would be at E_1—unless a price ceiling prevents the price from rising. If the price is not permitted to rise, the quantity supplied remains at 15,000. However, after the change in demand, the quantity demanded rises to 19,000, resulting in a shortage.*

Table showing the changes in quantity supplied and quantity demanded at each price.

Table 3.7 Rent Control

Price	Original Quantity Supplied	Original Quantity Demanded	New Quantity Demanded
$400	12,000	18,000	23,000
$500	15,000	15,000	19,000
$600	17,000	13,000	17,000
$700	19,000	11,000	15,000
$800	20,000	10,000	14,000

Suppose that a rent control law is passed to keep the price at the original equilibrium of $500 for a typical apartment. In Figure 3.21, the horizontal line at the price of $500 shows the legally fixed maximum price set by the rent control law. However, the underlying forces that shifted the demand curve to the right are still there. At that price ($500), the quantity supplied remains at the same 15,000 rental units, but the quantity demanded is 19,000 rental units. In other words, the quantity demanded exceeds the quantity supplied, so there is a shortage of rental housing. One of the ironies of price ceilings is that while the price ceiling was intended to help renters, there are actually fewer apartments rented out under the price ceiling (15,000 rental units) than would be the case at the market rent of $600 (17,000 rental units).

Price ceilings do not simply benefit renters at the expense of landlords. Rather, some renters (or potential renters) lose their housing as landlords convert apartments to co-ops and condos. Even when the housing remains in the rental market, landlords tend to spend less on maintenance and on essentials like heating, cooling, hot water, and lighting. The first rule of economics is you do not get something for nothing—everything has an opportunity cost. So if renters get "cheaper" housing than the market requires, they tend to also end up with lower quality housing.

Price ceilings have been proposed for other products. For example, price ceilings to limit what producers can charge have been proposed in recent years for prescription drugs, doctor and hospital fees, the charges made by some automatic teller bank machines, and auto insurance rates. Price ceilings are enacted in

an attempt to keep prices low for those who demand the product. But when the market price is not allowed to rise to the equilibrium level, quantity demanded exceeds quantity supplied, and thus a shortage occurs. Those who manage to purchase the product at the lower price given by the price ceiling will benefit, but sellers of the product will suffer, along with those who are not able to purchase the product at all. Quality is also likely to deteriorate.

Self Check: Price Ceilings

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the Reading in this section.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

An interactive or media element has been excluded from this version of the text. You can view it online here: https://pressbooks.ccconline.org/accmacro/?p=224

80. Outcome: Price Floors

What you'll learn to do: analyze the consequences of the government setting a binding price floor

In this outcome, we will see what happens when a price floor forces prices above a minimum standard, such as a minimum wage. Watch this video about Edgar the Exploiter to understand how the minimum wage can both help and harm workers.

A YouTube element has been excluded from this version of the text. You can view it online here: *https://pressbooks.ccconline.org/accmacro/?p=226*

The specific things you'll learn in this section include:

- Identify the market's equilibrium price and quantity for a price floor
- Compute and graph the market surplus resulting from a price floor
- Explain the outcome of a binding price ceiling or price floor on the price and quantity of a product sold

LEARNING ACTIVITIES

The learning activities for this section include:

- Reading: Price Floors
- Case in Point: Organic Foods
- Self Check: Price Floors

Take time to review and reflect on each of these activities in order to improve your performance on the assessment for this section.

81. Reading: Price Floors

Price Floors

A price floor is the lowest legal price that can be paid in markets for goods and services, labor, or financial capital. Perhaps the best-known example of a price floor is the minimum wage, which is based on the normative view that someone working full-time ought to be able to afford a basic standard of living. The federal minimum wage at the end of 2015 was $7.25 per hour, which yields an income for a single person slightly higher than the poverty line. As the cost of living rises over time, the Congress periodically raises the federal minimum wage.

Image from the NYC Rally To Raise The Minimum Wage, by The All Nite Images. Accessed via Flickr, CC-BY-SA.

Price floors are sometimes called "price supports," because they support a price by preventing it from falling below a certain level. Around the world, many countries have passed laws to create agricultural price supports. Farm prices and thus farm incomes

fluctuate, sometimes widely. So even if, on average, farm incomes are adequate, some years they can be quite low. The purpose of price supports is to prevent these swings.

The most common way price supports work is that the government enters the market and buys up the product, adding to demand to keep prices higher than they otherwise would be. According to Reuters News, the *European Union (EU)* will spend about $60 billion per year, or roughly 38% of the EU budget, on price supports for Europe's farmers from 2014 to 2020.

Figure 3.22 illustrates the effects of a government program that assures a price above the equilibrium by focusing on the market for wheat in Europe. In the absence of government intervention, the price would adjust so that the quantity supplied would equal the quantity demanded at the equilibrium point E_0, with price P_0 and quantity Q_0. However, policies to keep prices high for farmers keeps the price above what would have been the market equilibrium level—the price Pf shown by the dashed horizontal line in the diagram. The result is a quantity supplied in excess of the quantity demanded (Qd). When quantity supplied exceeds quantity demanded, a surplus exists.

The high-income areas of the world, including the United States, Europe, and Japan, are estimated to spend roughly $1 billion per day in supporting their farmers. If the government is willing to purchase the excess supply (or to provide payments for others to purchase it), then farmers will benefit from the price floor, but taxpayers and consumers of food will pay the costs. Numerous proposals have been offered for reducing farm subsidies. In many countries, however, political support for subsidies for farmers remains strong. Either because this is viewed by the population as supporting the traditional rural way of life or because of the lobbying power of the agro-business industry.

For more detail on the effects price ceilings and floors have on demand and supply, see the following Application feature.

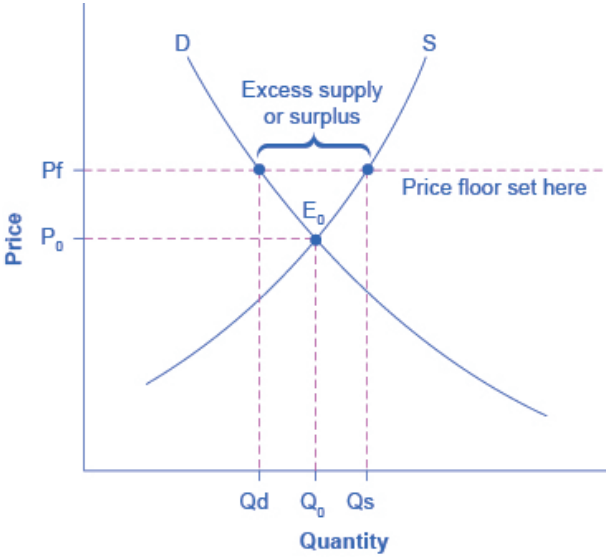


Figure 3.22. European Wheat Prices: A Price Floor Example. The intersection of demand (D) and supply (S) would be at the equilibrium point E0.

Do price ceilings and floors change demand or supply?

Neither price ceilings nor price floors cause demand or supply to change. They simply set a price that limits what can be legally charged in the market. Remember, changes in price do not cause demand or supply to change. Price ceilings and price floors can cause a different choice of quantity demanded along a demand curve, but they do not move the demand curve. Price controls can cause a different choice of quantity supplied along a supply curve, but they do not shift the supply curve.

DEMAND AND SUPPLY AS A SOCIAL ADJUSTMENT MECHANISM

The demand and supply model emphasizes that prices are not set only by demand or only by supply, but by the interaction between

the two. In 1890, the famous economist **Alfred Marshall** wrote that asking whether supply or demand determined a price was like arguing "whether it is the upper or the under blade of a pair of scissors that cuts a piece of paper." The answer is that both blades of the demand and supply scissors are always involved.

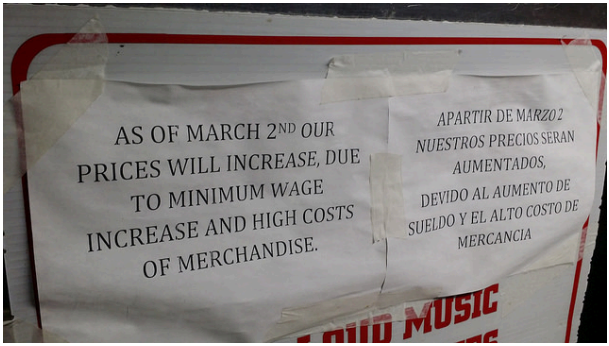


Image of store publicizing their price increases. By George Kelley. Accessed via Flickr and licensed under a CC-BY-ND *license.*

The adjustments of equilibrium price and quantity in a market-oriented economy often occur without much government direction or oversight. If the coffee crop in Brazil suffers a terrible frost, then the supply curve of coffee shifts to the left and the price of coffee rises. Some people—call them the coffee addicts—continue to drink coffee and pay the higher price. Others switch to tea or soft drinks. No government commission is needed to figure out how to adjust coffee prices, which companies will be allowed to process the remaining supply, which supermarkets in which cities will get how much coffee to sell, or which consumers will ultimately be allowed to drink the brew. Such adjustments in response to price changes happen all the time in a market economy, often so smoothly and rapidly that we barely notice them.

Think for a moment of all the seasonal foods that are available and inexpensive at certain times of the year, like fresh corn in midsummer, but more expensive at other times of the year. People alter their diets and restaurants alter their menus in response to

these fluctuations in prices without fuss or fanfare. For both the U.S. economy and the world economy as a whole, markets—that is, demand and supply—are the primary social mechanism for answering the basic questions about what is produced, how it is produced, and for whom it is produced.

Self Check: Price Floors

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the two Readings in this section.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

An interactive or media element has been excluded from this version of the text. You can view it online here: https://pressbooks.ccconline.org/accmacro/?p=228

82. Case in Point: Organic Foods

Why Can We Not Get Enough of Organic?

Organic food is grown without synthetic pesticides, chemical fertilizers or genetically modified seeds. In recent decades, the demand for organic products has increased dramatically. The Organic Trade Association reported sales increased from $1 billion in 1990 to $31.5 billion in 2011, more than 90% of which were sales of food products.

Why, then, are organic foods more expensive than their conventional counterparts? The answer is a clear application of the theories of supply and demand. As people have learned more about the harmful effects of chemical fertilizers, growth hormones, pesticides and the like from large-scale factory farming, our tastes and preferences for safer, organic foods have increased. This change in tastes has been reinforced by increases in income, which allow people to purchase pricier products, and has made organic foods more mainstream. This has led to an increased demand for organic foods. Graphically, the demand curve has shifted right, and we have moved up along the supply curve as producers have responded to the higher prices by supplying a greater quantity.

In addition to the movement along the supply curve, we have also had an increase in the number of farmers converting to organic farming over time. This is represented by a shift to the right of the supply curve. Since both demand and supply have shifted to the right, the resulting equilibrium quantity of organic foods is definitely higher, but the price will only fall when the increase in supply is larger than the increase in demand. We may need more time before we see lower prices in organic foods. Since the

production costs of these foods may remain higher than conventional farming, because organic fertilizers and pest management techniques are more expensive, they may never fully catch up with the lower prices of non-organic foods.

As a final, specific example: The Environmental Working Group's "Dirty Dozen" list of fruits and vegetables, which test high for pesticide residue even after washing, was released in April 2013. The inclusion of strawberries on the list has led to an increase in demand for organic strawberries, resulting in both a higher equilibrium price and quantity of sales.

83. Self Check: Impact of Binding Price Ceilings or Price Floors

Check Your Understanding

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the two Readings in this section.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

An interactive or media element has been excluded from this version of the text. You can view it online here: https://pressbooks.ccconline.org/accmacro/?p=232

84. A Worked Example: Price Controls

Price Controls

People often expect the government to solve problems that they seem unable to solve on their own. Sometimes this is effective and sometimes it is not. Price controls, either price ceilings or price floors, often have unanticipated side effects. Think about it—passing a law doesn't by itself make economic problems go away!

Such is the case with claims of price gouging, the charging of "excessively high" prices, which was exemplified by what occurred in the wake of Hurricane Katrina. Imposing a price ceiling below the equilibrium price may create as many problems as it solves. The basic problem is that the demand for bottled water is dramatically higher, since fresh water supplies were compromised, while the supply of bottled water was less as a result of storm damage.

The question is how to deal with the shortage, that is, how to allocate the limited supply of bottled water among competing needs and wants. Figure 1 depicts the example of price control for water after Hurricane Katrina.

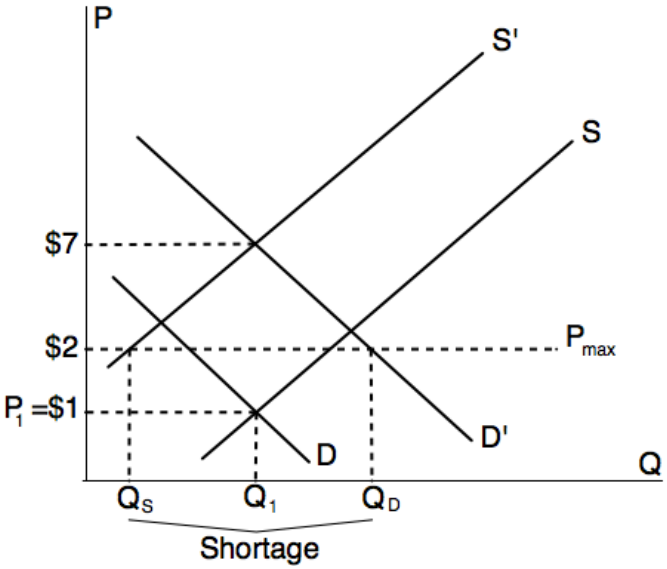


Figure 1 Price control for water after Hurricane Katrina.

When a price ceiling reduces the legal price of a product, businesses have less incentive to supply the product. Economically speaking, the law of supply says that at lower prices, the quantity supplied will be lower. At the same time, the law of demand states that at a lower price, the quantity demanded will be higher. This can be seen clearly in the graph. So who gets the limited supply? As Shakespeare said, that is the question.

Unfortunately, there is no clear answer to this. It could be first come, first serve. It could be friends of the seller. In many cases, what results are under-the-table payments by consumers willing to violate the law. What is certain is that less bottled water gets to consumers than would be the case if the price were allowed to rise. Many would argue that this shortfall is not the best outcome.

85. Why It Matters: Surplus

Why use the concept of producer, consumer surplus, and total surplus to explain the outcomes of markets for individuals, firms, and society?

Students often see this topic on surplus as technical, but it's really fundamental to understanding economics if you realize what it's about. Economists believe that voluntary transactions (purchases and sales) are mutually beneficial. It is not the case that one side gains and the other side loses. Rather, transactions are positive sum games in which both parties are better off as a result. In principle, we can measure the gains to both parties. This measurement is the rationale for two important concepts: consumer surplus and producer surplus, which together make up economic (or social) surplus—the gain to society from the transaction. This is the subject of this module.

Surplus, in the context of this module, just means how good a deal a consumer got on a purchase, or how good a deal a producer got on a sale. That's it in a nutshell.

Sale Image by *Tim Parkinson*, CC-BY.

For consumers, this is often highlighted by a sale when deals become bigger. Sales promotions bring in customers who wouldn't pay the normal price. But they also allow customers who would have purchased anyway to get an even better deal. Watch this BBC video about Cyber Monday to find out more about how consumers react to large sales.

A YouTube element has been excluded from this version of the text. You can view it online here: https://pressbooks.ccconline.org/accmacro/?p=255

How big a deal do consumers get together from Cyber Monday? We can answer this question by computing the consumer surplus.

What about businesses? Why do they run sales like Cyber Monday, and how much do they gain from them? The answer can be found by computing the producer surplus.

Let's see how it's done.

An interactive or media element has been excluded from this version of the text. You can view it online here: https://pressbooks.ccconline.org/accmacro/?p=255

LEARNING OUTCOMES

- Define and calculate consumer surplus
- Define and calculate producer surplus
- Define and calculate total surplus
- Use the concepts of consumer, producer and total surplus to explain why markets typically lead to efficient outcomes

86. Outcome: Consumer, Producer, and Total Surplus

What you'll learn to do: define and calculate consumer, producer, and total surplus; graphically illustrate consumer, producer, and total surplus

Imagine that you want to buy a new smartphone. You have been saving up money and are willing to pay $500 for you new phone. To your surprise, you go to the phone store and learn that recent changes in phone company legislation have lowered the price of your favorite phone to only $250. This is an obvious win for you, but from an economic standpoint, there is a surplus in the market. Consumers are willing to pay more than $250 for cell phones, so the equilibrium price is actually less than what consumers would be willing to pay. In this outcome, we will understand what happens to a market when there is a consumer, producer, or total surplus.

LEARNING ACTIVITIES

The learning activities for this section include:

- Reading: Surplus
- Self Check: Consumer, Producer, and Total Surplus

Take time to review and reflect on each of these activities in order to improve your performance on the assessment for this section.

87. Reading: Surplus

Demand, Supply and Efficiency

The familiar demand and supply diagram holds within it the concept of economic efficiency. One typical way that economists define efficiency is when it is impossible to improve the situation of one party without imposing a cost on another. Conversely, if a situation is inefficient, it becomes possible to benefit at least one party without imposing costs on others.

Efficiency in the demand and supply model has the same basic meaning: The economy is getting as much benefit as possible from its scarce resources and all the possible gains from trade have been achieved. In other words, the optimal amount of each good and service is being produced and consumed.

Consumer Surplus, Producer Surplus, Social Surplus

Consider a market for tablet computers, as shown in Figure 1. The equilibrium price is $80 and the equilibrium quantity is 28 million. To see the benefits to consumers, look at the segment of the demand curve above the equilibrium point and to the left. This portion of the demand curve shows that at least some demanders would have been willing to pay more than $80 for a tablet.

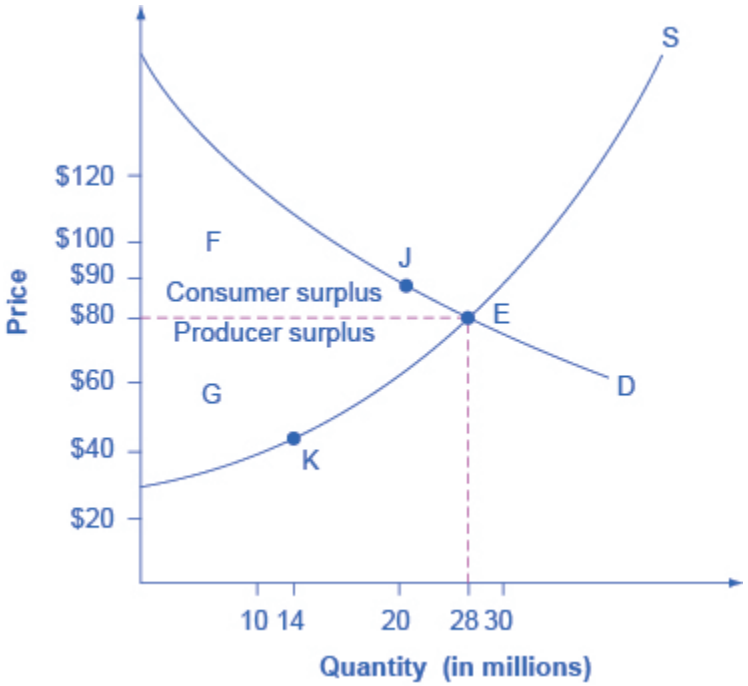


Figure 1: Consumer and Producer Surplus

For example, point J shows that if the price was $90, 20 million tablets would be sold. Those consumers who would have been willing to pay $90 for a tablet based on the utility they expect to receive from it, but who were able to pay the equilibrium price of $80, clearly received a benefit beyond what they had to pay for. Remember, the demand curve traces consumers' willingness to pay for different quantities. The amount that individuals would have been willing to pay, minus the amount that they actually paid, is called consumer surplus. Consumer surplus is the area labeled F—that is, the area above the market price and below the demand curve.

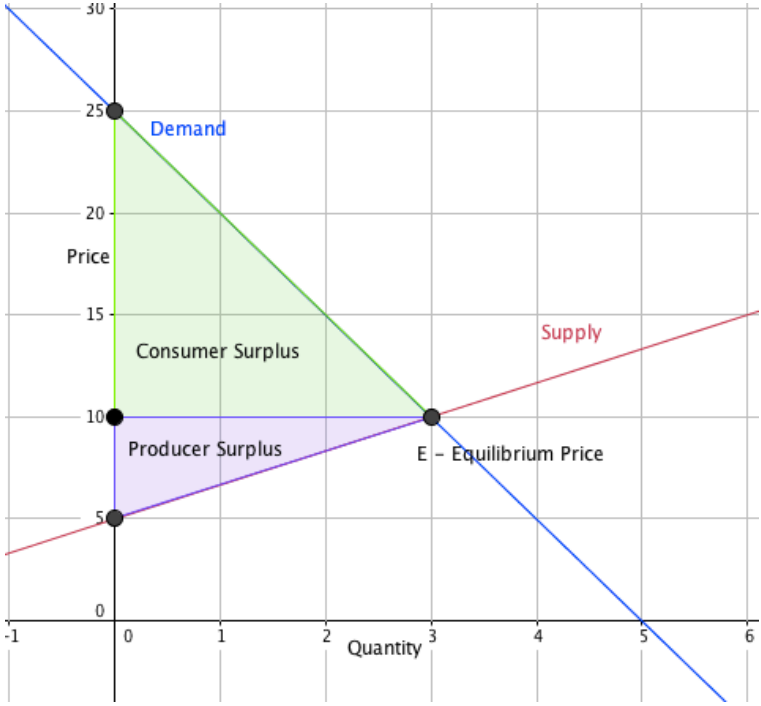
The somewhat triangular area labeled by F in the graph above shows the area of consumer surplus, which shows that the

equilibrium price in the market was less than what many of the consumers were willing to pay. Point J on the demand curve shows that, even at the price of $90, consumers would have been willing to purchase a quantity of 20 million. The somewhat triangular area labeled by G shows the area of producer surplus, which shows that the equilibrium price received in the market was more than what many of the producers were willing to accept for their products. For example, point K on the supply curve shows that at a price of $45, firms would have been willing to supply a quantity of 14 million.

The supply curve shows the quantity that firms are willing to supply at each price. For example, point K in Figure 1 illustrates that, at $45, firms would still have been willing to supply a quantity of 14 million. Those producers who would have been willing to supply the tablets at $45, but who were instead able to charge the equilibrium price of $80, clearly received an extra benefit beyond what they required to supply the product. The amount that a seller is paid for a good minus the seller's actual cost is called producer surplus. In Figure 1, producer surplus is the area labeled G—that is, the area between the market price and the segment of the supply curve below the equilibrium.

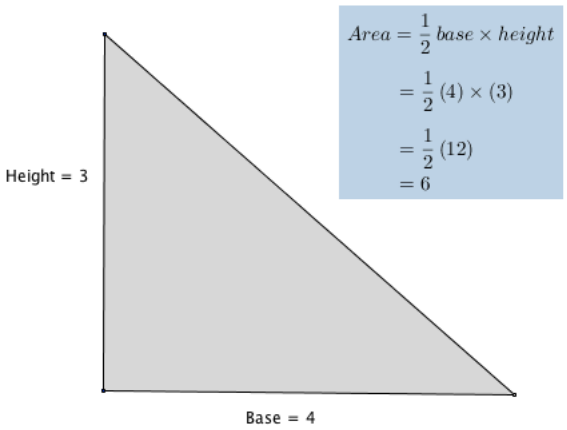
LINK IT UP

Example: Calculate consumer surplus given linear supply and demand curves.



In the sample market shown in the graph, equilibrium price is $10 and equilibrium quantity is 3 units. The consumer surplus area is highlighted above the equilibrium price line. This area can be calculated as the area of a triangle.

Recall that to find the area of a triangle, you will need to know it's base and height. Refer to the following example if you need a refresher.



Let's apply the calculation for the area of a triangle to our example market to see the added value that consumers will get for this item at the equilibrium price in our sample market.

Setp 1 Define the base and height of the consumer surplus triangle.

The base of the consumer surplus triangle is 3 units long. Be careful when you define the height of this triangle, it is tempting to say it is 25, can you see why it isn't? The height is determined by the distance from the equilibrium price line and where the demand curve intersects the vertical axis. The height of the triangle begins at $10 and ends at $25, so it will be $25 – $10 = $15

[latex]b = 3[/latex]

[latex]h = 15[/latex]

Setp 2 Apply the values for base and height to the formula for the area of a triangle.

A = [latex]\frac{1}{2}b\times h[/latex]

A = [latex]\frac{1}{2}3\times 15[/latex]

A = [latex]\frac{1}{2}45[/latex]

A = [latex]\frac{45}{2} = 22.5[/latex]

By calculating the consumer surplus value, we can gain insight

into the price elasticity of supply and demand. When demand is inelastic, consumer surplus is greater. Can you explain why? How would consumer surplus change as market price changes?

The sum of consumer surplus and producer surplus is social surplus, also referred to as economic surplus or total surplus. In Figure 1, social surplus would be shown as the area F + G. Social surplus is larger at equilibrium quantity and price than it would be at any other quantity. This demonstrates the economic efficiency of the market equilibrium. In addition, at the efficient level of output, it is impossible to produce greater consumer surplus without reducing producer surplus, and it is impossible to produce greater producer surplus without reducing consumer surplus.

Self Check: Consumer Surplus

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the Reading in this section.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

An interactive or media element has been excluded from this version of the text. You can view it online here: https://pressbooks.ccconline.org/accmacro/?p=259

88. Outcome: Surplus and Inefficiency

What you'll learn to do: use the concepts of consumer, producer, and total surplus to explain why markets typically lead to efficient outcomes

In this section, you'll build on your understanding of surplus from the previous outcome to examine the connection between types of surplus and the impact they have on the economy.

LEARNING ACTIVITIES

The learning activities for this section include:

- Reading: Inefficiency of Price Floors and Price Ceilings
- Self Check: Surplus and Inefficiency

Take time to review and reflect on each of these activities in order to improve your performance on the assessment for this section.

89. Reading: Inefficiency of Price Floors and Price Ceilings

Inefficiency of Price Floors and Price Ceilings

The imposition of a price floor or a price ceiling will prevent a market from adjusting to its equilibrium price and quantity, and thus will create an inefficient outcome. But there is an additional twist here. Along with creating inefficiency, price floors and ceilings will also transfer some consumer surplus to producers, or some producer surplus to consumers.

Imagine that several firms develop a promising but expensive new drug for treating back pain. If this therapy is left to the market, the equilibrium price will be $600 per month and 20,000 people will use the drug, as shown in Figure 2a. The original level of consumer surplus is T + U and producer surplus is V + W + X. However, the government decides to impose a price ceiling of $400 to make the drug more affordable. At this price ceiling, firms in the market now produce only 15,000.

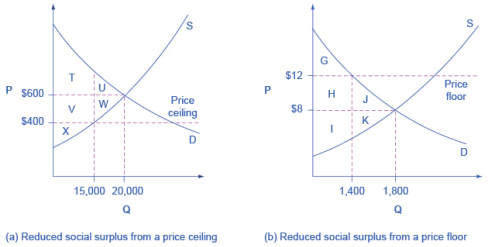


Figure 2. *(a) The original equilibrium price is $600 with a quantity of 20,000. Consumer surplus is T + U, and producer surplus is V + W + X. A price ceiling is imposed at $400, so firms in the market now produce only a quantity of 15,000. As a result, the new consumer surplus is T + V, while the new producer surplus is X. (b) The original equilibrium is $8 at a quantity of 1,800. Consumer surplus is G + H + J, and producer surplus is I + K. A price floor is imposed at $12, which means that quantity demanded falls to 1,400. As a result, the new consumer*

surplus is G, and the new producer surplus is H + I.

As a result, two changes occur. First, an inefficient outcome occurs and the total surplus of society is reduced. The loss in social surplus that occurs when the economy produces at an inefficient quantity is called deadweight loss. In a very real sense, it is like money thrown away that benefits no one. In Figure 2.a, the deadweight loss is the area U + W. When deadweight loss exists, it is possible for both consumer and producer surplus to be higher, in this case because the price control is blocking some suppliers and demanders from transactions they would both be willing to make.

A second change from the price ceiling is that some of the producer surplus is transferred to consumers. After the price ceiling is imposed, the new consumer surplus is T + V, while the new producer surplus is X. In other words, the price ceiling transfers the area of surplus (V) from producers to consumers. Note that the gain to consumers is less than the loss to producers, which is just another way of seeing the deadweight loss.

Efficiency and Price Floors and Ceilings

Figure 2.b shows a price floor example using a string of struggling movie theaters, all in the same city. The current equilibrium is $8 per movie ticket, with 1,800 people attending movies. The original consumer surplus is G + H + J, and producer surplus is I + K. The city government is worried that movie theaters will go out of business, reducing the entertainment options available to citizens, so it decides to impose a price floor of $12 per ticket. As a result, the quantity demanded of movie tickets falls to 1,400. The new consumer surplus is G, and the new producer surplus is H + I. In effect, the price floor causes the area H to be transferred from consumer to producer surplus, but also causes a deadweight loss of J + K.

This analysis shows that a price ceiling, like a law establishing rent

controls, will transfer some producer surplus to consumers—which helps to explain why consumers often favor them. Conversely, a price floor like a guarantee that farmers will receive a certain price for their crops will transfer some consumer surplus to producers, which explains why producers often favor them. However, both price floors and price ceilings block some transactions that buyers and sellers would have been willing to make, and creates deadweight loss. Removing such barriers, so that prices and quantities can adjust to their equilibrium level, will increase the economy's social surplus.

Summary

Consumer surplus is the gap between the price that consumers are willing to pay, based on their preferences, and the market equilibrium price. Producer surplus is the gap between the price for which producers are willing to sell a product, based on their costs, and the market equilibrium price. Social surplus is the sum of consumer surplus and producer surplus. Total surplus is larger at the equilibrium quantity and price than it will be at any other quantity and price. Deadweight loss is loss in total surplus that occurs when the economy produces at an inefficient quantity.

Self Check: Surplus and Inefficiency

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the Reading in this section.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

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90. Putting It Together: Surplus

Summary

The goal of this module was to use the concepts of consumer surplus, producer surplus, and total economic surplus to explain the outcomes of markets for individuals, firms and society. You learned how to:

- Define and calculate consumer surplus
- Define and calculate producer surplus
- Understand total economic surplus as the sum of consumer and producer surplus
- Use the concepts of consumer, producer and total surplus to explain why markets typically lead to efficient outcomes

Examples

Consider Groupon, a website which offers significant discounts on purchases at businesses people frequently use. It's not unusual to obtain 50% off the normal price. Why do customers like Groupon? Because it increases the consumer surplus they obtain on purchases.

Groupon Gift Card Image by Mike Mozart, CC-BY.

Why do businesses offer Groupon campaigns? Part of it is advertising, to attract customers who aren't familiar with those businesses. Some businesses offer regular Groupon deals. They must be doing this to increase their producer surplus (i.e., profit). This is likely part of a larger strategy, called *price discrimination*, which we will learn more about when we study the theory of the firm. For now, it is enough to understand that Groupon campaigns enhance producer surplus.

Since both consumer surplus and producer surplus increase, we can say that total economic (or social) surplus has increased. This is just another way of saying that transactions benefit both parties, or as economists would say, this is a more efficient outcome for society. Computing the additional consumer and producer surplus tells us by how much economic surplus has increased.

91. Glossary: Surplus

consumer surplus
: the extra benefit consumers receive from buying a good or service, measured by what the individuals would have been willing to pay minus the amount that they actually paid

deadweight loss
: the loss in social surplus that occurs when a market produces an inefficient quantity

economic surplus
: see social surplus

producer surplus
: the extra benefit producers receive from selling a good or service, measured by the price the producer actually received minus the price the producer would have been willing to accept

social surplus
: the sum of consumer surplus and producer surplus

92. Discussion: Efficiency of Free Markets

Economists have long known that free markets are perfectly efficient. Consider Q1 in the graph, above. How much do consumers value one more unit of output (Q1 + 1)? How much do producers value one more unit of output? Use the concepts of consumer surplus and producer surplus to explain why Q2 is more efficient than Q1. Now use the concept of total economic surplus to explain why the equilibrium quantity is the most efficient. Why would Q4 be less efficient than the equilibrium quantity?

PART V

LESSON 4: PUBLIC SECTOR

93. Why It Matters: Government Action

Why evaluate the consequences of government policies in markets?

In the module on Supply and Demand, we defined a free market as one with no government intervention. In this module, we will explore the outcomes, both anticipated and otherwise, when government does intervene in a market.

Economists believe there are a small number of fundamental principles that explain how economic agents respond in different situations. Two of these principles, which we have already been introduced to, are the laws of demand and supply.

"Always Check Your Work" by Don Nunn. CC-BY-SA.

Governments can pass laws affecting market outcomes, but no law can negate these economic principles. Rather, the principles will manifest themselves in sometimes unanticipated ways, which may subvert the intent of the government policy. This is one of the major conclusions of this module.

The three best examples of this are:

- Price floors – a legal minimum price in a market, e.g. the minimum wage;
- Price ceilings – a legal maximum price in a market, e.g. rent controls in certain cities;

- Tax incidence – who ends up paying a tax? For example, if the local government adds a sales tax on restaurant meals, is the tax paid by the diners or does it come out of the restaurant's profits?

Understanding all the effects, both anticipated and unanticipated, of government intervention in a market is critical to determining whether the policy achieves its goal.

As you go through this module, make sure to keep in mind who is a given policy (e.g., a minimum wage) supposed to help? Only then can you evaluate whether the policy is a good one or not. Check out the following video about minimum wage:

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LEARNING OUTCOMES

- Analyze the consequences of the government setting a binding price ceiling
- Analyze the consequences of the government setting a binding price floor
- Explain the outcome of a binding price ceiling or price floor on the price and quantity of a product sold
- Determine the incidence of a tax using the concepts of consumer and producer surplus
- Define progressive, proportional, and regressive taxes

94. Outcome: Tax Incidence

What you'll learn to do: explain how the price elasticities of demand and supply affect the incidence of a sales tax.

In this outcome, you'll learn about who bears the burden of a tax. Imagine a $1 tax on every barrel of apples an apple farmer produces. If the product (apples) is price inelastic to the consumer the farmer is able to pass the entire tax on to consumers of apples by raising the price by $1. In this example, consumers bear the entire burden of the tax; the tax incidence falls on consumers. On the other hand, if the apple farmer is unable to raise prices because the product is price elastic the farmer has to bear the burden of the tax or face decreased revenues: the tax incidence falls on the farmer. If the apple farmer can raise prices by an amount less than $1, then consumers and the farmer are sharing the tax burden.

LEARNING ACTIVITIES

The learning activities for this section include:

- Reading: Tax Incidence
- Self Check: Tax Incidence

Take time to review and reflect on each of these activities in order to improve your performance on the assessment for this section.

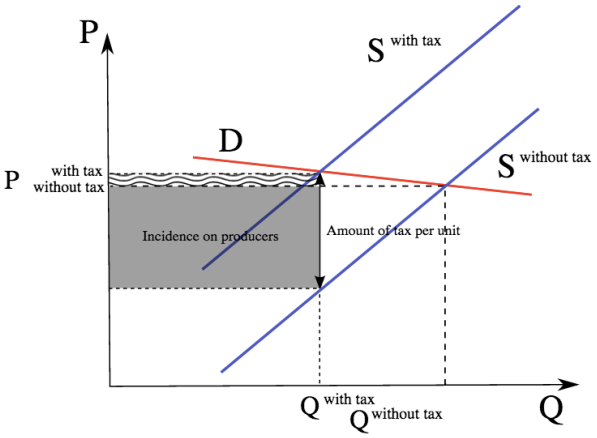
95. Reading: Tax Incidence

Tax Incidence

Tax incidence is the effect a particular tax has on the two parties of a transaction; the producer that makes the good and the consumer that buys it. The burden of the tax is not dependent on whether the state collects the revenue from the producer or consumer, but on the price elasticity of supply and the price elasticity of demand. To understand how elasticities influence tax incidence, it is important to consider the two extreme scenarios and how the tax burden is distributed between the two parties.

Inelastic supply, elastic demand

In this situation, because supply is inelastic, the firm will produce the same quantity no matter what the price. Because demand is elastic, the consumer is very sensitive to price. A small increase in price leads to a large drop in the quantity demanded. The imposition of the tax causes the market price to increase and the quantity demanded to decrease. Because consumption is elastic, the price consumers pay doesn't change very much. Because production is inelastic, the amount sold changes significantly. The producer is unable to pass the tax onto the consumer and the tax incidence falls on the producer.



Tax Incidence of Producer. *In a scenario with inelastic supply and elastic demand, the tax burden falls disproportionately on suppliers.*

Elastic supply, inelastic demand

Consumption is inelastic, so the consumer will consume near the same quantity no matter the price. The producer will be able to produce the same amount of the good, but will be able to increase the price by the amount of the tax. As a result, the entirety of the tax will be borne by the consumer.

Similarly elastic supply and demand

Generally consumers and producers are neither perfectly elastic or inelastic, so the tax burden is shared between the two parties in varying proportions. If one party is comparatively more inelastic than the other, they will pay the majority of the tax.

Increasing tax

If the government increases the tax on a good, that shifts the supply curve to the left, the consumer price increases, and sellers' price decreases. A tax increase does not affect the demand curve, nor does it make supply or demand more or less elastic. This potential increase in tax could be called marginal, because it is a tax in addition to existing levies.

Summary

- When supply is inelastic and demand is elastic, the tax incidence falls on the producer.
- When supply is elastic and demand is inelastic, the tax incidence falls on the consumer.
- Tax incidence is the analysis of the effect a particular tax has on the two parties of a transaction; the producer that makes the good and the consumer that buys it.
- A marginal tax is an increase in a tax on a good that shifts the supply curve to the left, increases the consumer price, and decreases the price for the sellers.

Self Check: Tax Incidence

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the Reading in this section.

Use this quiz to check your understanding and decide whether

to (1) study the previous section further or (2) move on to the next section.

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96. Outcome: Taxation

What you'll learn to do: define progressive, proportional, and regressive taxes

"Our new Constitution is now established, and has an appearance that promises permanency; but in this world nothing can be said to be certain, except **death and taxes**."—Benjamin Franklin, IN A LETTER TO JEAN-BAPTISTE LEROY, 1789

In this section, you will take a closer look at the types of government taxes and examine why they are so certain in our lives.

LEARNING ACTIVITIES

The learning activities for this section include:

- Reading: Financing Government
- Reading: Types of Taxes
- Reading: Taxation
- Self Check: Taxation

Take time to review and reflect on each of these activities in order to improve your performance on the assessment for this section.

97. Reading: Financing Government

If government services are to be provided, people must pay for them. The primary source of government revenue is taxes. In this section we examine the principles of taxation, compare alternative types of taxes, and consider the question of who actually bears the burden of taxes.

In addition to imposing taxes, governments obtain revenue by charging user fees, which are fees levied on consumers of government-provided services. The tuition and other fees charged by public universities and colleges are user fees, as are entrance fees at national parks. Finally, government agencies might obtain revenue by selling assets or by holding bonds on which they earn interest.

Principles of Taxation

Virtually anything can be taxed, but what should be taxed? Are there principles to guide us in choosing a system of taxes?

Jean-Baptiste Colbert, a minister of finance in seventeenth-century France, is generally credited with one of the most famous principles of taxation:

> *The art of taxation consists in so plucking the goose as to obtain the largest possible amount of feathers with the smallest possible amount of hissing.*

Economists, who do not typically deal with geese, cite two criteria for designing a tax system. The first is based on the ability of people

to pay taxes and the second focuses on the benefits they receive from particular government services.

Ability to Pay

The ability-to-pay principle holds that people with more income should pay more taxes. As income rises, the doctrine asserts, people are able to pay more for public services; a tax system should therefore be constructed so that taxes rise too. Wealth, the total of assets less liabilities, is sometimes used as well as income as a measure of ability to pay.

The ability-to-pay doctrine lies at the heart of tax systems that link taxes paid to income received. The relationship between taxes and income may take one of three forms: taxes can be regressive, proportional, or progressive.

Regressive Tax

A regressive tax is one that takes a higher percentage of income as income falls. Taxes on cigarettes, for example, are regressive. Cigarettes are an inferior good—their consumption falls as incomes rise. Thus, people with lower incomes spend more on cigarettes than do people with higher incomes. The cigarette taxes paid by low-income people represent a larger share of their income than do the cigarette taxes paid by high-income people and are thus regressive.

Proportional Tax

A proportional tax is one that takes a fixed percentage of income. Total taxes rise as income rises, but taxes are equal to the same percentage no matter what the level of income. Some people argue that the U.S. income tax system should be changed into a flat tax system, a tax that would take the same percentage of income from all taxpayers. Such a tax would be a proportional tax.

Progressive Tax

A progressive tax is one that takes a higher percentage of income as income rises. The federal income tax is an example of a progressive tax. Table 15.1 shows federal income tax rates for various brackets of income for a family of four in 2007. Such a family paid no income tax at all if its income fell below $24,300. At higher income levels, families faced a higher percentage tax rate. Any income over $374,000, for example, was taxed at a rate of 35%. Whether or not to make the tax system more progressive was a major debating point during the U.S. presidential election of 2008.

***Table* 15.1 Federal Income Tax Brackets, 2007**

2007 adjusted gross income (family of four)	**Personal income tax rate applied to bracket**
Less than $24,300	Zero (family may receive earned income credit)
$24,300–$88,000	15%
$88,000–152,800	25%
$152,800–$220,150	28%
$220,150–$374,000	33%
Greater than $374,000	35%

The federal income tax is progressive. The percentage tax rate rises as adjusted gross income rises.

While a pure flat tax would be proportional, most proposals for such a tax would exempt some income from taxation. Suppose, for example, that households paid a "flat" tax of 20% on all income over $40,000 per year. This tax would be progressive. A household with an income of $25,000 per year would pay no tax. One with an income of $50,000 per year would pay a tax of $2,000 (.2 times $10,000), or 4% of its income. A household with an income of $100,000 per year would pay a tax of $12,000 (.2 times $60,000) per year, or 12% of its income. A flat tax with an income exemption would thus be a progressive tax.

Benefits Received

An alternative criterion for establishing a tax structure is the benefits-received principle, which holds that a tax should be based on the benefits received from the government services funded by the tax.

Local governments rely heavily on taxes on property, in large part because the benefits of many local services, including schools, streets, and the provision of drainage for wastewater, are reflected in higher property values. Suppose, for example, that public schools in a particular area are especially good. People are willing to pay more for houses served by those schools, so property values are higher; property owners benefit from better schools. The greater their benefit, the greater the property tax they pay. The property tax can thus be viewed as a tax on benefits received from some local services.

User fees for government services apply the benefits-received principle directly. A student paying tuition, a visitor paying an entrance fee at a national park, and a motorist paying a highway toll are all paying to consume a publicly provided service; they are thus

paying directly for something from which they expect to benefit. Such fees can be used only for goods for which exclusion is possible; a user fee could not be applied to a service such as national defense.

Income taxes to finance public goods may satisfy both the ability-to-pay and benefits-received principles. The demand for public goods generally rises with income. Thus, people with higher incomes benefit more from public goods. The benefits-received principle thus suggests that taxes should rise with income, just as the ability-to-pay principle does. Consider, for example, an effort financed through income taxes by the federal government to clean up the environment. People with higher incomes will pay more for the cleanup than people with lower incomes, consistent with the ability-to-pay principle. Studies by economists consistently show that people with higher incomes have a greater demand for environmental improvement than do people with lower incomes—a clean environment is a normal good. Requiring people with higher incomes to pay more for the cleanup can thus be justified on the benefits-received principle as well.

Certainly taxes cannot respond precisely to benefits received. Neither the ability-to-pay nor the benefits-received doctrine gives us a recipe for determining just what each person "should" pay in taxes, but these doctrines give us a framework for thinking about the justification for particular taxes.

98. Reading: Types of Taxes

Types of Taxes

It is hard to imagine anything that has not been taxed at one time or another. Windows, closets, buttons, junk food, salt, death—all have been singled out for special taxes. In general, taxes fall into one of four primary categories.

Income taxes are imposed on the income earned by a person or firm; property taxes are imposed on assets; sales taxes are imposed on the value of goods sold; and excise taxes are imposed on specific goods or services. Figure 15.1 shows the major types of taxes financing all levels of government in the United States.

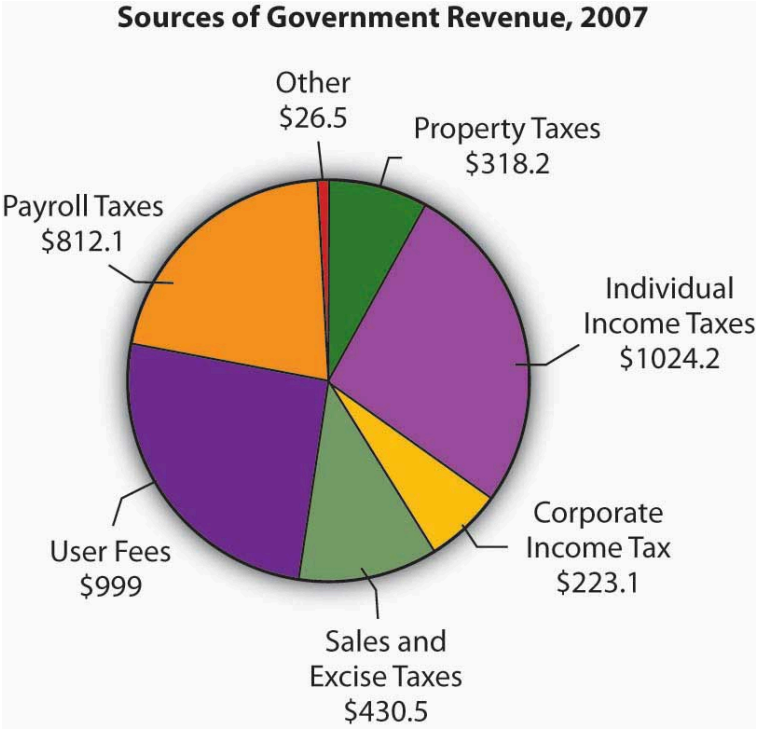

Figure 15.1 *Sources of Government Revenue, 2007. The chart shows sources of revenue for federal, state, and local governments in the United States. The data omit revenues from government-owned utilities and liquor stores. All figures are in billions of dollars. Source: U.S. Bureau of the Census, Statistical Abstract of US, 2008 (online) Tables 422 and 461.*

Personal Income Taxes

The federal personal income tax is the largest single source of tax revenue in the United States; most states and many cities tax income as well. All income tax systems apply a variety of exclusions to a taxpayer's total income before arriving at taxable income, the amount of income that is actually subject to the tax. In the U.S. federal income tax system, for example, a family deducted $3,200

from total income earned in 2005 for each member of the family as part of its computation of taxable income.

Income taxes can be structured to be regressive, proportional, or progressive. Income tax systems in use today are progressive.

In analyzing the impact of a progressive tax system on taxpayer choice, economists focus on the marginal tax rate. This is the tax rate that would apply to an additional $1 of taxable income earned. Suppose an individual was earning taxable income of $8,025 and paid federal income taxes of $802.50, or 10% of taxable income (we are ignoring exemptions that would eliminate taxes for such an individual). If the taxpayer were to receive $100 more of taxable income, however, that $100 would be taxed at a rate of 15%, the rate that applied in 2008 to taxable incomes between $8,025–$32,550 for individuals. That person thus faced a marginal tax rate of 15%.

Economists argue that choices are made at the margin; it is thus the marginal tax rate that is most likely to affect decisions. Say that the individual in our example is considering taking on additional work that would increase his or her income to $15,025 per year. With a marginal tax rate of 15%, the individual would keep $5,950 of the additional $7,000 earned. It is that $5,950 that the individual will weigh against the opportunity cost in forgone leisure in deciding whether to do the extra work.

Property Taxes

Property taxes are taxes imposed on assets. Local governments, for example, generally impose a property tax on business and personal property. A government official (typically a local assessor) determines the property's value, and a proportional tax rate is then applied to that value.

Property ownership tends to be concentrated among higher income groups; economists generally view property taxes as

progressive. That conclusion, however, rests on assumptions about who actually pays the tax, an issue examined later in this module.

Sales Taxes

Sales taxes are taxes imposed as a percentage of firms' sales and are generally imposed on retail sales. Some items, such as food and medicine, are often exempted from sales taxation.

People with lower incomes generally devote a larger share of their incomes to consumption of goods covered by sales taxes than do people with higher incomes. Sales taxes are thus likely to be regressive.

Excise Taxes

An excise tax is imposed on specific items. In some cases, excise taxes are justified as a way of discouraging the consumption of demerit goods, such as cigarettes and alcoholic beverages. In other cases, an excise tax is a kind of benefits-received tax. Excise taxes on gasoline, for example, are typically earmarked for use in building and maintaining highways, so that those who pay the tax are the ones who benefit from the service provided.

The most important excise tax in the United States is the payroll tax imposed on workers' earnings. In 2007, the payroll tax was 12.4% and was levied on incomes up to $97,500. The Medicare portion of the payroll tax, 2.9%, was levied on all earned wages without limit. Half of the payroll tax is charged to employers, half to employees. The proceeds of this excise on payrolls finance Social Security and Medicare benefits. Almost two-thirds of U. S. households pay more in payroll taxes than in any other taxes.

Tax Incidence Analysis

Next time you purchase an item at a store, notice the sales tax imposed by your state, county, and city. The clerk rings up the total, then adds up the tax. The store is the entity that "pays" the sales tax, in the sense that it sends the money to the government agencies that imposed it, but you are the one who actually foots the bill—or are you? Is it possible that the sales tax affects the price of the item itself?

These questions relate to tax incidence analysis, a type of economic analysis that seeks to determine where the actual burden of a tax rests. Does the burden fall on consumers, workers, owners of capital, owners of natural resources, or owners of other assets in the economy? When a tax imposed on a good or service increases the price by the amount of the tax, the burden of the tax falls on consumers. If instead it lowers wages or lowers prices for some of the other factors of production used in the production of the good or service taxed, the burden of the tax falls on owners of these factors. If the tax does not change the product's price or factor prices, the burden falls on the owner of the firm—the owner of capital. If prices adjust by a fraction of the tax, the burden is shared.

Figure 15.2 gives an example of tax incidence analysis. Suppose D1 and S1 are the demand and supply curves for beef. The equilibrium price is $3 per pound; the equilibrium quantity is 3 million pounds of beef per day. Now suppose an excise tax of $2 per pound of beef is imposed. It does not matter whether the tax is levied on buyers or on sellers of beef; the important thing to see is that the tax drives a $2 per pound "wedge" between the price buyers pay and the price sellers receive. This tax is shown as the vertical green line in the exhibit; its height is $2.

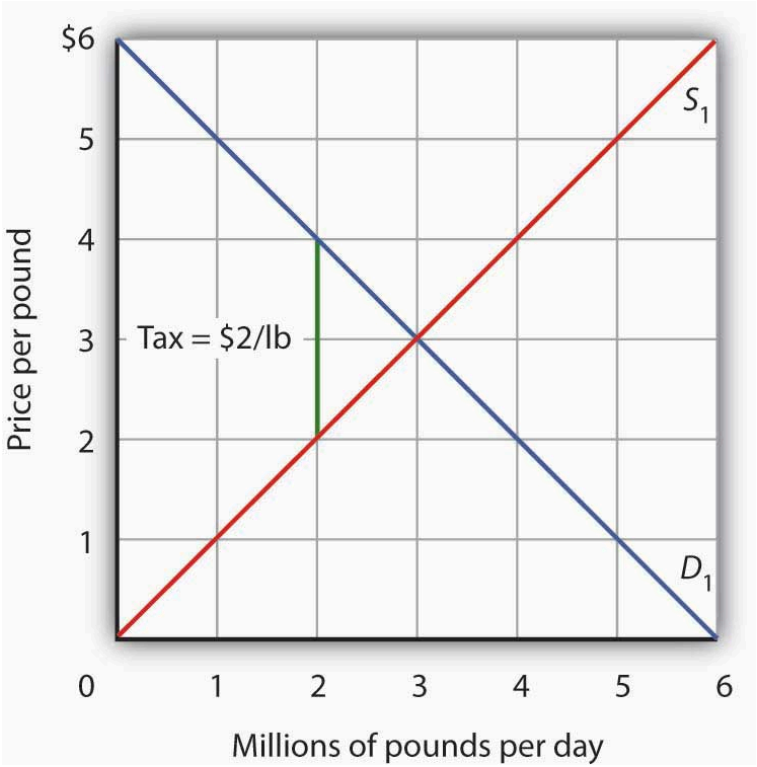

Figure 15.2 *Tax Incidence in the Model of Demand and Supply. Suppose the market price of beef is $3 per pound; the equilibrium quantity is 3 million pounds per day. Now suppose an excise tax of $2 per pound is imposed, shown by the vertical green line. We insert this tax wedge between the demand and supply curves. It raises the market price to $4 per pound, suggesting that buyers pay half the tax in the form of a higher price. Sellers receive a price of $2 per pound; they pay half the tax by receiving a lower price. The equilibrium quantity falls to 2 million pounds per day.*

We insert our tax "wedge" between the demand and supply curves. In our example, the price paid by buyers rises to $4 per pound. The price received by sellers falls to $2 per pound; the other $2 goes to the government. The quantity of beef demanded and supplied falls to 2 million pounds per day. In this case, we conclude that buyers bear half the burden of the tax (the price they pay rises by $1 per

pound), and sellers bear the other half (the price they receive falls by $1 per pound). In addition to the change in price, a further burden of the tax results from the reduction in consumer and in producer surplus. We have not shown this reduction in the graph.

Figure 15.3 shows how tax incidence varies with the relative elasticities of demand and supply. All four panels show markets with the same initial price, P1, determined by the intersection of demand D1and supply S1. We impose an excise tax, given by the vertical green line. As before, we insert this tax wedge between the demand and supply curves. We assume the amount of the tax per unit is the same in each of the four markets.

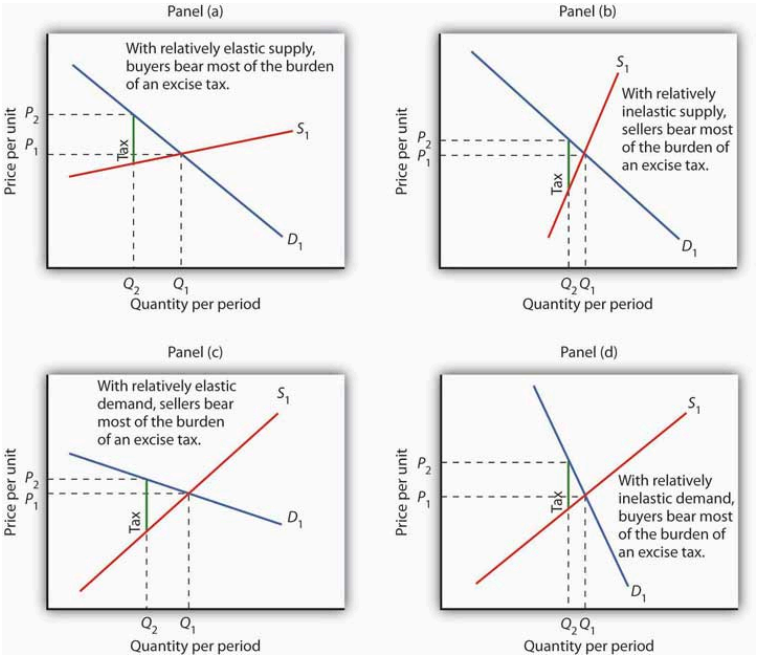

Figure 15.3 *Tax Incidence and the Elasticity of Demand and of Supply. We show the effect of an excise tax, given by the vertical green line, in the same way that we did in Figure 15.2. We see that buyers bear most of the burden of such a tax in cases of relatively elastic supply (Panel (a)) and of relatively inelastic demand (Panel (d)). Sellers bear most of the burden in cases of relatively inelastic supply (Panel (b)) and of relatively elastic demand (Panel (c)).*

In Panel (a), we have a market with a relatively elastic supply curve S1. When we insert our tax wedge, the price rises to P2; the price increase is nearly as great as the amount of the tax. In Panel (b), we have the same demand curve as in Panel (a), but with a relatively inelastic supply curve S2. This time the price paid by buyers barely rises; sellers bear most of the burden of the tax. When the supply curve is relatively elastic, the bulk of the tax burden is borne by buyers. When supply is relatively inelastic, the bulk of the burden is borne by sellers.

Panels (c) and (d) of the exhibit show the same tax imposed in markets with identical supply curves S1. With a relatively elastic demand curve D1in Panel (c) (notice that we are in the upper half, that is, the elastic portion of the curve), most of the tax burden is borne by sellers. With a relatively inelastic demand curve D1in Panel (d) (notice that we are in the lower half, that is, the inelastic portion of the curve), most of the burden is borne by buyers. If demand is relatively elastic, then sellers bear more of the burden of the tax. If demand is relatively inelastic, then buyers bear more of the burden.

The Congressional Budget Office (CBO) has prepared detailed studies of the federal tax system. Using the tax laws in effect in August 2004, it ranked the U.S. population according to income and then divided the population into quintiles (groups containing 20% of the population). Then, given the federal tax burden imposed by individual income taxes, payroll taxes for social insurance, corporate income taxes, and excise taxes on each quintile and the income earned by people in that quintile, it projected the average tax rate facing that group in 2006. The study assigned taxes on the basis of who bears the burden, not on who pays the tax. For example, many studies argue that, even though businesses pay half of the payroll taxes, the burden of payroll taxes actually falls on households. The reason is that the supply curve of labor is relatively inelastic, as shown in Panel (b) of Figure 15.3. Taking these adjustments into account, the CBO's results, showing progressivity in federal taxes, are reported in Table 15.2.

Table 15.2 Federal Tax Burdens in the United States

Income category	Households (number, millions)	Average pretax comprehensive household income	Effective federal tax rate, 2006 (percent)
Lowest quintile	24.0	$18,568	5.6
Second quintile	22.8	$42,619	12.1
Middle quintile	23.3	$64,178	15.7
Fourth quintile	23.2	$94,211	19.8
Highest quintile	24.3	$227,677	26.5
All quintiles	118.3	$89,476	21.6

In a regressive tax system, people in the lowest quintiles face the highest tax rates. A proportional system imposes the same rates on everyone; a progressive system imposes higher rates on people in higher deciles. The table gives estimates by the CBO of the burden on each quintile of federal taxes in 2006. As you can see, the tax structure in the United States is progressive.

KEY TAKEAWAYS

1. The primary principles of taxation are the ability-to-pay and benefits-received principles.
2. The percentage of income taken by a regressive tax rises as income falls. A proportional tax takes a constant percentage of income regardless of income level. A progressive tax takes a higher percentage of income as taxes as incomes rise.
3. The marginal tax rate is the tax rate that applies to an additional dollar of income earned.
4. Tax incidence analysis seeks to determine who ultimately bears the burden of a tax.

5. The major types of taxes are income taxes, sales taxes, property taxes, and excise taxes.
6. Buyers bear most of the burden of an excise tax when supply is relatively elastic and when demand is relatively inelastic; sellers bear most of the burden when supply is relatively inelastic and when demand is relatively elastic.
7. The federal tax system in the United States is progressive.

99. Reading: Taxation

Taxation

There are two main categories of taxes: those collected by the federal government and those collected by state and local governments. What percentage is collected and what that revenue is used for varies greatly. The following sections will briefly explain the taxation system in the United States.

Federal Taxes

Just as many Americans erroneously think that federal spending has grown considerably, many also believe that taxes have increased substantially. The top line of Figure 16.5 shows total federal taxes as a share of GDP since 1960. Although the line rises and falls, it typically remains within the range of 17% to 20% of GDP, except for 2009, when taxes fell substantially below this level, due to recession.

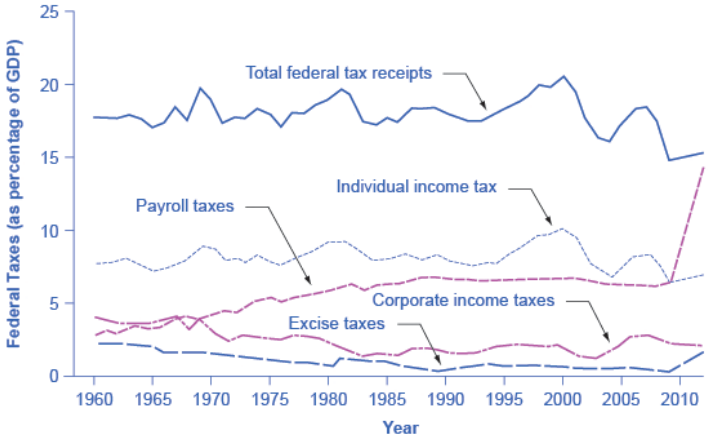

Figure 16.5. *Federal Taxes, 1960–2012. Federal tax revenues have been about 17–20% of GDP during most periods in recent decades. The primary sources of federal taxes are individual income taxes and the payroll taxes that finance Social Security and Medicare. Corporate income taxes, excise taxes, and other taxes provide smaller shares of revenue. (Source: Economic Report of the President, Tables B-81 and B-1, http://www.gpo.gov/fdsys/pkg/ERP-2013/content-deta…)*

Figure 16.5 also shows the patterns of taxation for the main categories of taxes levied by the federal government: personal income taxes, payroll taxes, corporate income taxes, and excise taxes. When most people think of taxes levied by the federal government, the first tax that comes to mind is the *individual income tax* that is due every year on April 15 (or the first business day after). The personal income tax is the largest single source of federal government revenue, but it still represents less than half of federal tax revenue.

The second largest source of federal revenue is the *payroll tax*, which provides funds for Social Security and Medicare. Payroll taxes have increased steadily over time. Together, the personal income tax and the payroll tax accounted for about 84% of federal tax revenues in 2012. Although personal income tax revenues account

for more total revenue than the payroll tax, nearly three-quarters of households pay more in payroll taxes than in income taxes.

The income tax is a *progressive tax*, which means that the tax rates increase as a household's income increases. Taxes also vary with marital status, family size, and other factors. The *marginal tax rates* (the tax that must be paid on all yearly income) for a single taxpayer range from 10% to 35%, depending on income, as explained below.

HOW DOES THE MARGINAL RATE WORK?

Suppose that a single taxpayer's income is $35,000 per year. Also suppose that income from $0 to $9,075 is taxed at 10%, income from $9,075 to $36,900 is taxed at 15%, and, finally, income from $36,900 and beyond is taxed at 25%. Since this person earns $35,000, their marginal tax rate is 15%.

The key fact here is that the federal income tax is designed so that tax rates increase as income increases, up to a certain level. The payroll taxes that support Social Security and Medicare are designed in a different way. First, the payroll taxes for Social Security are imposed at a rate of 12.4% up to a certain wage limit, set at $117,900 in 2014. Medicare, on the other hand, pays for elderly healthcare, and is fixed at 2.9%, with no upper ceiling.

In both cases, the employer and the employee split the payroll taxes. An employee only sees 6.2% deducted from his paycheck for Social Security, and 1.45% from Medicare. However, as economists are quick to point out, the employer's half of the taxes are probably passed along to the employees in the form of lower wages, so in reality, the worker pays all of the payroll taxes.

The Medicare payroll tax is also called a *proportional tax*; that is, a flat percentage of all wages earned. The Social Security payroll tax is proportional up to the wage limit, but above that level it becomes

a *regressive tax*, meaning that people with higher incomes pay a smaller share of their income in tax.

The third-largest source of federal tax revenue, as shown in Figure 16.5 is the *corporate income tax*. The common name for corporate income is "profits." Over time, corporate income tax receipts have declined as a share of GDP, from about 4% in the 1960s to an average of 1% to 2% of GDP in the first decade of the 2000s.

The federal government has a few other, smaller sources of revenue. It imposes an *excise tax*—that is, a tax on a particular good—on gasoline, tobacco, and alcohol. As a share of GDP, the amount collected by these taxes has stayed nearly constant over time, from about 2% of GDP in the 1960s to roughly 3% by 2012, according to the nonpartisan Congressional Budget Office. The government also imposes an *estate and gift tax* on people who pass large amounts of assets to the next generation—either after death or during life in the form of gifts. These estate and gift taxes collected about 0.2% of GDP in the first decade of the 2000s. By a quirk of legislation, the estate and gift tax was repealed in 2010, but reinstated in 2011. Other federal taxes, which are also relatively small in magnitude, include tariffs collected on imported goods and charges for inspections of goods entering the country.

State and Local Taxes

At the state and local level, taxes have been rising as a share of GDP over the last few decades to match the gradual rise in spending, as Figure 16.6 illustrates. The main revenue sources for state and local governments are sales taxes, property taxes, and revenue passed along from the federal government, but many state and local governments also levy personal and corporate income taxes, as well as impose a wide variety of fees and charges. The specific sources of tax revenue vary widely across state and local governments. Some states rely more on property taxes, some on sales taxes, some on

income taxes, and some more on revenues from the federal government.

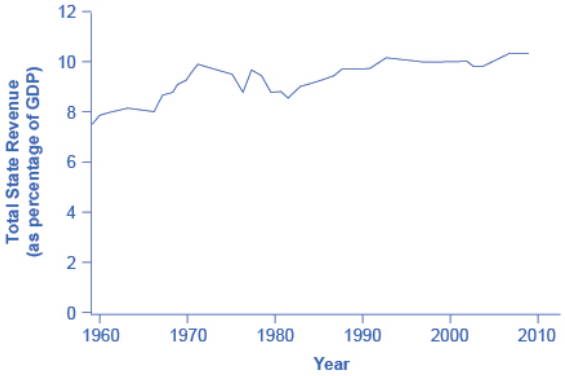

Figure 16.6. *State and Local Tax Revenue as a Share of GDP, 1960–2010. State and local tax revenues have increased to match the rise in state and local spending. (Source: Economic Report of the President, Tables B-85 and B-1, http://www.gpo.gov/fdsys/pkg/ERP-2013/content-deta...)*

Self Check: Taxation

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the three Readings in this section.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

An interactive or media element has been excluded from this version of the text. You can view it online here: https://pressbooks.ccconline.org/accmacro/?p=244

100. Outcome: The Federal Budget

What you'll learn to do: identify the major spending categories and major revenue sources in the U.S. Federal budget

In this section, you will take a look at how the government makes its money and how the money is allocated.

LEARNING ACTIVITIES

The learning activities for this section include:

- Reading: Introduction to Government Budgets and Fiscal Policy
- Reading: Federal Government Spending
- Reading: Federal Taxes
- Self Check: The Federal Budget

Take time to review and reflect on each of these activities in order to improve your performance on the assessment for this section.

101. Reading: Introduction to Government Budgets and Fiscal Policy

NO YELLOWSTONE PARK?

Imagine you had trekked all the way to see Yellowstone National Park in the beautiful month of October 2013, only to find it… closed. Closed! Why?

Figure 16.1. *Shut Downs and Parks Yellowstone National Park. is one of the many national parks forced to close down during the government shut down in October 2013. (Credit: modification of work by daveynin, CC BY).*

For two weeks in October 2013, the U.S. federal government shut down. Many federal services, like the national parks, closed and 800,000 federal employees were furloughed. Tourists were shocked and so was the rest of the world: Congress and the President could

not agree on a budget. Inside the Capitol, Republicans and Democrats argued about spending priorities and whether to increase the national debt limit. Each year's budget, which is over $3 trillion of spending, must be approved by Congress and signed by the President. Tied to the budget debate was the issue of increasing the debt ceiling—how high the national debt of the U.S. government can be. The House of Representatives refused to sign on to the bills to fund the government unless they included provisions to stop or change the Affordable Health Care Act (more colloquially known as Obamacare). As the days ticked by, the United States came very close to defaulting on its debt.

Why does the federal budget create such intense debates? What would happen if the United States actually defaulted on its debt? In this chapter we will examine the federal budget, taxation, and fiscal policy. We will also look at the annual federal budget deficits and the national debt.

Fiscal Policy

All levels of government—federal, state, and local—have budgets that show how much revenue the government expects to receive in taxes and other income and how the government plans to spend it. Budgets, however, can shift dramatically within a few years, as policy decisions and unexpected events shake up earlier tax and spending plans.

In this chapter we revisit *fiscal policy*, which was first covered in Welcome to Economics!. Fiscal policy is one of two policy tools for fine tuning the economy (the other is monetary policy). While *monetary policy* is made by policymakers at the Federal Reserve, fiscal policy is made by Congress and the President.

The discussion of fiscal policy focuses on how federal government taxing and spending affects aggregate demand. All government spending and taxes affect the economy, but fiscal policy focuses

strictly on the policies of the federal government. We begin with an overview of U.S. government spending and taxes. We then discuss fiscal policy from a short-run perspective; that is, how government uses tax and spending policies to address recession, unemployment, and inflation; how periods of recession and growth affect government budgets; and the merits of balanced budget proposals.

102. Reading: Federal Government Spending

Total U.S. Government Spending

Government spending covers a range of services provided by the federal, state, and local governments. When the federal government spends more money than it receives in taxes in a given year, it runs a *budget deficit*. Conversely, when the government receives more money in taxes than it spends in a year, it runs a *budget surplus*. If government spending and taxes are equal, it is said to have a *balanced budget*. For example, in 2009, the U.S. government experienced its largest budget deficit ever, as the federal government spent $1.4 trillion more than it collected in taxes. This deficit was about 10% of the size of the U.S. GDP in 2009, making it by far the largest budget deficit relative to GDP since the mammoth borrowing used to finance World War II.

Federal spending in nominal dollars (that is, dollars not adjusted for inflation) has grown by a multiple of more than 38 over the last four decades, from $92 billion in 1960 to $3.6 trillion in 2012. Comparing spending over time in nominal dollars is misleading because it does not take into account inflation or growth in population and the real economy. A more useful method of comparison is to examine government spending as a percent of GDP over time.

The top line in Figure 16.2 shows the level of federal spending since 1960, expressed as a share of GDP. Despite a widespread sense among many Americans that the federal government has been growing steadily larger, the graph shows that federal spending has hovered in a range from 18% to 22% of GDP most of the time since 1960. The other lines in Figure 16.2 show the major federal spending

categories: national defense, Social Security, health programs, and interest payments. From the graph, we see that national defense spending as a share of GDP has generally declined since the 1960s, although there were some upward bumps in the 1980s buildup under President Ronald Reagan and in the aftermath of the terrorist attacks on September 11, 2001. In contrast, Social Security and healthcare have grown steadily as a percent of GDP. Healthcare expenditures include both payments for senior citizens (Medicare), and payments for low-income Americans (Medicaid). Medicaid is also partially funded by state governments. Interest payments are the final main category of government spending shown in the figure.

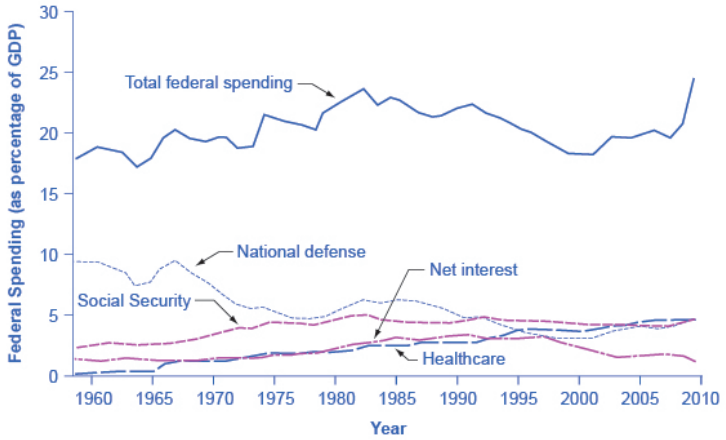

Figure 16.2. *Federal Spending, 1960–2010. Since 1960, total federal spending has ranged from about 18% to 22% of GDP, although it climbed above that level in 2009. The share spent on national defense has generally declined, while the share spent on Social Security and on healthcare expenses (mainly Medicare and Medicaid) has increased. (Source: Economic Report of the President, Tables B-80 and B-1, http://www.gpo.gov/fdsys/pkg/ERP-2013/content-detail.html)*

Each year, the government borrows funds from U.S. citizens and foreigners to cover its budget deficits. It does this by selling securities (Treasury bonds, notes, and bills)—in essence borrowing

from the public and promising to repay with interest in the future. From 1961 to 1997, the U.S. government has run budget deficits, and thus borrowed funds, in almost every year. It had budget surpluses from 1998 to 2001, and then returned to deficits.

The interest payments on past federal government borrowing were typically 1–2% of GDP in the 1960s and 1970s but then climbed above 3% of GDP in the 1980s and stayed there until the late 1990s. The government was able to repay some of its past borrowing by running surpluses from 1998 to 2001 and, with help from low interest rates, the interest payments on past federal government borrowing had fallen back to 1.4% of GDP by 2012.

We investigate the patterns of government borrowing and debt in more detail later in this chapter, but first we need to clarify the difference between the deficit and the debt. *The deficit is not the debt*. The difference between the deficit and the debt lies in the time frame. The government deficit (or surplus) refers to what happens with the federal government budget each year. The government debt is accumulated over time; it is the sum of all past deficits and surpluses. If you borrow $10,000 per year for each of the four years of college, you might say that your annual deficit was $10,000, but your accumulated debt over the four years is $40,000.

These four categories—national defense, Social Security, healthcare, and interest payments—account for roughly 71% of all federal spending, as Figure 16.3 shows. The remaining 29% wedge of the pie chart covers all other categories of federal government spending: international affairs; science and technology; natural resources and the environment; transportation; housing; education; income support for the poor; community and regional development; law enforcement and the judicial system; and the administrative costs of running the government.

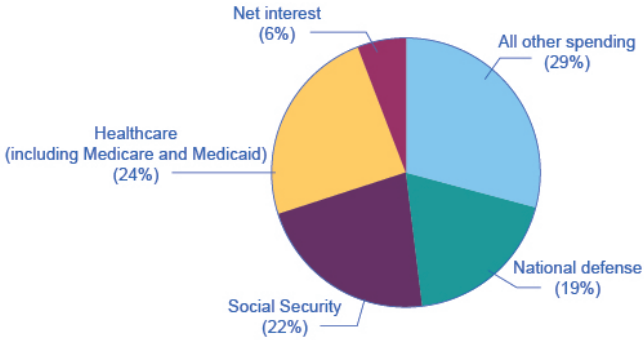

Figure 16.3. *Slices of Federal Spending, 2012. About 71% of government spending goes to four major areas: national defense, Social Security, healthcare, and interest payments on past borrowing. This leaves about 29% of federal spending for all other functions of the U.S. government. (Source: Economic Report of the President, Table B-80, http://www.gpo.gov/fdsys/pkg/ERP-2013/content-detail.html)*

LINK IT UP

Does the federal government spend too much? Use this budget simulator to see if you can reduce government outlays.

103. Reading: Federal Taxes

Federal Taxes

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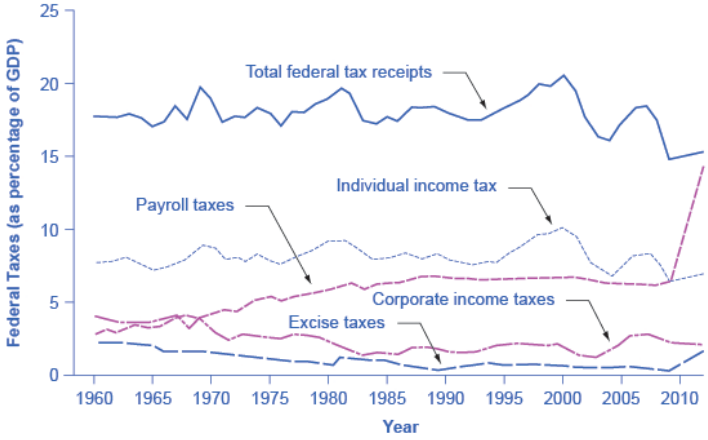

Figure 16.5. *Federal Taxes, 1960–2012. Federal tax revenues have been about 17–20% of GDP during most periods in recent decades. The primary sources of federal taxes are individual income taxes and the payroll taxes that finance Social Security and Medicare. Corporate income taxes, excise taxes, and other taxes provide smaller shares of revenue. (Source:Economic Report of the President, Tables B-81 and B-1, http://www.gpo.gov/fdsys/pkg/ERP-2013/content- detail.html).*

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HOW DOES THE MARGINAL RATE WORK?

Suppose that a single taxpayer's income is $35,000 per year. Also suppose that income from $0 to $9,075 is taxed at 10%, income from $9,075 to $36,900 is taxed at 15%, and, finally, income from $36,900 and beyond is taxed at 25%. Since this person earns $35,000, their marginal tax rate is 15%.

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designed in a different way. First, the payroll taxes for Social Security are imposed at a rate of 12.4% up to a certain wage limit, set at $117,900 in 2014. Medicare, on the other hand, pays for elderly healthcare, and is fixed at 2.9%, with no upper ceiling.

In both cases, the employer and the employee split the payroll taxes. An employee only sees 6.2% deducted from his paycheck for Social Security, and 1.45% from Medicare. However, as economists are quick to point out, the employer's half of the taxes are probably passed along to the employees in the form of lower wages, so in reality, the worker pays all of the payroll taxes.

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Self Check: The Federal Budget

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

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104. Outcome: State and Local Budgets

What you'll learn to do: identify the major spending categories and major revenue sources in U.S. state and local budgets

In this section, you will see how state and local governments allocate their resources.

LEARNING ACTIVITIES

The learning activities for this section include:

- Reading: State and Local Government Spending
- Reading: State and Local Taxes
- Self Check: State and Local Budgets

Take time to review and reflect on each of these activities in order to improve your performance on the assessment for this section.

105. Reading: State and Local Government Spending

State and Local Government Spending

Although federal government spending often gets most of the media attention, state and local government spending is also substantial–at about $3.2 trillion in 2013. Figure 16.4 shows that state and local government spending has increased during the last four decades from around 10% of GDP to above 16%. The single biggest item is education, which accounts for about one-third of the total. The rest covers programs like highways, libraries, hospitals and healthcare, parks, and police and fire protection. Unlike the federal government, all states (except Vermont) have balanced budget laws, which means any gaps between revenues and spending must be closed by higher taxes, lower spending, drawing down their previous savings, or some combination of all of these.

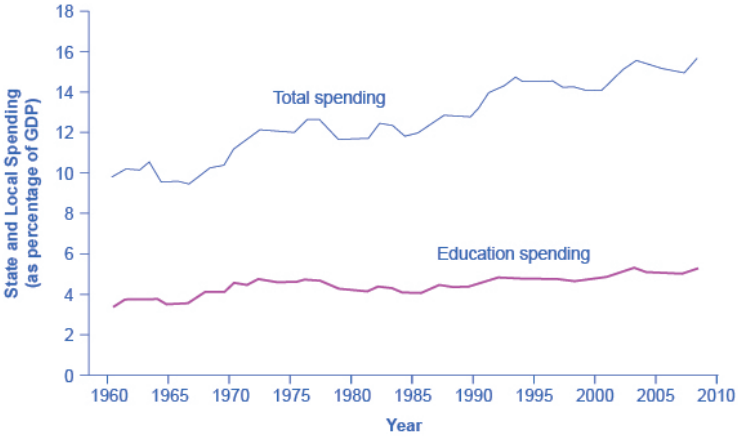

Figure 16.4. *State and Local Spending, 1960–2010. Spending by state and local government increased from about 10% of GDP in the early 1960s to 14–16% by the mid-1970s. It has remained at roughly that level since. The single biggest spending item is education, including both K–12 spending and support for public colleges and universities, which has been about 5–6% of GDP in recent decades. Source: Economic Report of the President, Tables B-86 and B-1, http://www.gpo.gov/fdsys/pkg/ERP-2013/content-detail.html).*

U.S. presidential candidates often run for office pledging to improve the public schools or to get tough on crime. However, in the U.S. system of government, these tasks are primarily the responsibilities of state and local governments. Indeed, in fiscal year 2013 state and local governments spent about $904 billion per year on education (including K–12 and college and university education), compared to only $83 billion by the federal government, according to usgovernmentspending.com. In other words, more than 90 cents of every dollar spent on education happens at the state and local level. A politician who really wants hands-on responsibility for reforming education or reducing crime might do better to run for mayor of a large city or for state governor rather than for president of the United States.

106. Reading: State and Local Taxes

State and Local Taxes

At the state and local level, taxes have been rising as a share of GDP over the last few decades to match the gradual rise in spending, as Figure 16.6 illustrates. The main revenue sources for state and local governments are sales taxes, property taxes, and revenue passed along from the federal government, but many state and local governments also levy personal and corporate income taxes, as well as impose a wide variety of fees and charges. The specific sources of tax revenue vary widely across state and local governments. Some states rely more on property taxes, some on sales taxes, some on income taxes, and some more on revenues from the federal government.

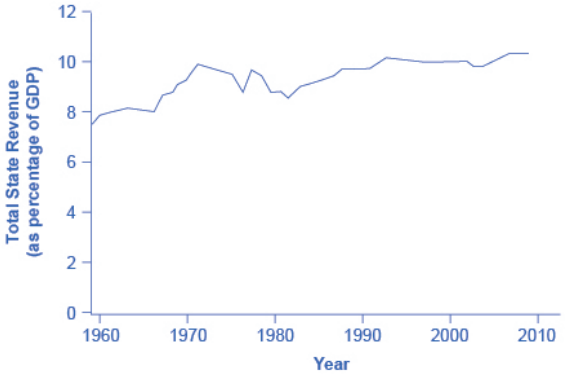

Figure 16.6. *State and Local Tax Revenue as a Share of GDP, 1960–2010. State and local tax revenues have increased to match the rise in state and local spending. (Source: Economic Report of the President, Tables B-85 and B-1, http://www.gpo.gov/fdsys/pkg/ERP-2013/content-detail.html).*

Self Check: State and Local Budgets

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

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107. Putting It Together: Government Action

Summary

This module was an application of the theories of supply and demand. You will notice that once you learn a theory in this course, you will use it over and over again, so the theories are important to learn (click here for a review of theories from the earlier module). The goal of this module was to explore the impacts of government intervention in markets. You learned how to:

- Define and analyze the impacts of price floors like the minimum wage
- Define and analyze the impacts of price ceilings like rent control
- Describe the incidence of various transaction-based taxes, that is, who bears the burden of the tax?
- Identify the types of taxes and the sources of federal income
- Define and analyze the impact of taxes as a percentage of one's income. In other words, is the burden on the rich, the poor or everyone equally?

Examples

Let's return to the example of the minimum wage. Careful analysis shows that imposition of, or increases in the minimum wage have significant distributional effects. In other words, there are winners and losers from the policy. The winners are workers who continue

to have a job, but are now paid a higher salary. The losers are businesses who have to pay more for their employees. This increase in production costs will be passed on, in part to consumers who will end up paying higher prices for the businesses' products. So consumers lose also.

The big losers, though, are the people who had jobs at the lower wage, but lose them when the minimum wage is increased. Which employees are most likely to lose their jobs, the most experienced and skilled, or the least experienced and skilled? Don't forget that ultimately what matters is the size of these effects, which we learned in the last module are based on wage elasticities of supply and demand for labor and the price elasticity of demand for the firm's products. These are the technical details that policy analysts will look at before making any recommendations to decision makers.

108. Glossary: Government Action

price ceiling
: a legal maximum price

price control
: government laws to regulate prices instead of letting market forces determine prices

price floor
: a legal minimum price

total surplus
: see social surplus

109. Discussion: Junk Food and Government Action

Recently there has been discussion in the news about taxing junk food (soft drinks, for example) in an effort to reduce the incidence of obesity in the U.S. Do you think the demand for junk food is elastic or inelastic with respect to price.

Based on your knowledge of the price elasticity of demand, do you think the deadweight loss of a soda/junk-food tax would be relatively large or relatively small? Why? Do you think taxing junk food would be a good idea? Based on your analysis, would it really help reduce the number of obese people in the United States? Explain.

PART VI

LESSON 5: MACROECONOMIC MEASURES: GDP

110. Why It Matters: GDP and Unemployment

Why evaluate macro economic performance using indicators that include output measures, unemployment, and inflation?

Dr.'s Office by *Morgan*, CC-BY.

When you go to a doctor's appointment, they check your weight, your heartbeat, and your blood pressure. They ask how you are feeling. They may also do other medical tests. What blood pressure is measuring, or what the laboratories look for in a urinalysis or blood test may not be intrinsically interesting (e.g. how is blood sugar measured?), but the results of the tests are anything but unimportant. Those results indicate how healthy or sick you are. They are necessary diagnostics for you and your doctor to determine what you need to do to improve your health, whether you are currently sick or you just want to improve the quality or length of your life.

That is a good metaphor for thinking about the present module. Up until this point, we've been studying introductory economics. This module is the first on macroeconomics per se. The module introduces the most important economic indicators for determining the state of a nation's macro economy. Are you planning to start a career or make a career change in the future? Are you interesting in purchasing a home, or selling one that you already own. How about buying a new car? What about saving for retirement? If so, what's the best place to put your savings? These are all questions that require some knowledge of how the economy is doing, now and in the future. This module will help you come up with better answers to those questions.

As you go through this module, here are a few questions to keep in mind:

- When have recessions occurred in your lifetime?
- When was the last time inflation was a significant problem for the U.S.?
- What is the average rate of unemployment during good times?
- Overall, how is the economy doing right now?

There is no doubt that this material contains some technical aspects. The idea is to give you enough technical detail to understand where the most important economic indicators come from and how they should be interpreted. Ultimately, you need to learn enough to be able to draw your own conclusions about the state of the economy from the statistics you hear about in the news.

This is completely doable, so let's get started.

LEARNING OUTCOMES

- Define the term “economic indicator”
- Explain GDP, including what it measures and what it excludes
- Describe the relationships among GDP, net domestic product, national income, personal income, and disposable income
- Explain how the unemployment rate is calculated.
- Identify and differentiate between the different types of unemployment
- Explain the concept of a price index and explain how price indices are derived.
- Define the rate of inflation; Explain how the rate of inflation is calculated
- Identify the consequences of price instability (i.e. inflation)
- Use a price index to translate between real and nominal data
- Define the GDP price index (also known as the GDP deflator or the Implicit Price Deflator)
- Differentiate between nominal GDP and real GDP

111. Outcome: Economic Indicators

What you'll learn to do: define the term "economic indicator"

This section will help you understand why economists use terms like GDP, GNP, and unemployment rates to assess how an economy is doing.

The specific things you'll learn in this section include:

- Identify the major economic indicators used to assess the state of the macroeconomy.

LEARNING ACTIVITIES

The learning activities for this section include:

- Reading: The Macroeconomic Perspective
- Self Check: Economic Indicators

Take time to review and reflect on each of these activities in order to improve your performance on the assessment for this section.

112. Reading: The Macroeconomic Perspective

HOW IS THE ECONOMY DOING? HOW DOES ONE TELL?

Figure 5.1. *The Great Depression At times, such as when many people are in need of government assistance, it is easy to tell how the economy is doing. This photograph shows people lined up during the Great Depression, waiting for relief checks. At other times, when some are doing well and others are not, it is more difficult to ascertain how the economy of a country is doing. (Credit: modification of work by the U.S. Library of Congress/Wikimedia Commons)*

The 1990s were boom years for the U.S. economy. The late 2000s, from 2007 to 2013 were not. What causes the economy to expand or contract? Why do businesses fail when they are making all the right decisions? Why do workers lose their jobs when they are hardworking and productive? Are bad economic times a failure of the market system? Are they a failure of the government?

These are all questions of macroeconomics, which we will begin to address in this module. We will not be able to answer all of these questions here, but we will start with the basics: How is the economy doing? How can we tell?

The macro economy includes all buying and selling, all production and consumption; everything that goes on in every market in the economy. The quest to measure the macro economy began more than 80 years ago, during the Great Depression. President Franklin D. Roosevelt and his economic advisers knew things were bad—but how could they express and measure just how bad it was? An economist named Simon Kuznets, who later won the Nobel Prize for his work, came up with a way to track what the entire economy is producing. The result—gross domestic product (GDP)—remains our basic measure of macroeconomic activity. In this module, you will learn how GDP is constructed, how it is used, and why it is so important.

Macroeconomics

Macroeconomics focuses on the economy as a whole (or on whole economies as they interact). It describes what causes recessions, and what makes unemployment stay high when recessions are supposed to be over. Macroeconomics addresses why some countries grow faster than others, and have higher standards of living than others. Macroeconomics involves adding up the economic activity of all households and all businesses in all markets to get the overall demand and supply in the economy. However, when we do that, something curious happens. It is not unusual that what results at the macro level is different from the sum of the microeconomic parts. Indeed, what seems sensible from a microeconomic point of view can have unexpected or counterproductive results at the macroeconomic level. Imagine that you are sitting at an event with a large audience, like a live concert

or a basketball game. A few people decide that they want a better view, and so they stand up. However, when these people stand up, they block the view for other people, and the others need to stand up as well if they wish to see. Eventually, nearly everyone is standing up, and as a result, no one can see much better than before. The rational decision of some individuals at the micro level—to stand up for a better view—ended up being self-defeating at the macro level. This is not macroeconomics, but it is an apt analogy.

The economy as a whole is massive. In order to determine how it is doing we use "economic indicators"— statistics that measure one or more aspects of the macro economic.

There is no one economic indicator that tells the whole story of the economy, so economists look at a variety of indicators some of which include:

- measures of aggregate production, like GDP
- measures of employment and unemployment, and measures of inflation, like the percent change in the Consumer Price Index
- the "Misery Index"—the sum of the inflation and unemployment rates as a measure of how bad (i.e., miserable) the economy is

The U.S. Department of Commerce even calculates the Index of Leading Economic Indicators, which is one attempt to combine multiple economic indicators to come up with one number that tries to predict the future path of the economy.

Self Check: Economic Indicators

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the Reading in this section.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

An interactive or media element has been excluded from this version of the text. You can view it online here: https://pressbooks.ccconline.org/accmacro/?p=276

113. Outcome: Calculating GDP

What you'll learn to do: explain GDP, including what it measures and what it excludes

GDP. You've heard of it before, but what it is? In this section, you will learn to define the Gross Domestic Product and see how economists are able to calculate the value of all of the goods and services produced within a country during a year.

The specific things you'll learn in this section include:

- Explain the expenditure approach to calculating GDP
- Explain the national income approach to calculating GDP

LEARNING ACTIVITIES

The learning activities for this section include:

- Reading: Calculating GDP
- Reading: Measuring Total Output
- Self Check: Calculating GDP

Take time to review and reflect on each of these activities in order to improve your performance on the assessment for this section.

114. Reading: Calculating GDP

Measuring the Size of the Economy: Gross Domestic Product

Macroeconomics is an empirical subject, meaning that it is verifiable by observation or experience rather than theory. Given this, the first step toward understanding macroeconomic concepts is to measure the economy.

How large is the U.S. economy? The size of a nation's overall economy is typically measured by its **gross domestic product** (GDP), which is the value of all final goods and services produced within a country in a given year. The measurement of GDP involves counting up the production of millions of different goods and services—smart phones, cars, music downloads, computers, steel, bananas, college educations, and all other new goods and services produced in the current year—and summing them into a total dollar value. This task is straightforward: take the quantity of everything produced, multiply it by the price at which each product sold, and add up the total. In 2014, the U.S. GDP totaled $17.4 trillion, the largest GDP in the world.

Each of the market transactions that enter into GDP must involve both a buyer and a seller. The GDP of an economy can be measured either by the total dollar value of what is purchased in the economy, or by the total dollar value of what is produced. There is even a third way, as we will explain later.

GDP Measured by Components of Demand

Who buys all of this production? This *demand* can be divided into four main parts:

- consumer spending (consumption)
- business spending (investment)
- government spending on goods and services
- spending on net exports

LINK IT UP

What is meant by the word "investment"?

What do economists mean by investment, or business spending? In calculating GDP, investment does not refer to the purchase of stocks and bonds or the trading of financial assets. It refers to the purchase of new capital goods, that is, new commercial real estate (such as buildings, factories, and stores) and equipment, residential housing construction, and inventories. Inventories that are produced this year are included in this year's GDP—even if they have not yet sold. From the accountant's perspective, it is as if the firm invested in its own inventories. Business investment in 2012 was over $2 trillion, according to the Bureau of Economic Analysis.

Table 5.1 shows how these four components added up to the GDP in 2012. Figure 5.4 (a) shows the levels of consumption, investment, and government purchases over time, expressed as a percentage of GDP, while Figure 5.4 (b) shows the levels of exports and imports as a percentage of GDP over time. A few patterns about each of these components are worth noticing. Table 5.1 shows the components of GDP from the demand side. Figure 5.3 provides a visual of the percentages.

Table 5.1. Components of U.S. GDP in 2012: From the Demand Side

	Components of GDP on the Demand Side (in trillions of dollars)	Percentage of Total
Consumption	$11.1	68.6%
Investment	$2.5	15.2%
Government	$3.2	19.5%
Exports	$2.2	13.5%
Imports	–$2.7	–16.9%
Total GDP	**$16.2**	**100%**

Source: http://bea.gov/iTable/iTable.cfm?ReqID=9&step=1

Percentage of Components of U.S. GDP on the Demand Side

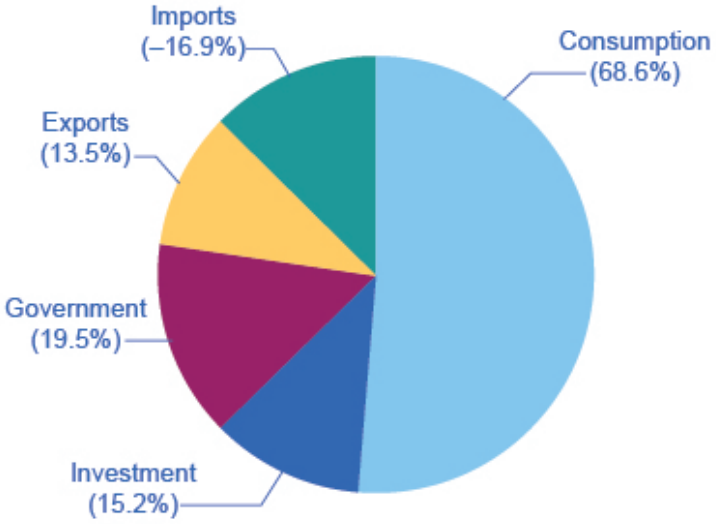

***Figure* 5.3.** *Percentage of Components of U.S. GDP on the Demand Side. Consumption makes up over half of the demand side components of the GDP. (Source: http://bea.gov/iTable/iTable.cfm?ReqID=9&step=1).*

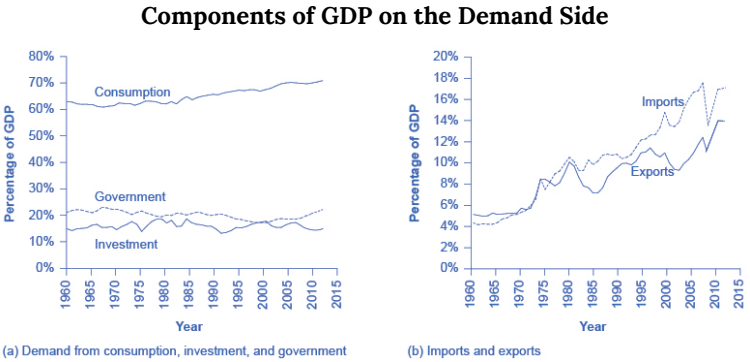

***Figure* 5.4.** *Components of GDP on the Demand Side (a) Consumption is about two-thirds of GDP, but it moves relatively little over time. Business investment hovers around 15% of GDP, but it increases and declines more than consumption. Government spending on goods and services is around 20% of GDP. (b) Exports are added to total demand for goods and services, while imports are subtracted from total demand. If exports exceed imports, as in most of the 1960s and 1970s in the U.S. economy, a trade surplus exists. If imports exceed exports, as in recent years, then a trade deficit exists. (Source: http://bea.gov/iTable/iTable.cfm?ReqID=9&step=1).*

Consumption expenditure by households is the largest component of GDP, accounting for about two-thirds of the GDP in any year. This tells us that consumers' spending decisions are a major driver of the economy. However, consumer spending is a gentle elephant: when viewed over time, it does not jump around too much.

Investment expenditure refers to purchases of physical plant and equipment, primarily by businesses. If Starbucks builds a new store, or Amazon buys robots, these expenditures are counted under business investment. *Investment demand* is far smaller than *consumption demand*, typically accounting for only about 15–18% of GDP, but it is very important for the economy because this is where jobs are created. However, it fluctuates more noticeably than consumption. Business investment is volatile; new technology or a new product can spur business investment, but then confidence can drop and business investment can pull back sharply.

If you have noticed any of the infrastructure projects (new

bridges, highways, airports) launched during the recession of 2009, you have seen how important government spending can be for the economy. Government expenditure in the United States is about 20% of GDP, and includes spending by all three levels of government: federal, state, and local. The only part of government spending counted in demand is government purchases of goods or services produced in the economy. Examples include the government buying a new fighter jet for the Air Force (federal government spending), building a new highway (state government spending), or a new school (local government spending). A significant portion of government budgets are transfer payments, like unemployment benefits, veteran's benefits, and Social Security payments to retirees. These payments are excluded from GDP because the government does not receive a new good or service in return or exchange. Instead they are transfers of income from taxpayers to others.

HOW DO STATISTICIANS MEASURE GDP?

Government economists at the Bureau of Economic Analysis (BEA), within the U.S. Department of Commerce, piece together estimates of GDP from a variety of sources.

Once every five years, in the second and seventh year of each decade, the Bureau of the Census carries out a detailed census of businesses throughout the United States. In between, the Census Bureau carries out a monthly survey of retail sales. These figures are adjusted with foreign trade data to account for exports that are produced in the United States and sold abroad and for imports that are produced abroad and sold here. Once every ten years, the Census Bureau conducts a comprehensive survey of housing and residential finance. Together, these sources provide the main basis for figuring out what is produced for consumers.

For investment, the Census Bureau carries out a monthly survey

of construction and an annual survey of expenditures on physical capital equipment.

For what is purchased by the federal government, the statisticians rely on the U.S. Department of the Treasury. An annual Census of Governments gathers information on state and local governments. Because a lot of government spending at all levels involves hiring people to provide services, a large portion of government spending is also tracked through payroll records collected by state governments and by the Social Security Administration.

With regard to foreign trade, the Census Bureau compiles a monthly record of all import and export documents. Additional surveys cover transportation and travel, and adjustment is made for financial services that are produced in the United States for foreign customers.

Many other sources contribute to the estimates of GDP. Information on energy comes from the U.S. Department of Transportation and Department of Energy. Information on healthcare is collected by the Agency for Health Care Research and Quality. Surveys of landlords find out about rental income. The Department of Agriculture collects statistics on farming.

All of these bits and pieces of information arrive in different forms, at different time intervals. The BEA melds them together to produce estimates of GDP on a quarterly basis (every three months). These numbers are then "annualized" by multiplying by four. As more information comes in, these estimates are updated and revised. The "advance" estimate of GDP for a certain quarter is released one month after a quarter. The "preliminary" estimate comes out one month after that. The "final" estimate is published one month later, but it is not actually final. In July, roughly updated estimates for the previous calendar year are released. Then, once every five years, after the results of the latest detailed five-year business census have been processed, the BEA revises all of the past estimates of GDP according to the newest methods and data, going all the way back to 1929.

LINK IT UP

Visit this website to read FAQs on the BEA site. You can even email your own questions!

Trade Balance

When thinking about the demand for domestically produced goods in a global economy, it is important to count spending on exports—domestically produced goods that are sold abroad. By the same token, we must also subtract spending on imports—goods produced in other countries that are purchased by residents of this country. The net export component of GDP is equal to the dollar value of exports (X) minus the dollar value of imports (M), (X – M). The gap between exports and imports is called the *trade balance*. If a country's exports are larger than its imports, then a country is said to have a *trade surplus*. In the United States, exports typically exceeded imports in the 1960s and 1970s, as shown in Figure 5.4 (b).

Since the early 1980s, imports have typically exceeded exports, and so the United States has experienced a *trade deficit* in most years. Indeed, the trade deficit grew quite large in the late 1990s and in the mid-2000s. Figure 5.4 (b) also shows that imports and exports have both risen substantially in recent decades, even after the declines during the *Great Recession* between 2008 and 2009. As noted before, if exports and imports are equal, foreign trade has no effect on total GDP. However, even if exports and imports are balanced overall, foreign trade might still have powerful effects on particular industries and workers by causing nations to shift workers and physical capital investment toward one industry rather than another.

Based on these four components of demand, GDP can be measured as:

GDP = Consumption + Investment + Government + Trade balance

GDP = C + I + G + (X − M)

Understanding how to measure GDP is important for analyzing connections in the macro economy and for thinking about macroeconomic policy tools.

GDP Measured by What is Produced

Everything that is purchased must be produced first. Table 5.2 breaks down what is produced into five categories: durable goods,nondurable goods, services, structures, and the change in inventories. Before going into detail about these categories, notice that total GDP measured according to what is produced is exactly the same as the GDP measured by looking at the five components of demand. Figure provides a visual representation of this information.

Table 5.2. Components of GDP on the Supply Side

	Components of GDP on the Supply Side (in trillions of dollars)	**Percentage of Total**
Goods		
Durable goods	$2.7	16.6%
Nondurable goods	$4.7	29.1%
Services	$7.6	46.7%
Structures	$1.2	7.2%
Changes in inventories	$0.1	0.4%
Total GDP	**$16.3**	**100%**

Source: http://bea.gov/iTable/iTable.cfm?ReqID=9&step=1

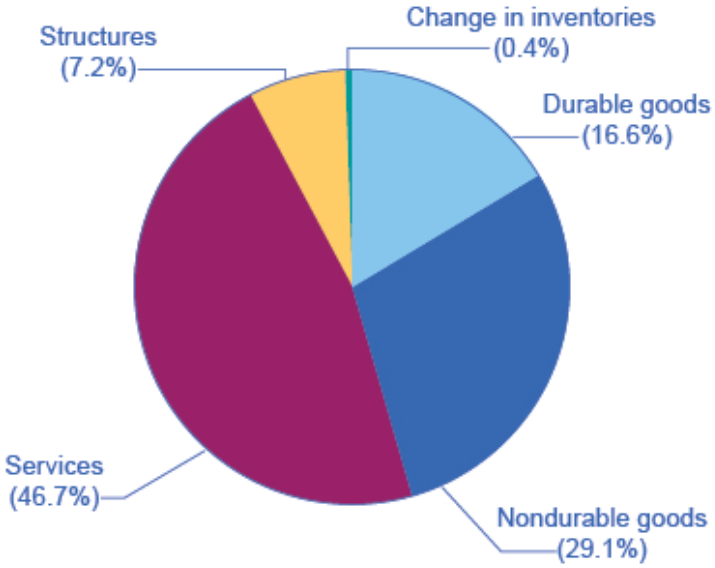

Figure 3. *Services make up almost half of the production side components of GDP in the United States. (Source: http://bea.gov/iTable/iTable.cfm?ReqID=9&step=1).*

Since every market transaction must have both a buyer and a seller, GDP must be the same whether measured by what is demanded or by what is produced. Figure 4 shows these components of what is produced, expressed as a percentage of GDP, since 1960.

Types of Production

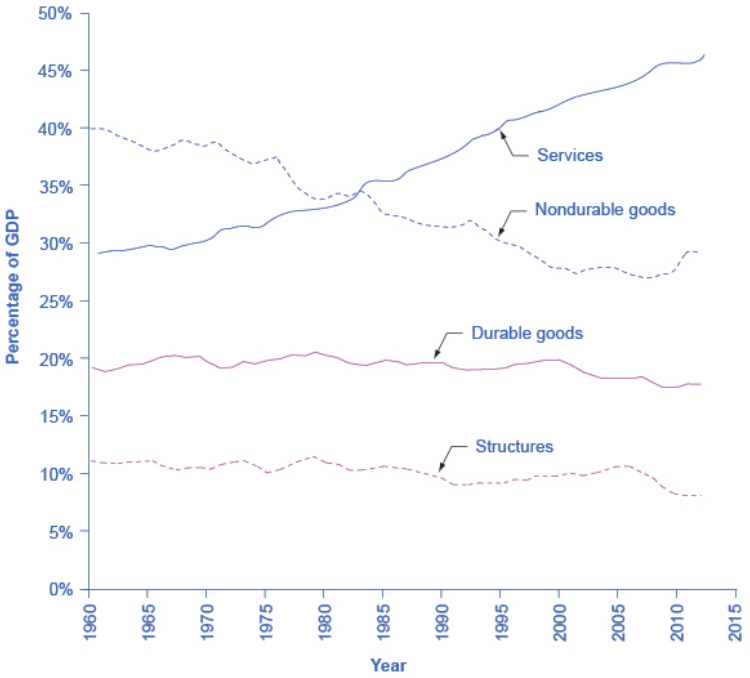

Figure 4. *Services are the largest single component of total supply, representing over half of GDP. Nondurable goods used to be larger than durable goods, but in recent years, nondurable goods have been dropping closer to durable goods, which is about 20% of GDP. Structures hover around 10% of GDP. The change in inventories, the final component of aggregate supply, is not shown here; it is typically less than 1% of GDP.*

In thinking about what is produced in the economy, many non-economists immediately focus on solid, long-lasting goods, like cars and computers. By far the largest part of GDP, however, is services. Moreover, services have been a growing share of GDP over time. A detailed breakdown of the leading service industries would include healthcare, education, and legal and financial services. It has been decades since most of the U.S. economy involved making solid objects. Instead, the most common jobs in a modern economy involve a worker looking at pieces of paper or a computer screen;

meeting with co-workers, customers, or suppliers; or making phone calls.

Even within the overall category of goods, long-lasting durable goods like cars and refrigerators are about the same share of the economy as short-lived nondurable goods like food and clothing. The category of structures includes everything from homes, to office buildings, shopping malls, and factories. Inventories is a small category that refers to the goods that have been produced by one business but have not yet been sold to consumers, and are still sitting in warehouses and on shelves. The amount of inventories sitting on shelves tends to decline if business is better than expected, or to rise if business is worse than expected.

The Problem of Double Counting

GDP is defined as the current value of all final goods and services produced in a nation in a year. What are final goods? They are goods at the furthest stage of production at the end of a year. Statisticians who calculate GDP must avoid the mistake of double counting, in which output is counted more than once as it travels through the stages of production. For example, imagine what would happen if government statisticians first counted the value of tires produced by a tire manufacturer, and then counted the value of a new truck sold by an automaker that contains those tires. In this example, the value of the tires would have been counted twice-because the price of the truck includes the value of the tires.

To avoid this problem, which would overstate the size of the economy considerably, government statisticians count just the value of final goods and services in the chain of production that are sold for consumption, investment, government, and trade purposes.Intermediate goods, which are goods that go into the production of other goods, are excluded from GDP calculations. From the example above, only the value of the Ford truck will be

counted. The value of what businesses provide to other businesses is captured in the final products at the end of the production chain.

The concept of GDP is fairly straightforward: it is just the dollar value of all final goods and services produced in the economy in a year. In our decentralized, market-oriented economy, actually calculating the more than $16 trillion-dollar U.S. GDP—along with how it is changing every few months—is a full-time job for a brigade of government statisticians.

Counting GDP

What is counted in GDP?

- Consumption
- Business investment
- Government spending on goods and services
- Net exports

What is not included in GDP?

- Intermediate goods
- Transfer payment and non-market activities
- Used goods
- Illegal goods

Notice the items that are not counted into GDP, as outlined in the list above. The sales of used goods are not included because they were produced in a previous year and are part of that year's GDP. The entire underground economy of services paid "under the table" and illegal sales should be counted, but is not, because it is impossible to track these sales. In a recent study by Friedrich Schneider of shadow economies, the underground economy in the United States was estimated to be 6.6% of GDP, or close to $2

trillion dollars in 2013 alone. Transfer payments, such as payment by the government to individuals, are not included, because they do not represent production. Also, production of some goods—such as home production as when you make your breakfast—is not counted because these goods are not sold in the marketplace.

LINK IT UP

Visit this website to read about the "New Underground Economy."

115. Reading: Measuring Total Output

Measuring Total Output

An economy produces a mind-boggling array of goods and services. In 2007, for example, Domino's Pizza produced 400 million pizzas. The United States Steel Corporation, the nation's largest steel company, produced 23.6 million tons of steel. Strong Brothers Lumber Co., a Colorado firm, produced 2.1 million board feet of lumber. The Louisiana State University football team drew 722,166 fans to its home games—and won the national championship. Leonor Montenegro, a pediatric nurse in Los Angeles, delivered 387 babies and took care of 233 additional patients. A list of all the goods and services produced in any year would be virtually endless.

So—what kind of year was 2007? We would not get very far trying to wade through a list of all the goods and services produced that year. It is helpful to have instead a single number that measures total output in the economy; that number is GDP.

The Components of GDP

We can divide the goods and services produced during any period into four broad components, based on who buys them. These components of GDP are personal consumption (*C*), gross private domestic investment (*I*), government purchases (*G*), and net exports or exports minus imports (X-M). Thus

GPD = consumption (*C*) + private investment (*I*) + government purchases (*G*) + net exports (X-M)

OR

GPD = $C + I + G + (X-M)$

We will examine each of these components, and we will see how each fits into the pattern of macroeconomic activity. Before we begin, it will be helpful to distinguish between two types of variables: stocks and flows. A flow variable is a variable that is measured over a specific period of time. A stock variable is a variable that is independent of time. Income is an example of a flow variable. To say one's income is, for example, $1,000 is meaningless without a time dimension. Is it $1,000 per hour? Per day? Per week? Per month? Until we know the time period, we have no idea what the income figure means. The balance in a checking account is an example of a stock variable. When we learn that the balance in a checking account is $1,000, we know precisely what that means; we do not need a time dimension. We will see that stock and flow variables play very different roles in macroeconomic analysis.

Personal Consumption

Personal consumption is a flow variable that measures the value of goods and services purchased by households during a time period. Purchases by households of groceries, health-care services, clothing, and automobiles—all are counted as consumption.

The production of consumer goods and services accounts for about 70% of total output. Because consumption is such a large part of GDP, economists seeking to understand the determinants of GDP must pay special attention to the determinants of consumption. In a later chapter we will explore these determinants and the impact of consumption on economic activity.

Personal consumption represents a demand for goods and services placed on firms by households. In the chapter on demand and supply, we saw how this demand could be presented in a circular flow model of the economy. Figure 6.1 "Personal

Consumption in the Circular Flow" presents a circular flow model for an economy that produces only personal consumption goods and services. (We will add the other components of GDP to the circular flow as we discuss them.) Spending for these goods flows from households to firms; it is the arrow labeled "Personal consumption." Firms produce these goods and services using factors of production: labor, capital, and natural resources. These factors are ultimately owned by households. The production of goods and services thus generates income to households; we see this income as the flow from firms to households labeled "Factor incomes" in the exhibit.

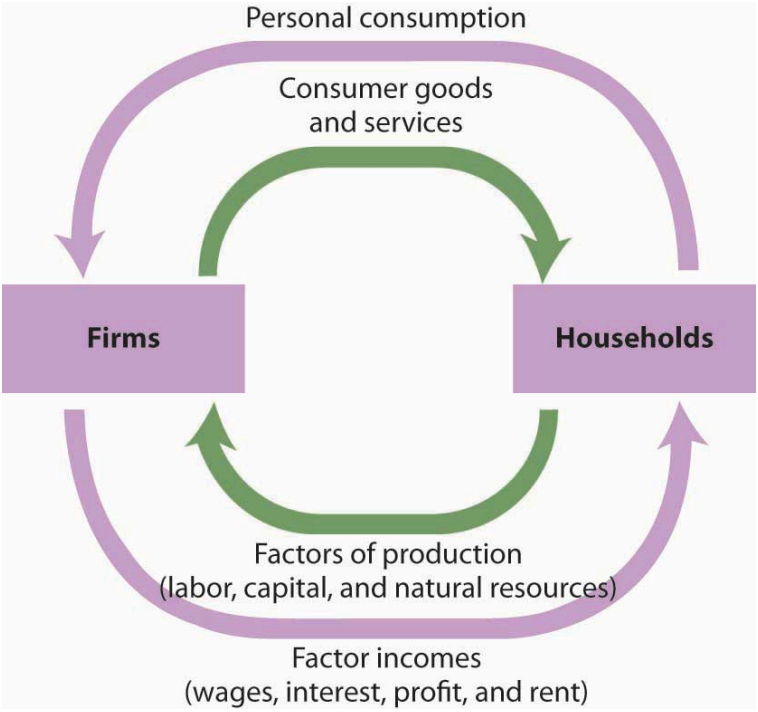

Figure 6.1 *Personal Consumption in the Circular Flow. Personal consumption spending flows from households to firms. In return, consumer goods and services flow from firms to households. To produce the goods and services households demand, firms employ factors of production owned by households. There is thus a flow of factor services from households to firms, and a flow of payments of factor incomes from firms to households.*

In exchange for payments that flow from households to firms, there is a flow of consumer goods and services from firms to households. This flow is shown in Figure 6.1 "Personal Consumption in the Circular Flow" as an arrow going from firms to households. When you buy a soda, for example, your payment to the store is part of the flow of personal consumption; the soda is part of the flow of consumer goods and services that goes from the store to a household—yours.

Similarly, the lower arrow in Figure 6.1 "Personal Consumption in the Circular Flow" shows the flow of factors of production—labor, capital, and natural resources—from households to firms. If you work for a firm, your labor is part of this flow. The wages you receive are part of the factor incomes that flow from firms to households.

Because our focus is macroeconomics, the study of aggregates of economic activity, we will think in terms of the *total* of personal consumption and the *total* of payments to households in the circular flow.

Private Investment

Gross private domestic investment is the value of all goods produced during a period for use in the production of other goods and services. Like personal consumption, gross private domestic investment is a flow variable. It is often simply referred to as "private investment." A hammer produced for a carpenter is private investment. A printing press produced for a magazine publisher is private investment, as is a conveyor-belt system produced for a manufacturing firm. Capital includes all the goods that have been produced for use in producing other goods; it is a stock variable. Private investment is a flow variable that adds to the stock of capital during a period.

Heads Up!

The term "*investment*" can generate confusion. In everyday conversation, we use the term "*investment*" to refer to uses of money to earn income. We say we have invested in a stock or invested in a bond. Economists, however, restrict "*investment*" to activities that increase the economy's stock of capital. The purchase of a share of stock does not add to the capital stock; it is not investment in the economic meaning of the word. We refer to the exchange of financial assets, such as stocks or bonds, as financial investment to distinguish it from the creation of capital that occurs as the result of investment. Only when new capital is produced does investment occur. Confusing the economic concept of private investment with the concept of financial investment can cause misunderstanding of the way in which key components of the economy relate to one another.

Gross private domestic investment includes three flows that add to or maintain the nation's capital stock: expenditures by business firms on new buildings, plants, tools, equipment, and software that will be used in the production of goods and services; expenditures on new residential housing; and changes in business inventories. Any addition to a firm's inventories represents an addition to investment; a reduction subtracts from investment. For example, if a clothing store stocks 1,000 pairs of jeans, the jeans represent an addition to inventory and are part of gross private domestic

investment. As the jeans are sold, they are subtracted from inventory and thus subtracted from investment.

By recording additions to inventories as investment and reductions from inventories as subtractions from investment, the accounting for GDP records production in the period in which it occurs. Suppose, for example, that Levi Strauss manufactures 1 million pairs of jeans late in 2007 and distributes them to stores at the end of December. The jeans will be added to inventory; they thus count as investment in 2007 and enter GDP for that year. Suppose they are sold in January 2008. They will be counted as consumption in GDP for 2008 but subtracted from inventory, and from investment. Thus, the production of the jeans will add to GDP in 2007, when they were produced. They will not count in 2008, save for any increase in the value of the jeans resulting from the services provided by the retail stores that sold them.

Private investment accounts for about 16% of GDP. Despite its relatively small share of total economic activity, private investment plays a crucial role in the macroeconomy for two reasons:

1. Private investment represents a choice to forgo current consumption in order to add to the capital stock of the economy. Private investment therefore adds to the economy's capacity to produce and shifts its production possibilities curve outward. Investment is thus one determinant of economic growth, which is explored in another chapter.
2. Private investment is a relatively volatile component of GDP; it can change dramatically from one year to the next. Fluctuations in GDP are often driven by fluctuations in private investment. We will examine the determinants of private investment in a chapter devoted to the study of investment.

Private investment represents a demand placed on firms for the production of capital goods. While it is a demand placed on firms, it flows from firms. In the circular flow model in Figure 6.2 "Private Investment in the Circular Flow," we see a flow of investment going

from firms to firms. The production of goods and services for consumption generates factor incomes to households; the production of capital goods for investment generates income to households as well.

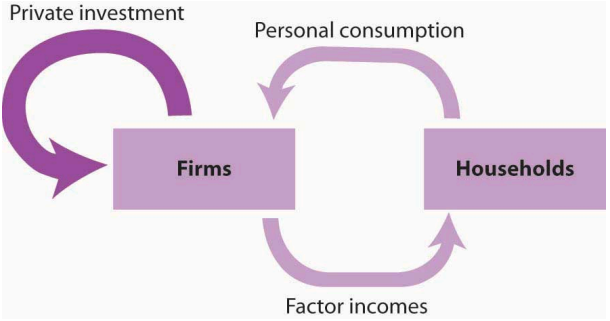

Figure 6.2 *Private Investment in the Circular Flow. Private investment constitutes a demand placed on firms by other firms. It also generates factor incomes for households. To simplify the diagram, only the spending flows are shown—the correspondin g flows of goods and services have been omitted.*

Figure 6.2 "Private Investment in the Circular Flow" shows only spending flows and omits the physical flows represented by the arrows in Figure 6.1 "Personal Consumption in the Circular Flow." This simplification will make our analysis of the circular flow model easier. It will also focus our attention on spending flows, which are the flows we will be studying.

Government Purchases

Government agencies at all levels purchase goods and services from firms. They purchase office equipment, vehicles, buildings, janitorial services, and so on. Many government agencies also produce goods and services. Police departments produce police protection. Public schools produce education. The National Aeronautics and Space Administration (NASA) produces space exploration.

Government purchases are the sum of purchases of goods and services from firms by government agencies plus the total value of output produced by government agencies themselves during a time period. Government purchases make up about 20% of GDP.

Government purchases are not the same thing as government spending. Much government spending takes the form of transfer payments, which are payments that do not require the recipient to produce a good or service in order to receive them. Transfer payments include Social Security and other types of assistance to retired people, welfare payments to poor people, and unemployment compensation to people who have lost their jobs. Transfer payments are certainly significant—they account for roughly half of all federal government spending in the United States. They do not count in a nation's GDP, because they do not reflect the production of a good or service.

Government purchases represent a demand placed on firms, represented by the flow shown in Figure 6.3 "Government Purchases in the Circular Flow." Like all the components of GDP, the production of goods and services for government agencies creates factor incomes for households.

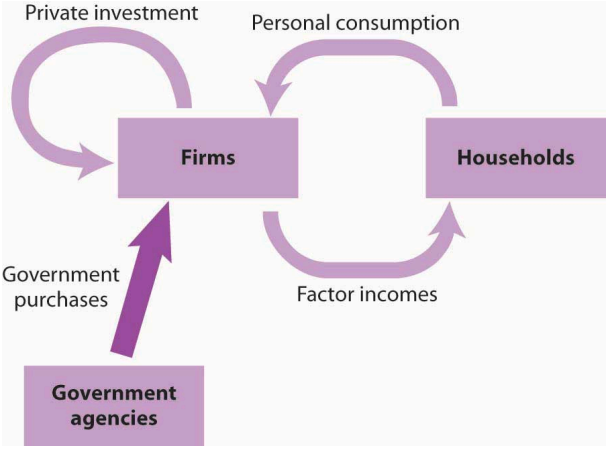

Figure 6.3 *Government Purchases in the Circular Flow. Purchases of goods and services by government agencies create demands on firms. As firms produce these goods and services, they create factor incomes for households.*

Net Exports

Sales of a country's goods and services to buyers in the rest of the world during a particular time period represent its exports. A purchase by a Japanese buyer of a Ford Taurus produced in the United States is a U.S. export. Exports also include such transactions as the purchase of accounting services from a New York accounting firm by a shipping line based in Hong Kong or the purchase of a ticket to Disney World by a tourist from Argentina. Imports are purchases of foreign-produced goods and services by a country's residents during a period. United States imports include such transactions as the purchase by Americans of cars produced in Japan or tomatoes grown in Mexico or a stay in a French hotel by a tourist from the United States. Subtracting imports from exports yields net exports.

Exports (X) − imports (M) = net exports (X-M)

In the third quarter of 2008, foreign buyers purchased $1,971.3 billion worth of goods and services from the United States. In the same year, U.S. residents, firms, and government agencies purchased $2,677.9 billion worth of goods and services from foreign countries. The difference between these two figures, –$706.6 billion, represented the net exports of the U.S. economy in the third quarter of 2008. Net exports were negative because imports exceeded exports. Negative net exports constitute a trade deficit. The amount of the deficit is the amount by which imports exceed exports. When exports exceed imports there is a trade surplus. The magnitude of the surplus is the amount by which exports exceed imports.

The United States has recorded more deficits than surpluses since World War II, but the amounts have typically been relatively small, only a few billion dollars. The trade deficit began to soar, however, in the 1980s and again in the 2000s. We will examine the reasons for persistent trade deficits in another chapter. The rest of the world plays a key role in the domestic economy and, as we will see later in the book, there is nothing particularly good or bad about trade surpluses or deficits. Goods and services produced for export represent roughly 14% of GDP, and the goods and services the United States imports add significantly to our standard of living.

In the circular flow diagram in Figure 6.4 "Net Exports in the Circular Flow," net exports are shown with an arrow connecting firms to the rest of the world. The balance between the flows of exports and imports is net exports. When there is a trade surplus, net exports are positive and add spending to the circular flow. A trade deficit implies negative net exports; spending flows from firms to the rest of the world.

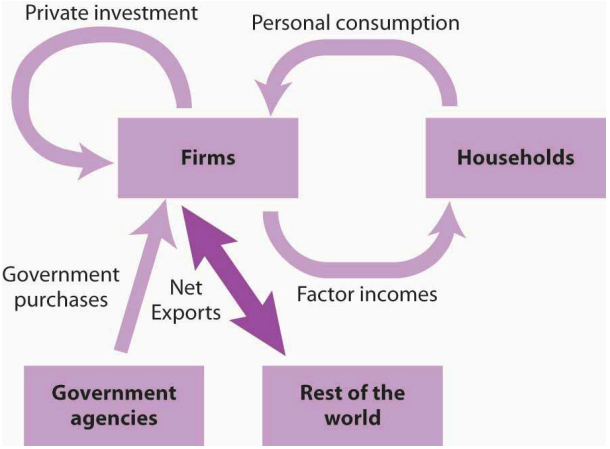

Figure 6.4 *Net Exports in the Circular Flow. Net exports represent the balance between exports and imports. Net exports can be positive or negative. If they are positive, net export spending flows from the rest of the world to firms. If they are negative, spending flows from firms to the rest of the world.*

The production of goods and services for personal consumption, private investment, government purchases, and net exports makes up a nation's GDP. Firms produce these goods and services in response to demands from households (personal consumption), from other firms (private investment), from government agencies (government purchases), and from the rest of the world (net exports). All of this production creates factor income for households. Figure 6.5 "Spending in the Circular Flow Model" shows the circular flow model for all the spending flows we have discussed. Each flow is numbered for use in the exercise at the end of this section.

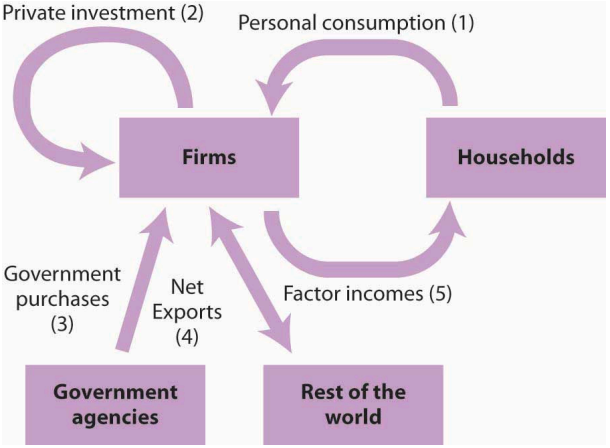

Figure 6.5 *Spending in the Circular Flow Model. GDP equals the sum of production by firms of goods and services for personal consumption (1), private investment (2), government purchases (3), and net exports (4). The circular flow model shows these flows and shows that the production of goods and services generates factor incomes (5) to households.*

The circular flow model identifies some of the forces at work in the economy, forces that we will be studying in later chapters. For example, an increase in any of the flows that place demands on firms (personal consumption, private investment, government purchases, and exports) will induce firms to expand their production. This effect is characteristic of the expansion phase of the business cycle. An increase in production will require firms to employ more factors of production, which will create more income for households. Households are likely to respond with more

consumption, which will induce still more production, more income, and still more consumption. Similarly, a reduction in any of the demands placed on firms will lead to a reduction in output, a reduction in firms' use of factors of production, a reduction in household incomes, a reduction in income, and so on. This sequence of events is characteristic of the contraction phase of the business cycle. Much of our work in macroeconomics will involve an analysis of the forces that prompt such changes in demand and an examination of the economy's response to them.

Figure 6.6 "Components of GDP, 2008 (Q3) in Billions of Dollars" shows the size of the components of GDP in 2008. We see that the production of goods and services for personal consumption accounted for about 70% of GDP. Imports exceeded exports, so net exports were negative.

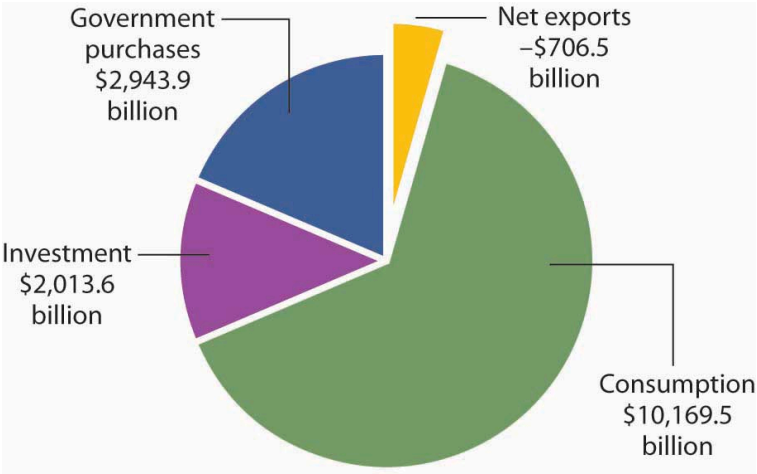

Figure 6.6 *Components of GDP, 2008 (Q3) in Billions of Dollars. Consumption makes up the largest share of GDP. Net exports were negative in 2008. Total GDP—the sum of personal consumption, private investment, government purchases, and net exports—equaled $14,420.5 billion in 2008.*

Final Goods and Value Added

GDP is the total value of all *final* goods and services produced during a particular period valued at prices in that period. That is not the same as the total value of all goods and services produced during a period. This distinction gives us another method of estimating GDP in terms of output.

Suppose, for example, that a logger cuts some trees and sells the logs to a sawmill. The mill makes lumber and sells it to a construction firm, which builds a house. The market price for the lumber includes the value of the logs; the price of the house includes the value of the lumber. If we try to estimate GDP by adding the value of the logs, the lumber, and the house, we would be counting the lumber twice and the logs three times. This problem is called "double counting," and the economists who compute GDP seek to avoid it.

In the case of logs used for lumber and lumber produced for a house, GDP would include the value of the house. The lumber and the logs would not be counted as additional production because they are intermediate goods that were produced for use in building the house.

Another approach to estimating the value of final production is to estimate for each stage of production the value added, the amount by which the value of a firm's output exceeds the value of the goods and services the firm purchases from other firms. Table 6.1 "Final Value and Value Added" illustrates the use of value added in the production of a house.

Table 6.1. Final Value and Value Added

Good	Produced by	Purchased by	Price	Value Added
Logs	Logger	Sawmill	$12,000	$12,000
Lumber	Sawmill	Construction firm	$25,000	$13,000
House	Construction firm	Household	$125,000	$100,000
		Final Value	**$125,000**	
		Sum of Values Added		**$125,000**

If we sum the value added at each stage of the production of a good or service, we get the final value of the item. The example shown here involves the construction of a house, which is produced from lumber that is, in turn, produced from logs.

Suppose the logs produced by the logger are sold for $12,000 to a mill, and that the mill sells the lumber it produces from these logs for $25,000 to a construction firm. The construction firm uses the lumber to build a house, which it sells to a household for $125,000. (To simplify the example, we will ignore inputs other than lumber that are used to build the house.) The value of the final product, the house, is $125,000. The value added at each stage of production is estimated as follows:

1. The logger adds $12,000 by cutting the logs.
2. The mill adds $13,000 ($25,000 – $12,000) by cutting the logs into lumber.
3. The construction firm adds $100,000 ($125,000 – $25,000) by using the lumber to build a house.

The sum of values added at each stage ($12,000 + $13,000 + $100,000) equals the final value of the house, $125,000.

The value of an economy's output in any period can thus be estimated in either of two ways. The values of final goods and services produced can be added directly, or the values added at

each stage in the production process can be added. The Commerce Department uses both approaches in its estimate of the nation's GDP.

Self Check: Calculating GDP

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the two Readings in this section.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

An interactive or media element has been excluded from this version of the text. You can view it online here: https://pressbooks.ccconline.org/accmacro/?p=282

116. Outcome: GDP and Income

What you'll learn to do: describe the relationships among GDP, net domestic product, national income, personal income, and disposable income

In this section, you will learn how the GDP relates to other economic indicators. You'll learn about other measures of economic output, including Gross National Product and Net National Product.

LEARNING ACTIVITIES

The learning activities for this section include:

- Reading: Alternative Ways to Measure the Economy
- Reading: Gross National Product: An Alternative Measure of Output
- Self Check: GDP and Income

Take time to review and reflect on each of these activities in order to improve your performance on the assessment for this section.

117. Reading: Alternative Ways to Measure the Economy

Alternative Ways to Measure the Economy

Besides GDP, there are several different but closely related ways of measuring the size of the economy. We mentioned above that GDP can be thought of as total production and as total purchases. It can also be thought of as total income since anything produced and sold produces income.

One of the closest cousins of GDP is the **gross national product** (GNP). GDP includes only what is produced within a country's borders. GNP adds what is produced by domestic businesses and labor abroad, and subtracts out any payments sent home to other countries by foreign labor and businesses located in the United States. In other words, GNP is based more on the production of citizens and firms of a country, wherever they are located, and GDP is based on what happens within the geographic boundaries of a certain country. For the United States, the gap between GDP and GNP is relatively small; in recent years, only about 0.2%. For small nations, which may have a substantial share of their population working abroad and sending money back home, the difference can be substantial.

Net national product (NNP) is calculated by taking GNP and then subtracting the value of how much physical capital is worn out, or reduced in value because of aging, over the course of a year. The process by which capital ages and loses value is called **depreciation**. The NNP can be further subdivided into **national income**, which

includes all income to businesses and individuals, and **personal income**, which includes only income to people.

To get an idea of how these calculations work, follow the steps in the following feature.

CALCULATING GDP, NET EXPORTS, AND NNP

Based on the information in table below:

- What is the value of GDP?
- What is the value of net exports?
- What is the value of NNP?

Government purchases	$120 billion
Depreciation	$40 billion
Consumption	$400 billion
Business Investment	$60 billion
Exports	$100 billion
Imports	$120 billion
Income receipts from rest of the world	$10 billion
Income payments to rest of the world	$8 billion

Step 1. To calculate GDP use the following formula:
GDP =
Consumption + Investment + Government spending + (Exports − Imports)
=C + I + G + (X − M)
=$400 + $60 + $120 + ($100 − $120)
=$560 billion

Step 2. To calculate net exports, subtract imports from exports.
Net exports = X − M
=$100 − $120
=−$20 billion

Step 3. To calculate NNP, use the following formula:
NNP = GDP + Income receipts from the rest of the world− Income payments to the rest of the world − Depreciation
=$560 + $10 − $8 − $40
=$522 billion

118. Reading: Gross National Product: An Alternative Measure of Output

Gross National Product: An Alternative Measure of Output

While GDP represents the most commonly used measure of an economy's output, economists sometimes use an alternative measure. Gross National Product (GNP) is the total value of final goods and services produced during a particular period with factors of production owned by the residents of a particular country.

The difference between GDP and GNP is a subtle one. The GDP of a country equals the value of final output produced within the borders of that country; the GNP of a country equals the value of final output produced using factors owned by residents of the country. Most production in a country employs factors of production owned by residents of that country, so the two measures overlap. Differences between the two measures emerge when production in one country employs factors of production *owned* by residents of other countries.

Suppose, for example, that a resident of Bellingham, Washington, owns and operates a watch repair shop across the Canadian–U.S. border in Victoria, British Columbia. The value of watch repair services produced at the shop would be counted as part of Canada's GDP because they are produced in Canada. That value would not, however, be part of U.S. GDP. But, because the watch repair services were produced using capital and labor provided by a resident of the United States, they would be counted as part of GNP in the United States and not as part of GNP in Canada.

Because most production fits in both a country's GDP as well as its GNP, there is seldom much difference between the two measures. The relationship between GDP and GNP is given by

Equation 6.3

GDP + net income received from abroad by residents of a nation = GNP

In the third quarter of 2008, for example, GDP equaled $14,220.5 billion. We add income receipts earned by residents of the United States from the rest of the world of $805.8 billion and then subtract income payments that went from the United States to the rest of the world of $688.4 billion to get GNP of $14,538.0 billion for the third quarter of 2008. GNP is often used in international comparisons of income; we shall examine those later in this module.

Self Check: GDP and Income

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the two Readings in this section.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

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119. Glossary: Macroeconomic Measures of Performance

adverse selection of wage cuts argument
: if employers reduce wages for all workers, the best will leave

cyclical unemployment
: unemployment closely tied to the business cycle, like higher unemployment during a recession

depreciation
: the process by which capital ages over time and therefore loses its value

discouraged workers
: those who have stopped looking for employment due to the lack of suitable positions available

double counting
: a potential mistake to be avoided in measuring GDP, in which output is counted more than once as it travels through the stages of production

durable good
: long-lasting good like a car or a refrigerator

efficiency wage theory
: the theory that the productivity of workers, either individually or as a group, will increase if they are paid more

final good and service
: output used directly for consumption, investment, government, and trade purposes; contrast with "intermediate good"

frictional unemployment
: unemployment that occurs as workers move between jobs

gross domestic product (GDP)
: the value of the output of all goods and services produced within a country in a year

gross national product (GNP)
: includes what is produced domestically and what is produced by domestic labor and business abroad in a year

implicit contract
: an unwritten agreement in the labor market that the employer will try to keep wages from falling when the economy is weak or the business is having trouble, and the employee will not expect huge salary increases when the economy or the business is strong

insider-outsider model
: those already working for the firm are "insiders" who know the procedures; the other workers are "outsiders" who are recent or prospective hires

intermediate good
: output provided to other businesses at an intermediate stage of production, not for final users; contrast with "final good and service"

inventory
: good that has been produced, but not yet been sold

labor force participation rate
: this is the percentage of adults in an economy who are either employed or who are unemployed and looking for a job

Lorenz curve
: a graph that compares the cumulative income actually received to a perfectly equal distribution of income; it shows the share

of population on the horizontal axis and the cumulative percentage of total income received on the vertical axis

national income
includes all income earned: wages, profits, rent, and profit income

natural rate of unemployment
the unemployment rate that would exist in a growing and healthy economy from the combination of economic, social, and political factors that exist at a given time

net national product (NNP)
GNP minus depreciation

nondurable good
short-lived good like food and clothing

out of the labor force
those who are not working and not looking for work—whether they want employment or not; also termed "not in the labor force"

relative wage coordination argument
across-the-board wage cuts are hard for an economy to implement, and workers fight against them

service
product which is intangible (in contrast to goods) such as entertainment, healthcare, or education

structure
building used as residence, factory, office building, retail store, or for other purposes

structural unemployment
unemployment that occurs because individuals lack skills valued by employers

trade balance
gap between exports and imports

trade deficit
exists when a nation's imports exceed its exports and is calculated as imports –exports

trade surplus
exists when a nation's exports exceed its imports and is calculated as exports – imports

underemployed
individuals who are employed in a job that is below their skills

unemployment rate
the percentage of adults who are in the labor force and thus seeking jobs, but who do not have jobs

quintile
dividing a group into fifths, a method often used to look at distribution of income

120. Discussion: State of the Macroeconomy

How has the U.S. economy been doing in recent years? Why do you think that is? Gather relevant economic statistics, such as the growth rate of real GDP, the unemployment rate, and the inflation rate, to support your case.

PART VII

LESSON 6: BUSINESS CYCLES, AGGREGATE DEMAND AND AGGREGATE SUPPLY

121. Why It Matters: Macro Workings

Why model the macro economy over the short and long terms?

This is the most important module in the principles of macroeconomics course. The module introduces the key macroeconomic model, the Aggregate Demand-Aggregate Supply model, that will be used in nearly every module that follows. Studying this module will be like learning how to cut and join wood for a carpenter, learning how to work with pipes for a plumber, or learning how to write code for a programmer. In short, this is what macroeconomics is all about: using the AD-AS model to analyze issues and problems in the macro economy. The effort you put into learning this module will be time well spent.

The AD-AS model shows how spending in the economy (AD) interacts with production (AS) to determine the aggregate price level and the level of real GDP. The model works like an ordinary market demand and supply model, but you will see that the way it is interpreted is quite different.

Some of the questions you will explore are:

- What does the macro economy look like in the short run?
- What does it look like over the long run?
- What determines the amount of total spending in the economy?
- What determines the amount of real GDP?
- How do the level of GDP and the price level respond to shocks (i.e., changes) in aggregate demand or aggregate supply?
- How do these answers differ in the short run versus the long

run?

Let's get started.

LEARNING OUTCOMES

- Describe the business cycle and its primary phases
- Define economic growth
- Use the AD-AS model to explain the equilibrium levels of real GDP and price level.

122. Outcome: The Business Cycle

What you'll learn to do: describe the business cycle and its primary phases

In this section, you will look at fluctuations in GDP and learn about the peaks and troughs of the typical business cycle.

LEARNING ACTIVITIES

The learning activities for this section include:

- Reading: Tracking Real GDP Over Time
- Reading: Phases of the Business Cycle
- Reading: Overheating and Stagflation
- Video: The Business Cycle
- Self Check: The Business Cycle

Take time to review and reflect on each of these activities in order to improve your performance on the assessment for this section.

123. Reading: Tracking Real GDP Over Time

Tracking Real GDP Over Time

When news reports indicate that "the economy grew 1.2% in the first quarter," the reports are referring to the percentage change in real GDP. By convention, GDP growth is reported at an annualized rate: Whatever the calculated growth in real GDP was for the quarter, it is multiplied by four when it is reported as if the economy were growing at that rate for a full year.

The graph illustrates that both real GDP and real GDP per capita have substantially increased since 1900.

Figure 5.10. *U.S. GDP, 1900–2012 Real GDP in the United States in 2012 was about $13 trillion. After adjusting to remove the effects of inflation, this represents a roughly 20-fold increase in the economy's production of goods and services since the start of the twentieth century. (Source: bea.gov).*

Real GDP is important because it is highly correlated with other measures of economic activity, like employment and unemployment. When real GDP rises, so does employment.

The most significant human problem associated with recessions (and their larger, uglier cousins, depressions) is that a slowdown in production means that firms need to lay off or fire some of the workers they have. Losing a job imposes painful financial and personal costs on workers, and often on their extended families as well. In addition, even those who keep their jobs are likely to find that wage raises are scanty at best—they may even be asked to take pay cuts or work reduced hours.

Table 5.7 lists the pattern of recessions and expansions in the U.S. economy since 1900. The highest point of the economy, before the recession begins, is called the *peak*; conversely, the lowest point of a recession, before a recovery begins, is called the *trough*. Thus, a recession lasts from peak to trough, and an economic upswing runs from trough to peak. The movement of the economy from peak to trough and trough to peak is called the *business cycle*. It is intriguing to notice that the three longest trough-to-peak expansions of the twentieth century have happened since 1960. The most recent recession started in December 2007 and ended formally in June 2009. This was the most severe recession since the Great Depression of the 1930s.

Table 5.7. U.S. Business Cycles since 1900

Trough	Peak	Months of Contraction	Months of Expansion
December 1900	September 1902	18	21
August 1904	May 1907	23	33
June 1908	January 1910	13	19
January 1912	January 1913	24	12
December 1914	August 1918	23	44
March 1919	January 1920	7	10
July 1921	May 1923	18	22
July 1924	October 1926	14	27
November 1927	August 1929	23	21
March 1933	May 1937	43	50
June 1938	February 1945	13	80
October 1945	November 1948	8	37
October 1949	July 1953	11	45
May 1954	August 1957	10	39
April 1958	April 1960	8	24
February 1961	December 1969	10	106
November 1970	November 1973	11	36
March 1975	January 1980	16	58
July 1980	July 1981	6	12
November 1982	July 1990	16	92
March 2001	November 2001	8	120
December 2007	June 2009	18	73

Source: http://www.nber.org/cycles/main.html

A private think tank, the *National Bureau of Economic Research*, is the official tracker of business cycles for the U.S. economy. However, the effects of a severe recession often linger on after the official ending date assigned by the NBER.

124. Reading: Phases of the Business Cycle

Phases of the Business Cycle

In this section, our goal is to use the concept of real GDP to look at the business cycle—the economy's pattern of expansion, then contraction, then expansion again—and at growth of real GDP.

Figure 5.1 "Phases of the Business Cycle" shows a stylized picture of a typical business cycle. It shows that economies go through periods of increasing and decreasing real GDP, but that over time they generally move in the direction of increasing levels of real GDP. A sustained period in which real GDP is rising is an expansion; a sustained period in which real GDP is falling is a recession. Typically, an economy is said to be in a recession when real GDP drops for two consecutive quarters, but in the United States, the responsibility of defining precisely when the economy is in recession is left to the Business Cycle Dating Committee of the National Bureau of Economic Research (NBER). The Committee defines a recession as a "significant decline in economic activity spread across the economy, lasting more than a few months, normally visible in real GDP, real income, employment, industrial production, and wholesale-retail sales."

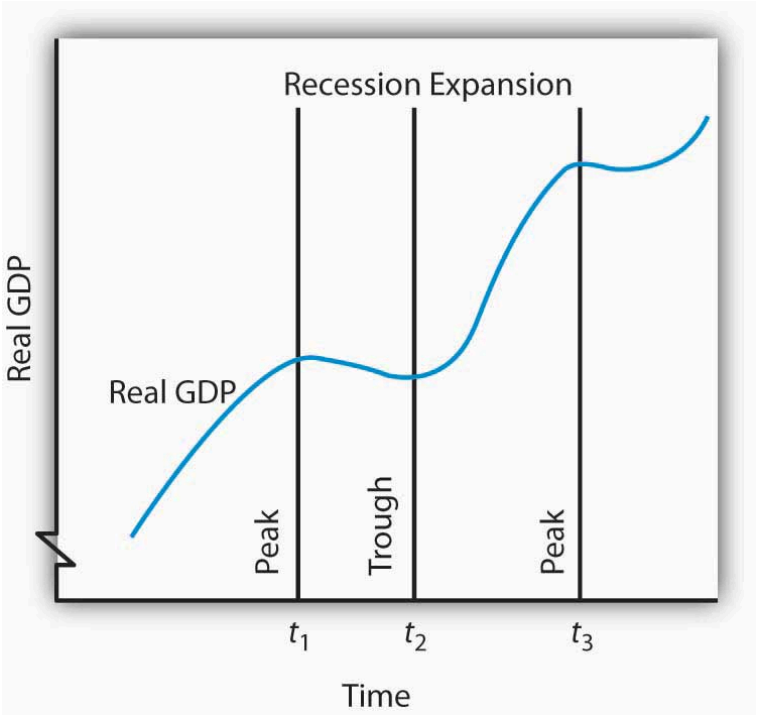


Figure 5.1. *Phases of the Business Cycle. The business cycle is a series of expansions and contractions in real GDP. The cycle begins at a peak and continues through a recession, a trough, and an expansion. A new cycle begins at the next peak. Here, the first peak occurs at time t1, the trough at time t2, and the next peak at time t3. Notice that there is a tendency for real GDP to rise over time.*

At time t_1 in Figure 5.1 "Phases of the Business Cycle", an expansion ends and real GDP turns downward. The point at which an expansion ends and a recession begins is called the peak of the business cycle. Real GDP then falls during a period of recession. Eventually it starts upward again (at time t_2). The point at which a recession ends and an expansion begins is called the trough of the business cycle. The expansion continues until another peak is

reached at time t_3.[1] A complete business cycle is defined by the passage from one peak to the next.

Because the Business Cycle Dating Committee dates peaks and troughs by specific months, and because real GDP is estimated only on a quarterly basis by the Bureau of Economic Analysis, the committee relies on a variety of other indicators that are published monthly, including real personal income, employment, industrial production, and real wholesale and retail sales. The committee typically determines that a recession has happened long after it has actually begun and sometimes ended! In large part, that avoids problems when data released about the economy are revised, and the committee avoids having to reverse itself on its determination of when a recession begins or ends, something it has never done. In December 2008, the Committee announced that a recession in the United States had begun in December 2007. Interestingly, real GDP fell in the fourth quarter of 2007, grew in the first and second quarters of 2008, and shrank in the third quarter of 2008, so clearly the Committee was not using the two consecutive quarters of declining GDP rule-of-thumb. Rather, it was taking into account the behavior of a variety of other variables, such as employment and personal income.

1. Some economists prefer to break the expansion phase into two parts. The recovery phase is said to be the period between the previous trough and the time when the economy achieves its previous peak level of real GDP. The "expansion" phase is from that point until the following peak.

Business Cycles and the Growth of Real GDP in the United States

Figure 5.2 “Expansions and Recessions, 1960–2008” shows movements in real GDP in the United States from 1960 to 2008. Over those years, the economy experienced eight recessions, shown by the shaded areas in the chart. Although periods of expansion have been more prolonged than periods of recession, we see the cycle of economic activity that characterizes economic life.

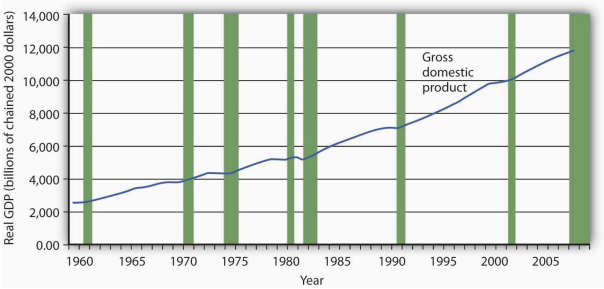


Figure 5.2. *Expansions and Recessions, 1960–2008. The chart shows movements in real GDP since 1960. Recessions—periods of falling real GDP—are shown as shaded areas. On average, the annual rate of growth of real GDP over the period was 3.3% per year. Source: Bureau of Economic Analysis, NIPA Table 1.1.6. Real Gross Domestic Product, Chained Dollars [Billions of chained (2000) dollars]. Seasonally adjusted at annual rates. Data for 2008 is through 3rd quarter.*

Real GDP clearly grew between 1960 and 2008. While the economy experienced expansions and recessions, its general trend during the period was one of rising real GDP. The average annual rate of growth of real GDP was about 3.3%.

During the post–World War II period, the average expansion has lasted 57 months, and the average recession has lasted about 10 months. The 2001 recession, which lasted eight months, was thus slightly shorter than the average. The Great Recession (2007-2009), lasted longer than the average recession at nineteen months.

Economists have sought for centuries to explain the forces at work in a business cycle. Not only are the currents that move the economy up or down intellectually fascinating but also an understanding of them is of tremendous practical importance. A business cycle is not just a movement along a curve in a textbook. It is new jobs for people, or the loss of them. It is new income, or the loss of it. It is the funds to build new schools or to provide better health care—or the lack of funds to do all those things. The story of the business cycle is the story of progress and plenty, of failure and sacrifice.

The effects of recessions extend beyond the purely economic realm and influence the social fabric of society as well. Suicide rates and property crimes—burglary, larceny, and motor vehicle theft tend to rise during recessions. Even popular music appears to be affected. Terry F. Pettijohn II, a psychologist at Coastal Carolina University, has studied Billboard No. 1 songs from 1955–2003. He finds that during recessions, popular songs tend to be longer and slower, and to have more serious lyrics. "It's 'Bridge over Troubled Water' or 'That's What Friends Are For'," he says. During expansions, songs tend to be faster, shorter, and somewhat sillier, such as "At the Hop" or "My Sharona."

In our study of macroeconomics, we will gain an understanding of the forces at work in the business cycle. We will also explore policies through which the public sector might act to make recessions less

severe and, perhaps, to prolong expansions. We turn next to an examination of price-level changes and unemployment.

125. Reading: Overheating and Stagflation

Overheating and Stagflation

There are a couple helpful vocabulary terms to understand related to the states of the economy.

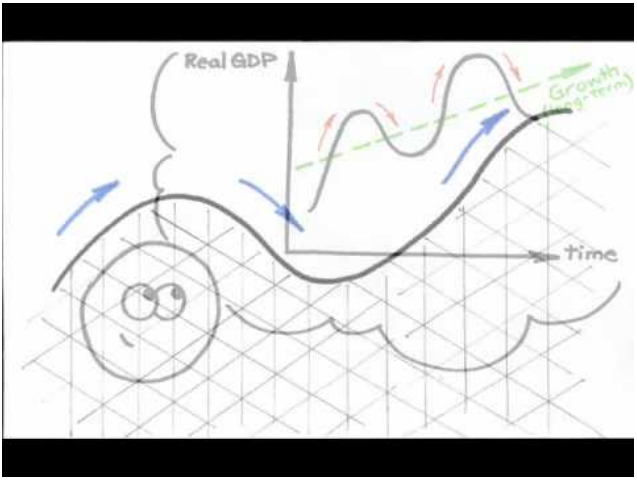
Overheating means the economy is picking up speed leading to increased inflation. It occurs when its productive capacity is unable to keep pace with growing aggregate demand. It is generally characterized by an above-trend rate of economic growth, where growth is occurring at an unsustainable rate. Boom periods are often characterized by overheating in the economy.

Stagflation means the simultaneous occurrence of stagnant growth (or recession) and inflation, something the Keynesian economists thought to be impossible, but you can show it with AD/AS. It is a situation where the inflation rate is high, the economic growth rate slows down, and unemployment is also high. It raises a dilemma for economic policy since actions designed to lower inflation may exacerbate unemployment, and vice versa.

126. Video: The Business Cycle

The Business Cycle

Although its impossible to predict exactly when and for how long real GDP will rise and fall, we do know that GDP fluctuates in predictable patterns. The business cycle describes these predictable periods of change between economic growth and depression.



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127. Self Check: The Business Cycle

Check Your Understanding

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the three Readings in this section.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

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128. Outcome: The Aggregate Demand-Aggregate Supply Model

What you'll learn to do: use the AD-AS model to explain the equilibrium levels of real GDP and price level

In this learning outcome, you will become an expert at understanding, defining, and applying the concepts of aggregate demand and aggregate supply.

The specific things you'll learn in this section include:

- Define aggregate demand (AD) and explain the factors that cause it to change
- Define aggregate supply (AS) and explain the factors that cause it to change
- Use the AD-AS model to explain periods of recession, and expansion, demand-pull inflation and cost-push inflation
- Use the AD-AS model to explain periods of economic growth

LEARNING ACTIVITIES

The learning activities for this section include:

- Reading: The Aggregate Demand-Aggregate Supply Model
- Reading: Macroeconomic Perspectives on Demand and Supply
- Reading: Building a Model of Aggregate Supply and Aggregate

Demand
- Reading: Aggregate Demand
- Reading: Shifts in Aggregate Supply
- Reading: The Long Run and the Short Run
- Reading: Shifts in Aggregate Demand
- Self Check: The Aggregate Demand-Aggregate Supply Model
- Reading: Growth and Recession in the AS–AD Diagram
- Reading: The AS–AD Model and Economic Growth
- Simulation: Spend or Save—Government Edition
- Self Check: The AD-AS Model and Growth, Recession, Expansion, and Inflation

Take time to review and reflect on each of these activities in order to improve your performance on the assessment for this section.

129. Reading: The Aggregate Demand-Aggregate Supply Model

Figure 10.1. *New Home Construction At the peak of the housing bubble, many people across the country were able to secure the loans necessary to build new houses. (Credit: modification of work by Tim Pierce/Flickr Creative Commons)*

FROM HOUSING BUBBLE TO HOUSING BUST

The United States experienced rising home ownership rates for most of the last two decades. Between 1990 and 2006, the U.S. housing market grew. Homeownership rates grew from 64% to a high of over 69% between 2004 and 2005. For many people, this was a period in which they could either buy first homes or buy a larger and more expensive home. During this time mortgage values tripled. Housing became more accessible to Americans and was considered to be a safe financial investment. Figure 10.2 shows how new single family home sales peaked in 2005 at 107,000 units.

The figure shows that single family house sales were highest in 2005 before plummeting drastically. Between 2009 and 2012, housing sales were still lower than they had been in 1990 when they were over 40,000.

Figure 10.2. *New Single Family Houses Sold From the early 1990s up through 2005, the number of new single family houses sold rose steadily. In 2006, the number dropped dramatically and this dramatic decline continued through 2011. In 2012, the number sold rose a bit over previous years, but it was still lower than the number of new houses sold in 1990. (Source: U.S. Census Bureau)*

The housing bubble began to show signs of bursting in 2005, as delinquency and late payments began to grow and an oversupply of new homes on the market became apparent. Dropping home values contributed to a decrease in the overall wealth of the household sector and caused homeowners to pull back on spending. Several mortgage lenders were forced to file for bankruptcy because homeowners were not making their payments, and by 2008 the problem had spread throughout the financial markets. Lenders

clamped down on credit and the housing bubble burst. Financial markets were now in crisis and unable or unwilling to even extend credit to credit-worthy customers.

The housing bubble and the crisis in the financial markets were major contributors to the Great Recession that led to unemployment rates over 10% and falling GDP. While the United States is still recovering from the impact of the Great Recession, it has made substantial progress in restoring financial market stability through the implementation of aggressive fiscal and monetary policy.

Introduction to the Aggregate Supply-Aggregate Demand Model

The economic history of the United States is cyclical in nature with recessions and expansions. Some of these fluctuations are severe, such as the economic downturn experienced during Great Depression of the 1930's which lasted several years. Why does the economy grow at different rates in different years? What are the causes of the cyclical behavior of the economy? This module will introduce an important model, the aggregate demand–aggregate supply model, to begin our understanding of why economies expand and contract over time.

A key part of macroeconomics is the use of models to analyze macro issues and problems. How is the rate of economic growth connected to changes in the unemployment rate? Is there a reason why unemployment and inflation seem to move in opposite directions: lower unemployment and higher inflation from 1997 to 2000, higher unemployment and lower inflation in the early 2000s, lower unemployment and higher inflation in the mid-2000s, and then higher unemployment and lower inflation in 2009? Why did the current account deficit rise so high, but then decline in 2009?

To analyze questions like these, we must move beyond discussing macroeconomic issues one at a time, and begin building economic models that will capture the relationships and interconnections between them. This module introduces the macroeconomic model of aggregate supply and aggregate demand, how the two interact to reach a macroeconomic equilibrium, and how shifts in aggregate demand or aggregate supply will affect that equilibrium. This module also relates the model of aggregate supply and aggregate demand to the three goals of economic policy (growth, unemployment, and inflation), and provides a framework for thinking about many of the connections and tradeoffs between these goals. In a subsequent module we will discuss the Keynesian perspective, which focuses on the macroeconomy in the short run where aggregate demand plays a crucial role, and the Neoclassical perspective, which explores the macroeconomy in the long run where aggregate supply plays a crucial role.

130. Reading: Macroeconomic Perspectives on Demand and Supply

Say's Law and the Macroeconomics of Supply

Macroeconomists over the last two centuries have often divided into two groups: those who argue that supply is the most important determinant of the size of the macroeconomy while demand just tags along, and those who argue that demand is the most important factor in the size of the macroeconomy while supply just tags along.

Those economists who emphasize the role of supply in the macroeconomy often refer to the work of a famous French economist of the early nineteenth century named *Jean-Baptiste Say* (1767–1832). *Say's law* is: "Supply creates its own demand." As a matter of historical accuracy, it seems clear that Say never actually wrote down this law and that it oversimplifies his beliefs, but the law lives on as useful shorthand for summarizing a point of view.

The intuition behind Say's law is that each time a good or service is produced and sold, it generates income that is earned for someone: a worker, a manager, an owner, or those who are workers, managers, and owners at firms that supply inputs along the chain of production. The forces of supply and demand in individual markets will cause prices to rise and fall. The bottom line remains, however, that every sale represents income to someone, and so, Say's law argues, a given value of supply must create an equivalent value of demand somewhere else in the economy. Because Jean-Baptiste Say, *Adam Smith*, and other economists writing around the turn of the nineteenth century who discussed this view were known as "classical" economists, modern economists who generally subscribe

to the Say's law view on the importance of supply for determining the size of the macroeconomy are called *neoclassical economists*.

If *supply* always creates exactly enough demand at the macroeconomic level, then (as Say himself recognized) it is hard to understand why periods of recession and high unemployment should ever occur. To be sure, even if total supply always creates an equal amount of total demand, the economy could still experience a situation of some firms earning profits while other firms suffer losses. Nevertheless, a *recession* is not a situation where all business failures are exactly counterbalanced by an offsetting number of successes. A recession is a situation in which the economy as a whole is shrinking in size, business failures outnumber the remaining success stories, and many firms end up suffering losses and lying off workers.

Say's law that supply creates its own *demand* does seem a good approximation for the long run. Over periods of some years or decades, as the productive power of an economy to supply goods and services increases, total demand in the economy grows at roughly the same pace. However, over shorter time horizons of a few months or even years, recessions or even depressions occur in which firms, as a group, seem to face a lack of demand for their products.

Keynes' Law and the Macroeconomics of Demand

The alternative to Say's law, with its emphasis on supply, can be named *Keynes' law*: "Demand creates its own supply." As a matter of historical accuracy, just as Jean-Baptiste Say never wrote down anything as simpleminded as Say's law, *John Maynard Keynes* never wrote down Keynes' law, but the law is a useful simplification that conveys a certain point of view.

When Keynes wrote his great work *The General Theory of Employment, Interest, and Money* during the *Great Depression* of the

1930s, he pointed out that during the Depression, the capacity of the economy to supply goods and services had not changed much. U.S. unemployment rates soared higher than 20% from 1933 to 1935, but the number of possible workers had not increased or decreased much. Factories were closed and shuttered, but machinery and equipment had not disappeared. Technologies that had been invented in the 1920s were not un-invented and forgotten in the 1930s. Thus, Keynes argued that the Great Depression—and many ordinary recessions as well—were not caused by a drop in the ability of the economy to supply goods as measured by labor, physical capital, or technology. He argued the economy often produced less than its full potential, not because it was technically impossible to produce more with the existing workers and machines, but because a lack of demand in the economy as a whole led to inadequate incentives for firms to produce. In such cases, he argued, the level of GDP in the economy was not primarily determined by the potential of what the economy could supply, but rather by the amount of total demand.

Keynes' law seems to apply fairly well in the short run of a few months to a few years, when many firms experience either a drop in demand for their output during a recession or so much demand that they have trouble producing enough during an economic boom. However, demand cannot tell the whole macroeconomic story, either. After all, if demand was all that mattered at the macroeconomic level, then the government could make the economy as large as it wanted just by pumping up total demand through a large increase in the government spending component or by legislating large tax cuts to push up the consumption component. Economies do, however, face genuine limits to how much they can produce, limits determined by the quantity of labor, physical capital, technology, and the institutional and market structures that bring these factors of production together. These constraints on what an economy can supply at the macroeconomic level do not disappear just because of an increase in demand.

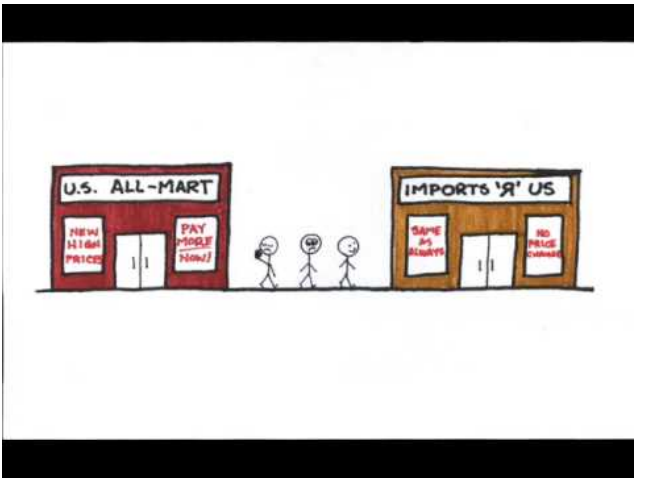
Combining Supply and Demand in Macroeconomics

Two insights emerge from this overview of Say's law with its emphasis on macroeconomic supply and Keynes' law with its emphasis on macroeconomic demand. The first conclusion, which is not exactly a hot news flash, is that an economic approach focused only on the supply side or only on the demand side can be only a partial success. Both supply and demand need to be taken into account. The second conclusion is that since Keynes' law applies more accurately in the short run and Say's law applies more accurately in the long run, the tradeoffs and connections between the three goals of macroeconomics may be different in the short run and the long run.

131. Video: Overview of Aggregate Demand-Aggregate Supply Model

This video visually demonstrates aggregate demand and supply and explains what things cause a shift in the aggregate demand a supply curves.

It provides a nice overview of the concepts that we will cover in the next sections. This is an important module that includes a significant amount of new content. Please take the time to review the video so that you have a context for the explanations, diagrams and examples that follow.



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text. You can view it online here:

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132. Reading: Building a Model of Aggregate Supply and Aggregate Demand

The Aggregate Supply Curve and Potential GDP

To build a useful macroeconomic model, we need a model that shows what determines total supply or total demand for the economy, and how total demand and total supply interact at the macroeconomic level. This model is called the *aggregate supply–aggregate demand model*. This module will explain aggregate supply, aggregate demand, and the equilibrium between them. The following modules will discuss the causes of shifts in aggregate supply and aggregate demand.

Firms make decisions about what quantity to supply based on the profits they expect to earn. Profits, in turn, are also determined by the price of the outputs the firm sells and by the price of the inputs, like labor or raw materials, the firm needs to buy. A*ggregate supply* (AS) is the relationship between real GDP and the price level for output, holding the price of inputs fixed. The *aggregate supply* (AS) *curve* shows the total quantity of output that firms choose to produce and sell (for example, real GDP) at each different price level.

Figure 10.3 shows an aggregate supply curve. In the following paragraphs, we will walk through the elements of the diagram one at a time: the horizontal and vertical axes, the aggregate supply curve itself, and the meaning of the potential GDP vertical line.

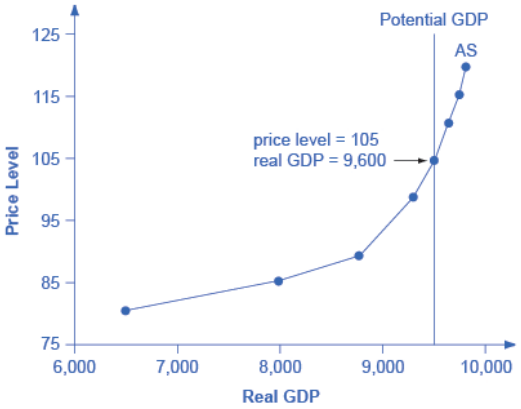

Figure 10.3. *The Aggregate Supply Curve Aggregate supply (AS) slopes up, because as the price level for outputs rises, with the price of inputs remaining fixed, firms have an incentive to produce more and to earn higher profits. The potential GDP line shows the maximum that the economy can produce with full employment of workers and physical capital.*

The horizontal axis of the diagram shows real GDP—that is, the level of GDP adjusted for inflation. The vertical axis shows the price level. Remember that the price level is different from the inflation rate. Visualize the price level as an index number, like the GDP deflator, while the inflation rate is the percentage change between price levels over time.

As the price level rises, the aggregate quantity of goods and services supplied rises as well. Why? The price level shown on the vertical axis represents prices for final goods or outputs bought in the economy—like the GDP deflator—not the price level for intermediate goods and services that are inputs to production. Thus, the AS curve describes how suppliers will react to a higher price level for final outputs of goods and services, while holding the prices of inputs like labor and energy constant. If firms across the economy face a situation where the price level of what they produce and sell is rising, but their costs of production are not rising, then the lure of higher profits will induce them to expand production.

The slope of an AS curve changes from nearly flat at its far left to nearly vertical at its far right. At the far left of the aggregate supply curve, the level of output in the economy is far below *potential GDP*, which is defined as the quantity that an economy can produce by fully employing its existing levels of labor, physical capital, and technology, in the context of its existing market and legal institutions. At these relatively low levels of output, levels of unemployment are high, and many factories are running only part-time, or have closed their doors. In this situation, a relatively small increase in the prices of the outputs that businesses sell—while making the assumption of no rise in input prices—can encourage a considerable surge in the quantity of aggregate supply because so many workers and factories are ready to swing into production.

As the quantity produced increases, however, certain firms and industries will start running into limits: perhaps nearly all of the expert workers in a certain industry will have jobs or factories in certain geographic areas or industries will be running at full speed. In the intermediate area of the AS curve, a higher price level for outputs continues to encourage a greater quantity of output—but as the increasingly steep upward slope of the aggregate supply curve shows, the increase in quantity in response to a given rise in the price level will not be quite as large.

WHY DOES AS CROSS POTENTIAL GDP?

The aggregate supply curve is typically drawn to cross the potential GDP line. This shape may seem puzzling: How can an economy produce at an output level which is higher than its "potential" or "full employment" GDP? The economic intuition here is that if prices for outputs were high enough, producers would make fanatical efforts to produce: all workers would be on double-overtime, all machines would run 24 hours a day, seven days a week. Such hyper-intense production would go beyond using potential labor and

physical capital resources fully, to using them in a way that is not sustainable in the long term. Thus, it is indeed possible for production to sprint above potential GDP, but only in the short run.

At the far right, the aggregate supply curve becomes nearly vertical. At this quantity, higher prices for outputs cannot encourage additional output, because even if firms want to expand output, the inputs of labor and machinery in the economy are fully employed. In this example, the vertical line in the exhibit shows that potential GDP occurs at a total output of 9,500. When an economy is operating at its potential GDP, machines and factories are running at capacity, and the unemployment rate is relatively low—at the natural rate of unemployment. For this reason, potential GDP is sometimes also called *full-employment GDP*.

The Aggregate Demand Curve

Aggregate demand (AD) is the relationship between the total spending in an economy on domestic goods and services and the price level for output. (Strictly speaking, AD is what economists call total planned expenditure. For now, just think of aggregate demand as total spending.) It includes all four components of demand: consumption, investment, government spending, and net exports (exports minus imports). This demand is determined by a number of factors, but one of them is the price level—recall though, that the price level is an index number such as the GDP deflator that measures the average price of the things we buy. The *aggregate demand* (AD) *curve* shows the total spending on domestic goods and services at each price level.

Figure 10.4 presents an aggregate demand (AD) curve. Just like the aggregate supply curve, the horizontal axis shows real GDP and the vertical axis shows the price level. The AD curve slopes down, which means that increases in the price level of outputs lead to a lower quantity of total spending. The reasons behind this shape

are related to how changes in the price level affect the different components of aggregate demand. The following components make up aggregate demand: consumption spending (C), investment spending (I), government spending (G), and spending on exports (X) minus imports (M): C + I + G + X − M.

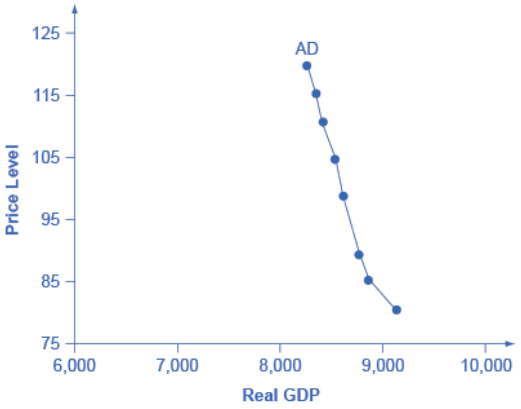

Figure 10.4. *The Aggregate Demand Curve Aggregate demand (AD) slopes down, showing that, as the price level rises, the amount of total spending on domestic goods and services declines.*

The wealth effect holds that as the price level increases, the buying power of savings that people have stored up in bank accounts and other assets will diminish, eaten away to some extent by inflation. Because a rise in the price level reduces people's wealth, consumption spending will fall as the price level rises.

The interest rate effect is that as prices for outputs rise, the same purchases will take more money or credit to accomplish. This additional demand for money and credit will push interest rates higher. In turn, higher interest rates will reduce borrowing by businesses for investment purposes and reduce borrowing by households for homes and cars—thus reducing consumption and investment spending.

The foreign price effect points out that if prices rise in the United States while remaining fixed in other countries, then goods in the United States will be relatively more expensive compared to goods in the rest of the world. U.S. *exports* will be relatively more expensive, and the quantity of exports sold will fall. U.S. *imports* from abroad will be relatively cheaper, so the quantity of imports will rise. Thus, a higher domestic price level, relative to price levels in other countries, will reduce net export expenditures.

Truth be told, among economists all three of these effects are controversial, in part because they do not seem to be very large. For this reason, the aggregate demand curve in Figure 10.4 slopes downward fairly steeply; the steep slope indicates that a higher price level for final outputs reduces aggregate demand for all three of these reasons, but that the change in the quantity of aggregate demand as a result of changes in price level is not very large.

Read the following worked example to learn how to interpret the AS–AD model. In this example, aggregate supply, aggregate demand, and the price level are given for the imaginary country of Xurbia.

INTERPRETING THE AS–AD MODEL

Table 10.1 shows information on aggregate supply, aggregate demand, and the price level for the imaginary country of Xurbia. What information does Table 10.1 tell you about the state of the Xurbia's economy? Where is the equilibrium price level and output level (this is the SR macroequilibrium)? Is Xurbia risking inflationary pressures or facing high unemployment? How can you tell?

Table 10.1. Price Level:Aggregate Supply–Aggregate Demand

Price Level	Aggregate Demand	Aggregate Supply
110	$700	$600
120	$690	$640
130	$680	$680
140	$670	$720
150	$660	$740
160	$650	$760
170	$640	$770

To begin to use the AS–AD model, it is important to plot the AS and AD curves from the data provided. What is the equilibrium?

Step 1. Draw your x- and y-axis. Label the x-axis Real GDP and the y-axis Price Level.

Step 2. Plot AD on your graph.

Step 3. Plot AS on your graph.

Step 4. Look at Figure 10.5 which provides a visual to aid in your analysis.

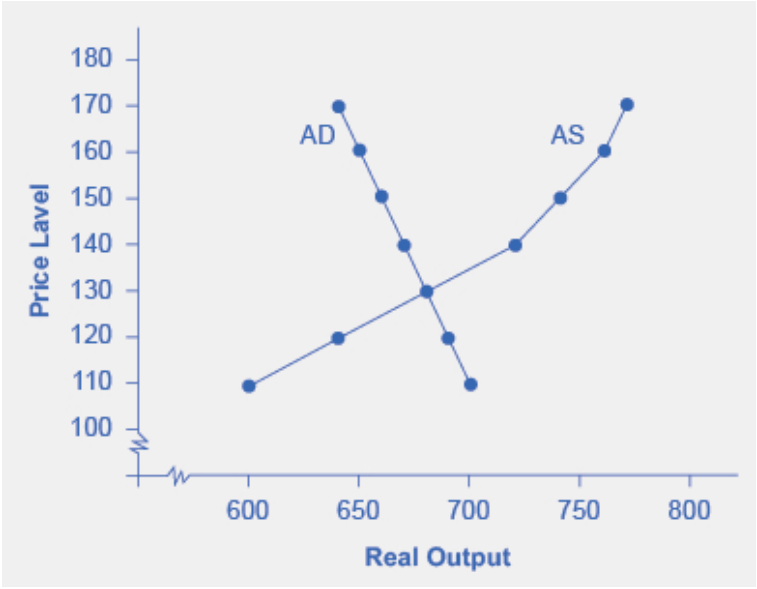

Figure 10.5. *The AS–AD Curves AD and AS curves created from the data in Table 10.1.*

Step 5. Determine where AD and AS intersect. This is the equilibrium with price level at 130 and real GDP at $680.

Step 6. Look at the graph to determine where equilibrium is located. We can see that this equilibrium is fairly far from where the AS curve becomes near-vertical (or at least quite steep) which seems to start at about $750 of real output. This implies that the economy is not close to potential GDP. Thus, unemployment will be high. In the relatively flat part of the AS curve, where the equilibrium occurs, changes in the price level will not be a major concern, since such changes are likely to be small.

Step 7. Determine what the steep portion of the AS curve indicates. Where the AS curve is steep, the economy is at or close to potential GDP.

Step 8. Draw conclusions from the given information:

- If equilibrium occurs in the flat range of AS, then economy is not close to potential GDP and will be experiencing unemployment, but stable price level.
- If equilibrium occurs in the steep range of AS, then the economy is close or at potential GDP and will be experiencing rising price levels or inflationary pressures, but will have a low unemployment rate.

Equilibrium in the Aggregate Supply–Aggregate Demand Model

The intersection of the aggregate supply and aggregate demand curves shows the equilibrium level of real GDP and the equilibrium price level in the economy. At a relatively low price level for output, firms have little incentive to produce, although consumers would be willing to purchase a high quantity. As the price level for outputs rises, aggregate supply rises and aggregate demand falls until the equilibrium point is reached.

Figure 10.6 combines the AS curve from Figure 10.3 and the AD curve from Figure 10.4 and places them both on a single diagram. In this example, the equilibrium point occurs at point E, at a price level of 90 and an output level of 8,800.

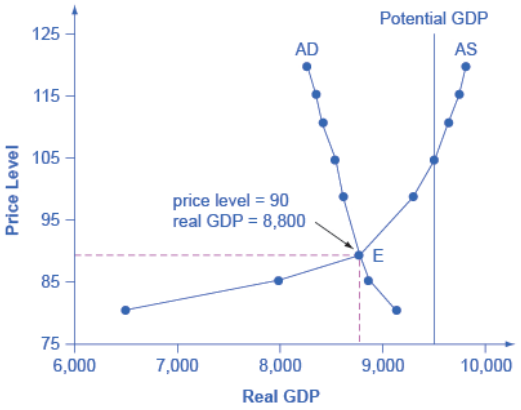

Figure 10.6. *Aggregate Supply and Aggregate Demand The equilibrium, where aggregate supply (AS) equals aggregate demand (AD), occurs at a price level of 90 and an output level of 8,800.*

Confusion sometimes arises between the aggregate supply and aggregate demand model and the microeconomic analysis of demand and supply in particular markets for goods, services, labor, and capital.

ARE AS AND AD MACRO OR MICRO?

These aggregate supply and aggregate demand model and the microeconomic analysis of demand and supply in particular markets for goods, services, labor, and capital have a superficial resemblance, but they also have many underlying differences.

For example, the vertical and horizontal axes have distinctly different meanings in macroeconomic and microeconomic diagrams. The vertical axis of a microeconomic demand and supply diagram expresses a price (or wage or rate of return) for an individual good or service. This price is implicitly relative: it is

intended to be compared with the prices of other products (for example, the price of pizza relative to the price of fried chicken). In contrast, the vertical axis of an aggregate supply and aggregate demand diagram expresses the level of a price index like the Consumer Price Index or the GDP deflator—combining a wide array of prices from across the economy. The price level is absolute: it is not intended to be compared to any other prices since it is essentially the average price of all products in an economy. The horizontal axis of a microeconomic supply and demand curve measures the quantity of a particular good or service. In contrast, the horizontal axis of the aggregate demand and aggregate supply diagram measures GDP, which is the sum of all the final goods and services produced in the economy, not the quantity in a specific market.

In addition, the economic reasons for the shapes of the curves in the macroeconomic model are different from the reasons behind the shapes of the curves in microeconomic models. Demand curves for individual goods or services slope down primarily because of the existence of substitute goods, not the wealth effects, interest rate, and foreign price effects associated with aggregate demand curves. The slopes of individual supply and demand curves can have a variety of different slopes, depending on the extent to which quantity demanded and quantity supplied react to price in that specific market, but the slopes of the AS and AD curves are much the same in every diagram (although as we shall see in later chapters, short-run and long-run perspectives will emphasize different parts of the AS curve).

In short, just because the AS–AD diagram has two lines that cross, do not assume that it is the same as every other diagram where two lines cross. The intuitions and meanings of the macro and micro diagrams are only distant cousins from different branches of the economics family tree.

Defining SRAS and LRAS

In the section above "Why Does AS Cross Potential GDP?" we differentiated between short run changes in aggregate supply which are shown by the AS curve and long run changes in aggregate supply which are defined by the vertical line at potential GDP. In the short run, if demand is too low (or too high), it is possible for producers to supply less GDP (or more GDP) than potential. In the long run, however, producers are limited to producing at potential GDP. For this reason, what we have been calling the AS curve, will from this point on may also be referred to as the short run aggregate supply (SRAS) curve. The vertical line at potential GDP may also be referred to as the long run aggregate supply (LRAS) curve.

133. Reading: Aggregate Demand

The Slope of the Aggregate Demand Curve

Firms face four sources of demand: households (personal consumption), other firms (investment), government agencies (government purchases), and foreign markets (net exports). Aggregate demand is the relationship between the total quantity of goods and services demanded (from all the four sources of demand) and the price level, all other determinants of spending unchanged. The aggregate demand curve is a graphical representation of aggregate demand.

We will use the implicit price deflator as our measure of the price level; the aggregate quantity of goods and services demanded is measured as real GDP. The table in Figure 7.1 "Aggregate Demand" gives values for each component of aggregate demand at each price level for a hypothetical economy. Various points on the aggregate demand curve are found by adding the values of these components at different price levels. The aggregate demand curve for the data given in the table is plotted on the graph in Figure 7.1 "Aggregate Demand." At point A, at a price level of 1.18, $11,800 billion worth of goods and services will be demanded; at point C, a reduction in the price level to 1.14 increases the quantity of goods and services demanded to $12,000 billion; and at point E, at a price level of 1.10, $12,200 billion will be demanded.

Point on aggregate demand curve	Price level	$C+$	$I+$	$G+$	$X_n=$	Aggregate demand
A	1.18	8,400	1,820	2,150	−570	11,800
B	1.16	8,450	1,860	2,150	−560	11,900
C	1.14	8,500	1,900	2,150	−550	12,000
D	1.12	8,550	1,940	2,150	−540	12,100
E	1.10	8,600	1,980	2,150	−530	12,200

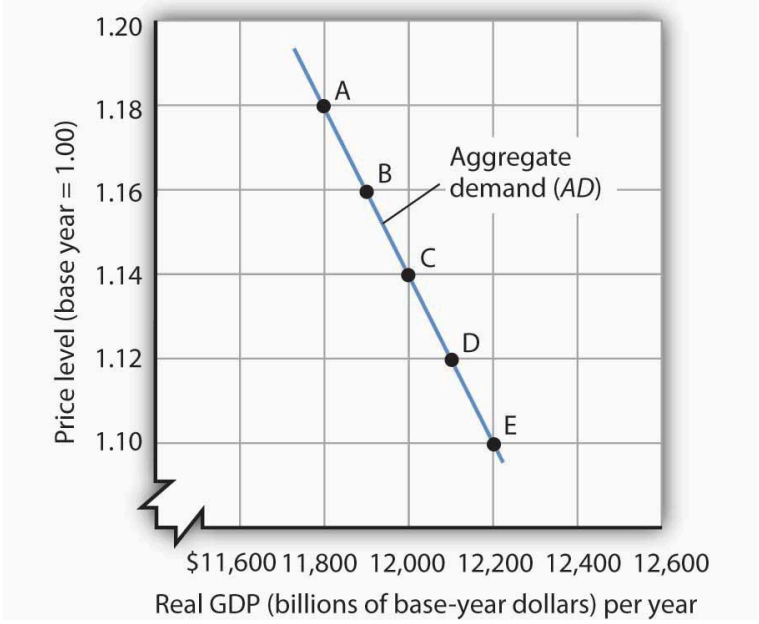

Figure 7.1. *Aggregate Demand. An aggregate demand curve* (AD) *shows the relationship between the total quantity of output demanded (measured as real GDP) and the price level (measured as the implicit price deflator). At each price level, the total quantity of goods and services demanded is the sum of the components of real GDP, as shown in the table. There is a negative relationship between the price level and the total quantity of goods and services demanded, all other things unchanged.*

The negative slope of the aggregate demand curve suggests that it behaves in the same manner as an ordinary demand curve. But we *cannot* apply the reasoning we use to explain downward-sloping

demand curves in individual markets to explain the downward-sloping aggregate demand curve. There are two reasons for a negative relationship between price and quantity demanded in individual markets. First, a lower price induces people to substitute more of the good whose price has fallen for other goods, increasing the quantity demanded. Second, the lower price creates a higher real income. This normally increases quantity demanded further.

Neither of these effects is relevant to a change in prices in the aggregate. When we are dealing with the average of all prices—the price level—we can no longer say that a fall in prices will induce a change in relative prices that will lead consumers to buy more of the goods and services whose prices have fallen and less of the goods and services whose prices have not fallen. The price of corn may have fallen, but the prices of wheat, sugar, tractors, steel, and most other goods or services produced in the economy are likely to have fallen as well.

Furthermore, a reduction in the price level means that it is not just the prices consumers pay that are falling. It means the prices people receive—their wages, the rents they may charge as landlords, the interest rates they earn—are likely to be falling as well. A falling price level means that goods and services are cheaper, but incomes are lower, too. There is no reason to expect that a change in real income will boost the quantity of goods and services demanded—indeed, no change in real income would occur. If nominal incomes and prices all fall by 10%, for example, real incomes do not change.

Why, then, does the aggregate demand curve slope downward? One reason for the downward slope of the aggregate demand curve lies in the relationship between real wealth (the stocks, bonds, and other assets that people have accumulated) and consumption (one of the four components of aggregate demand). When the price level falls, the real value of wealth increases—it packs more purchasing power. For example, if the price level falls by 25%, then $10,000 of wealth could purchase more goods and services than it would have if the price level had not fallen. An increase in wealth will induce

people to increase their consumption. The consumption component of aggregate demand will thus be greater at lower price levels than at higher price levels. The tendency for a change in the price level to affect real wealth and thus alter consumption is called the wealth effect; it suggests a negative relationship between the price level and the real value of consumption spending.

A second reason the aggregate demand curve slopes downward lies in the relationship between interest rates and investment. A lower price level lowers the demand for money, because less money is required to buy a given quantity of goods. What economists mean by money demand will be explained in more detail in a later chapter. But, as we learned in studying demand and supply, a reduction in the demand for something, all other things unchanged, lowers its price. In this case, the "something" is money and its price is the interest rate. A lower price level thus reduces interest rates. Lower interest rates make borrowing by firms to build factories or buy equipment and other capital more attractive. A lower interest rate means lower mortgage payments, which tends to increase investment in residential houses. Investment thus rises when the price level falls. The tendency for a change in the price level to affect the interest rate and thus to affect the quantity of investment demanded is called the interest rate effect. John Maynard Keynes, a British economist whose analysis of the Great Depression and what to do about it led to the birth of modern macroeconomics, emphasized this effect. For this reason, the interest rate effect is sometimes called the Keynes effect.

A third reason for the rise in the total quantity of goods and services demanded as the price level falls can be found in changes in the net export component of aggregate demand. All other things unchanged, a lower price level in an economy reduces the prices of its goods and services relative to foreign-produced goods and services. A lower price level makes that economy's goods more attractive to foreign buyers, increasing exports. It will also make foreign-produced goods and services less attractive to the economy's buyers, reducing imports. The result is an increase in net

exports. The international trade effect is the tendency for a change in the price level to affect net exports.

Taken together, then, a fall in the price level means that the quantities of consumption, investment, and net export components of aggregate demand may all rise. Since government purchases are determined through a political process, we assume there is no causal link between the price level and the real volume of government purchases. Therefore, this component of GDP does not contribute to the downward slope of the curve.

In general, a change in the price level, with all other determinants of aggregate demand unchanged, causes a movement along the aggregate demand curve. A movement along an aggregate demand curve is a change in the aggregate quantity of goods and services demanded. A movement from point A to point B on the aggregate demand curve in Figure 7.1 "Aggregate Demand" is an example. Such a change is a response to a change in the price level.

Notice that the axes of the aggregate demand curve graph are drawn with a break near the origin to remind us that the plotted values reflect a relatively narrow range of changes in real GDP and the price level. We do not know what might happen if the price level or output for an entire economy approached zero. Such a phenomenon has never been observed.

Changes in Aggregate Demand

Aggregate demand changes in response to a change in any of its components. An increase in the total quantity of consumer goods and services demanded at every price level, for example, would shift the aggregate demand curve to the right. A change in the aggregate quantity of goods and services demanded at every price level is a change in aggregate demand, which shifts the aggregate demand curve. Increases and decreases in aggregate demand are shown in Figure 7.2 "Changes in Aggregate Demand."

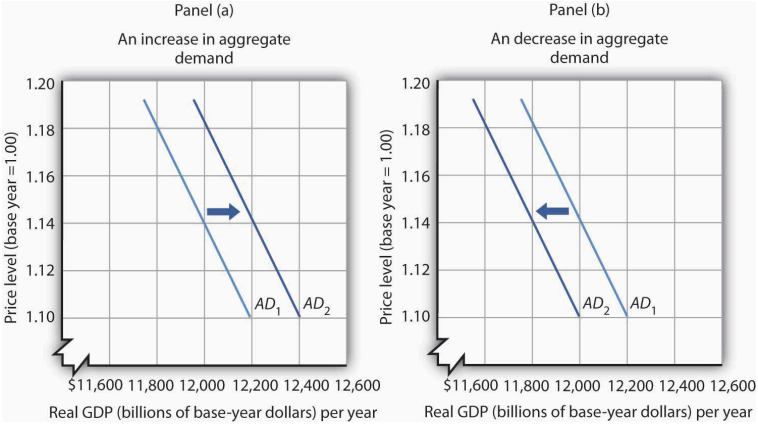

Figure 7.2. *Changes in Aggregate Demand. An increase in consumption, investment, government purchases, or net exports shifts the aggregate demand curve AD1 to the right as shown in Panel (a). A reduction in one of the components of aggregate demand shifts the curve to the left, as shown in Panel (b).*

What factors might cause the aggregate demand curve to shift? Each of the components of aggregate demand is a possible aggregate demand shifter. We shall look at some of the events that can trigger changes in the components of aggregate demand and thus shift the aggregate demand curve.

Changes in Consumption

Several events could change the quantity of consumption at each price level and thus shift aggregate demand. One determinant of consumption is consumer confidence. If consumers expect good economic conditions and are optimistic about their economic prospects, they are more likely to buy major items such as cars or furniture. The result would be an increase in the real value of

consumption at each price level and an increase in aggregate demand. In the second half of the 1990s, sustained economic growth and low unemployment fueled high expectations and consumer optimism. Surveys revealed consumer confidence to be very high. That consumer confidence translated into increased consumption and increased aggregate demand. In contrast, a decrease in consumption would accompany diminished consumer expectations and a decrease in consumer confidence, as happened after the stock market crash of 1929. The same problem has plagued the economies of most Western nations in 2008 as declining consumer confidence has tended to reduce consumption. A survey by the Conference Board in September of 2008 showed that just 13.5% of consumers surveyed expected economic conditions in the United States to improve in the next six months. Similarly pessimistic views prevailed in the previous two months. That contributed to the decline in consumption that occurred in the third quarter of the year.

Another factor that can change consumption and shift aggregate demand is tax policy. A cut in personal income taxes leaves people with more after-tax income, which may induce them to increase their consumption. The federal government in the United States cut taxes in 1964, 1981, 1986, 1997, and 2003; each of those tax cuts tended to increase consumption and aggregate demand at each price level.

In the United States, another government policy aimed at increasing consumption and thus aggregate demand has been the use of rebates in which taxpayers are simply sent checks in hopes that those checks will be used for consumption. Rebates have been used in 1975, 2001, and 2008. In each case the rebate was a one-time payment. Careful studies by economists of the 1975 and 2001 rebates showed little impact on consumption. Final evidence on the impact of the 2008 rebates is not yet in, but early results suggest a similar outcome. In a subsequent chapter, we will investigate arguments about whether temporary increases in income produced by rebates are likely to have a significant impact on consumption.

Transfer payments such as welfare and Social Security also affect

the income people have available to spend. At any given price level, an increase in transfer payments raises consumption and aggregate demand, and a reduction lowers consumption and aggregate demand.

Changes in Investment

Investment is the production of new capital that will be used for future production of goods and services. Firms make investment choices based on what they think they will be producing in the future. The expectations of firms thus play a critical role in determining investment. If firms expect their sales to go up, they are likely to increase their investment so that they can increase production and meet consumer demand. Such an increase in investment raises the aggregate quantity of goods and services demanded at each price level; it increases aggregate demand.

Changes in interest rates also affect investment and thus affect aggregate demand. We must be careful to distinguish such changes from the interest rate effect, which causes a movement along the aggregate demand curve. A change in interest rates that results from a change in the price level affects investment in a way that is already captured in the downward slope of the aggregate demand curve; it causes a movement along the curve. A change in interest rates for some other reason shifts the curve. We examine reasons interest rates might change in another chapter.

Investment can also be affected by tax policy. One provision of the Job and Growth Tax Relief Reconciliation Act of 2003 was a reduction in the tax rate on certain capital gains. Capital gains result when the owner of an asset, such as a house or a factory, sells the asset for more than its purchase price (less any depreciation claimed in earlier years). The lower capital gains tax could stimulate investment, because the owners of such assets know that they will

lose less to taxes when they sell those assets, thus making assets subject to the tax more attractive.

Changes in Government Purchases

Any change in government purchases, all other things unchanged, will affect aggregate demand. An increase in government purchases increases aggregate demand; a decrease in government purchases decreases aggregate demand.

Many economists argued that reductions in defense spending in the wake of the collapse of the Soviet Union in 1991 tended to reduce aggregate demand. Similarly, increased defense spending for the wars in Afghanistan and Iraq increased aggregate demand. Dramatic increases in defense spending to fight World War II accounted in large part for the rapid recovery from the Great Depression.

Changes in Net Exports

A change in the value of net exports at each price level shifts the aggregate demand curve. A major determinant of net exports is foreign demand for a country's goods and services; that demand will vary with foreign incomes. An increase in foreign incomes increases a country's net exports and aggregate demand; a slump in foreign incomes reduces net exports and aggregate demand. For example, several major U.S. trading partners in Asia suffered recessions in 1997 and 1998. Lower real incomes in those countries reduced U.S. exports and tended to reduce aggregate demand.

Exchange rates also influence net exports, all other things unchanged. A country's exchange rate is the price of its currency in terms of another currency or currencies. A rise in the U.S. exchange rate means that it takes more Japanese yen, for example, to

purchase one dollar. That also means that U.S. traders get more yen per dollar. Since prices of goods produced in Japan are given in yen and prices of goods produced in the United States are given in dollars, a rise in the U.S. exchange rate increases the price to foreigners for goods and services produced in the United States, thus reducing U.S. exports; it reduces the price of foreign-produced goods and services for U.S. consumers, thus increasing imports to the United States. A higher exchange rate tends to reduce net exports, reducing aggregate demand. A lower exchange rate tends to increase net exports, increasing aggregate demand.

Foreign price levels can affect aggregate demand in the same way as exchange rates. For example, when foreign price levels fall relative to the price level in the United States, U.S. goods and services become relatively more expensive, reducing exports and boosting imports in the United States. Such a reduction in net exports reduces aggregate demand. An increase in foreign prices relative to U.S. prices has the opposite effect.

The trade policies of various countries can also affect net exports. A policy by Japan to increase its imports of goods and services from India, for example, would increase net exports in India.

The Multiplier

A change in any component of aggregate demand shifts the aggregate demand curve. Generally, the aggregate demand curve shifts by more than the amount by which the component initially causing it to shift changes.

Suppose that net exports increase due to an increase in foreign incomes. As foreign demand for domestically made products rises, a country's firms will hire additional workers or perhaps increase the average number of hours that their employees work. In either case, incomes will rise, and higher incomes will lead to an increase in consumption. Taking into account these other increases in the

components of aggregate demand, the aggregate **demand** curve will shift by more than the initial shift caused by the initial increase in net exports.

The multiplier is the ratio of the change in the quantity of real GDP demanded at each price level to the initial change in one or more components of aggregate demand that produced it:

[latex]\displaystyle\text{Multiplier}=\frac{\Delta\text{(real GDP demanded at each price level)}}{\text{initial }\Delta\text{ (component of AD)}}[/latex]

We use the capital Greek letter delta (Δ) to mean "change in." In the aggregate demand–aggregate supply model presented in this chapter, it is the number by which we multiply an initial change in aggregate demand to obtain the amount by which the aggregate demand curve shifts as a result of the initial change. In other words, we can use Equation 7.1 to solve for the change in real GDP demanded at each price level:

[latex]\Delta\text{ real GDP demanded at each price level}=\text{multiplier}\times\text{initial }\Delta\text{(component of AD)}[/latex]

Suppose that the initial increase in net exports is $100 billion and that the initial $100-billion increase generates additional consumption of $100 billion at each price level. In Panel (a) of Figure 7.3 "The Multiplier," the aggregate demand curve shifts to the right by $200 billion—the amount of the initial increase in net exports times the multiplier of 2. We obtained the value for the multiplier in this example by plugging $200 billion (the initial $100-billion increase in net exports plus the $100-billion increase that it generated in consumption) into the numerator of Equation 7.1 and $100 billion into the denominator. Similarly, a decrease in net exports of $100 billion leads to a decrease in aggregate demand of $200 billion at each price level, as shown in Panel (b).

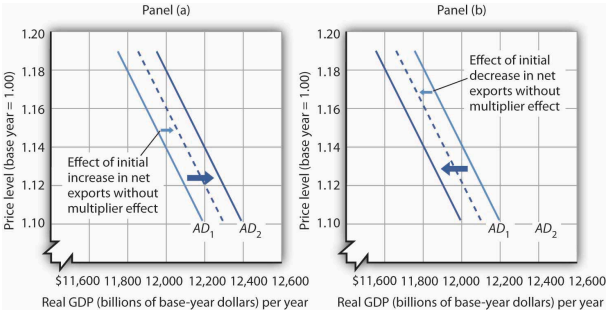

Figure 7.3. *The Multiplier. A change in one component of aggregate demand shifts the aggregate demand curve by more than the initial change. In Panel (a), an initial increase of $100 billion of net exports shifts the aggregate demand curve to the right by $200 billion at each price level. In Panel (b), a decrease of net exports of $100 billion shifts the aggregate demand curve to the left by $200 billion. In this example, the multiplier is 2.*

KEY TAKEAWAYS

- Potential output is the level of output an economy can achieve when labor is employed at its natural level. When an economy fails to produce at its potential, the government or the central bank may try to push the economy toward its potential.
- The aggregate demand curve represents the total of consumption, investment, government purchases, and net exports at each price level in any period. It slopes downward because of the wealth effect on consumption, the interest rate effect on investment, and the international trade effect on net exports.
- The aggregate demand curve shifts when the quantity of real GDP demanded at each price level changes.
- The multiplier is the number by which we multiply an initial change in aggregate demand to obtain the amount by which the aggregate demand curve shifts at each price level as a result of the initial change.

134. Reading: Shifts in Aggregate Supply

Shifts in Aggregate Supply

The original equilibrium in the AS–AD diagram will shift to a new equilibrium if the AS or AD curve shifts. When the aggregate supply curve shifts to the right, then at every price level, a greater quantity of real GDP is produced. When the AS curve shifts to the left, then at every price level, a lower quantity of real GDP is produced. This module discusses two of the most important factors that can lead to shifts in the AS curve: productivity growth and input prices.

How Productivity Growth Shifts the AS Curve

In the long run, the most important factor shifting the AS curve is *productivity growth*. Productivity means how much output can be produced with a given quantity of labor. One measure of this is output per worker or *GDP per capita*. Over time, productivity grows so that the same quantity of labor can produce more output. Historically, the real growth in GDP per capita in an advanced economy like the United States has averaged about 2% to 3% per year, but productivity growth has been faster during certain extended periods like the 1960s and the late 1990s through the early 2000s, or slower during periods like the 1970s. A higher level of productivity shifts the AS curve to the right, because with improved productivity, firms can produce a greater quantity of output at every price level. Figure 10.7 (a) shows an outward shift in productivity over two time periods. The AS curve shifts out from AS_0 to AS_1 to

AS_2, reflecting the rise in potential GDP in this economy, and the equilibrium shifts from E_0 to E_1 to E_2.

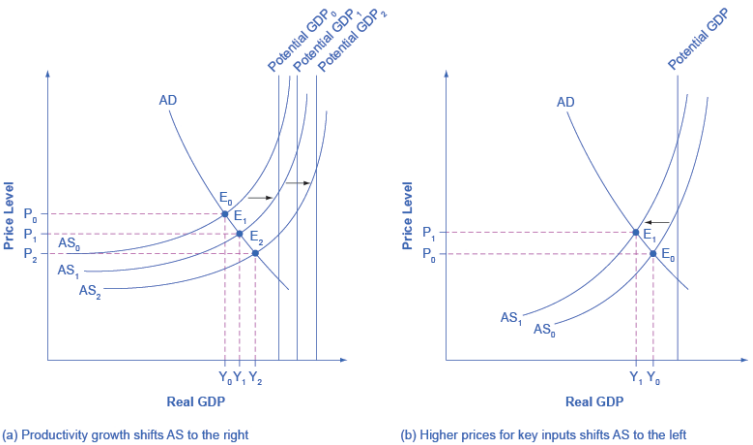

Figure 10.7. *Shifts in Aggregate Supply (a) The rise in productivity causes the AS curve to shift to the right. The original equilibrium E0 is at the intersection of AD and AS0. When AS shifts right, then the new equilibrium E1 is at the intersection of AD and AS1, and then yet another equilibrium, E2, is at the intersection of AD and AS2. Shifts in AS to the right, lead to a greater level of output and to downward pressure on the price level. (b) A higher price for inputs means that at any given price level for outputs, a lower quantity will be produced so aggregate supply will shift to the left from AS0 to AS1. The new equilibrium, E1, has a reduced quantity of output and a higher price level than the original equilibrium (E0).*

A shift in the AS curve to the right will result in a greater real GDP and downward pressure on the price level, if aggregate demand remains unchanged. However, if this shift in AS results from gains in productivity growth, which are typically measured in terms of a few percentage points per year, the effect will be relatively small over a few months or even a couple of years.

How Changes in Input Prices Shift the AS Curve

Higher prices for inputs that are widely used across the entire economy can have a macroeconomic impact on aggregate supply. Examples of such widely used inputs include wages and energy products. Increases in the price of such inputs will cause the AS curve to shift to the left, which means that at each given price level for outputs, a higher price for inputs will discourage production because it will reduce the possibilities for earning profits. Figure 10.7 (b) shows the aggregate supply curve shifting to the left, from AS_0 to AS_1, causing the equilibrium to move from E_0 to E_1. The movement from the original equilibrium of E_0 to the new equilibrium of E_1 will bring a nasty set of effects: reduced GDP or recession, higher unemployment because the economy is now further away from potential GDP, and an inflationary higher price level as well. For example, the U.S. economy experienced recessions in 1974–1975, 1980–1982, 1990–91, 2001, and 2007–2009 that were each preceded or accompanied by a rise in the key input of oil prices. In the 1970s, this pattern of a shift to the left in AS leading to a stagnant economy with high unemployment and inflation was nicknamed *stagflation*.

Conversely, a decline in the price of a key input like oil will shift the AS curve to the right, providing an incentive for more to be produced at every given price level for outputs. From 1985 to 1986, for example, the average price of crude oil fell by almost half, from $24 a barrel to $12 a barrel. Similarly, from 1997 to 1998, the price of a barrel of crude oil dropped from $17 per barrel to $11 per barrel. In both cases, the plummeting price of oil led to a situation like that presented earlier in Figure 10.7 (a), where the outward shift of AS to the right allowed the economy to expand, unemployment to fall, and inflation to decline.

Along with energy prices, two other key inputs that may shift the AS curve are the cost of labor, or wages, and the cost of imported goods that are used as inputs for other products. In these cases as

well, the lesson is that lower prices for inputs cause AS to shift to the right, while higher prices cause it to shift back to the left.

Other Supply Shocks

The aggregate supply curve can also shift due to shocks to input goods or labor. For example, an unexpected early freeze could destroy a large number of agricultural crops, a shock that would shift the AS curve to the left since there would be fewer agricultural products available at any given price.

Similarly, shocks to the labor market can affect aggregate supply. An extreme example might be an overseas war that required a large number of workers to cease their ordinary production in order to go fight for their country. In this case, aggregate supply would shift to the left because there would be fewer workers available to produce goods at any given price.

135. Reading: The Long Run and the Short Run

Aggregate Demand and Aggregate Supply: The Long Run and the Short Run

In macroeconomics, we seek to understand two types of equilibria, one corresponding to the short run and the other corresponding to the long run. The **short run** in macroeconomic analysis is a period in which wages and some other prices do not respond to changes in economic conditions. In certain markets, as economic conditions change, prices (including wages) may not adjust quickly enough to maintain equilibrium in these markets. A **sticky price** is a price that is slow to adjust to its equilibrium level, creating sustained periods of shortage or surplus. Wage and price stickiness prevent the economy from achieving its natural level of employment and its potential output. In contrast, the **long run** in macroeconomic analysis is a period in which wages and prices are flexible. In the long run, employment will move to its natural level and real GDP to potential.

We begin with a discussion of long-run macroeconomic equilibrium, because this type of equilibrium allows us to see the macroeconomy after full market adjustment has been achieved. In contrast, in the short run, price or wage stickiness is an obstacle to full adjustment. Why these deviations from the potential level of output occur and what the implications are for the macroeconomy will be discussed in the section on short-run macroeconomic equilibrium.

The Long Run

As explained in a previous module, the natural level of employment occurs where the real wage adjusts so that the quantity of labor demanded equals the quantity of labor supplied. When the economy achieves its natural level of employment, it achieves its potential level of output. We will see that real GDP eventually moves to potential, because all wages and prices are assumed to be flexible in the long run.

Long-Run Aggregate Supply

The long-run aggregate supply (LRAS) curve relates the level of output produced by firms to the price level in the long run. In Panel (b) of Figure 7.5 "Natural Employment and Long-Run Aggregate Supply", the long-run aggregate supply curve is a vertical line at the economy's potential level of output. There is a single real wage at which employment reaches its natural level. In Panel (a) of Figure 7.5 "Natural Employment and Long-Run Aggregate Supply," only a real wage of ω_e generates natural employment L_e. The economy could, however, achieve this real wage with any of an infinitely large set of nominal wage and price-level combinations. Suppose, for example, that the equilibrium real wage (the ratio of wages to the price level) is 1.5. We could have that with a nominal wage level of 1.5 and a price level of 1.0, a nominal wage level of 1.65 and a price level of 1.1, a nominal wage level of 3.0 and a price level of 2.0, and so on.

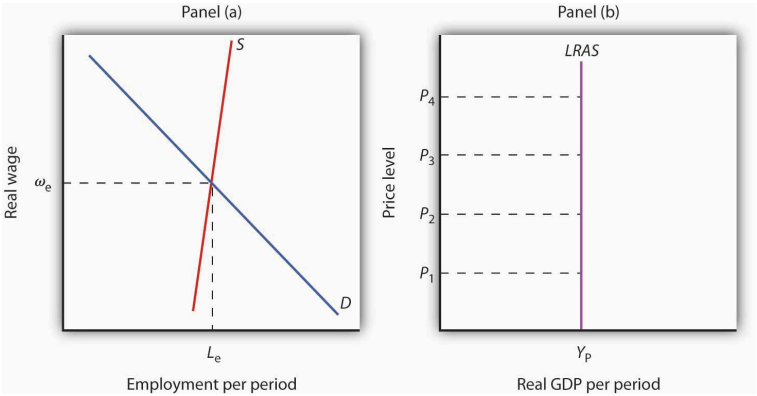

Figure 7.5. *Natural Employment and Long-Run Aggregate Supply. When the economy achieves its natural level of employment, as shown in Panel (a) at the intersection of the demand and supply curves for labor, it achieves its potential output, as shown in Panel (b) by the vertical long-run aggregate supply curve LRAS at YP. In Panel (b) we see price levels ranging from P1 to P4. Higher price levels would require higher nominal wages to create a real wage of ωe, and flexible nominal wages would achieve that in the long run. In the long run, then, the economy can achieve its natural level of employment and potential output at any price level. This conclusion gives us our long-run aggregate supply curve. With only one level of output at any price level, the long-run aggregate supply curve is a vertical line at the economy's potential level of output of YP.*

Equilibrium Levels of Price and Output in the Long Run

The intersection of the economy's aggregate demand curve and the long-run aggregate supply curve determines its equilibrium real GDP and price level in the long run. Figure 7.6 "Long-Run Equilibrium" depicts an economy in long-run equilibrium. With aggregate demand at AD_1 and the long-run aggregate supply curve as shown, real GDP is $12,000 billion per year and the price level is 1.14. If aggregate demand increases to AD_2, long-run equilibrium will be reestablished at real GDP of $12,000 billion per year, but at a higher price level of 1.18. If aggregate demand decreases to AD_3,

long-run equilibrium will still be at real GDP of $12,000 billion per year, but with the now lower price level of 1.10.

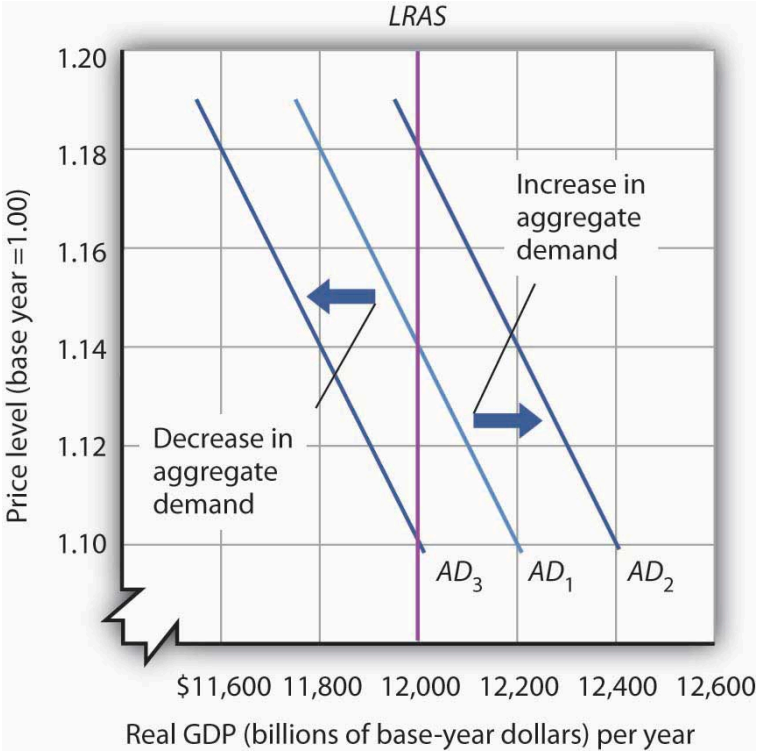

***Figure 7.6**. Long-Run Equilibrium. Long-run equilibrium occurs at the intersection of the aggregate demand curve and the long-run aggregate supply curve. For the three aggregate demand curves shown, long-run equilibrium occurs at three different price levels, but always at an output level of $12,000 billion per year, which corresponds to potential output.*

The Short Run

Analysis of the macroeconomy in the short run—a period in which stickiness of wages and prices may prevent the economy from operating at potential output—helps explain how deviations of real

GDP from potential output can and do occur. We will explore the effects of changes in aggregate demand and in short-run aggregate supply in this section.

Short-Run Aggregate Supply

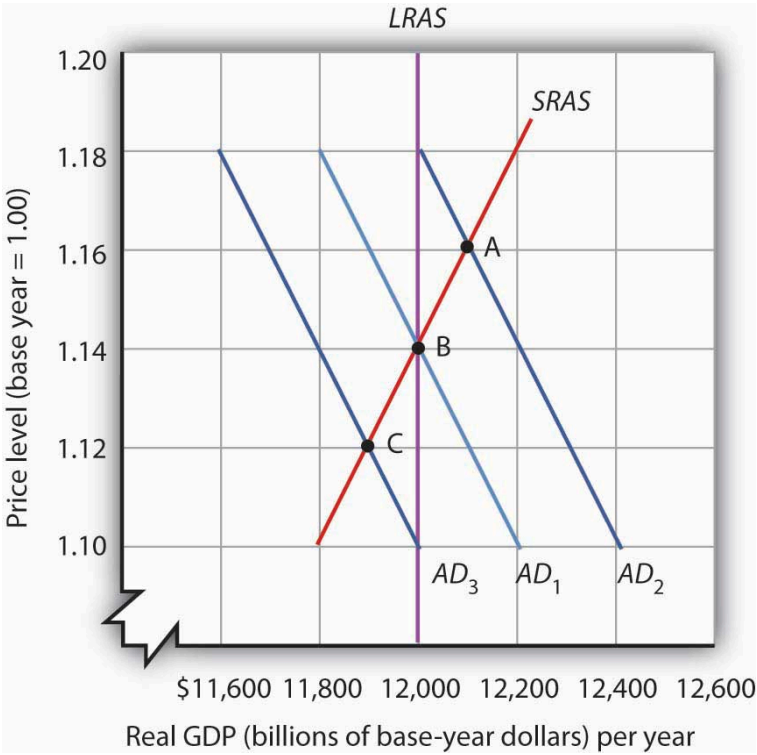

Figure 7.7. *Deriving the Short-Run Aggregate Supply Curve. The economy shown here is in long-run equilibrium at the intersection of AD1 with the long-run aggregate supply curve. If aggregate demand increases to AD2, in the short run, both real GDP and the price level rise. If aggregate demand decreases to AD3, in the short run, both real GDP and the price level fall. A line drawn through points A, B, and C traces out the short-run aggregate supply curve SRAS.*

The model of aggregate demand and long-run aggregate supply predicts that the economy will eventually move toward its potential output. To see how nominal wage and price stickiness can cause real GDP to be either above or below potential in the short run, consider the response of the economy to a change in aggregate demand. Figure 7.7 "Deriving the Short-Run Aggregate Supply Curve" shows an economy that has been operating at potential output of $12,000 billion and a price level of 1.14. This occurs at the intersection of AD_1 with the long-run aggregate supply curve at point B. Now suppose that the aggregate demand curve shifts to the right (to AD_2). This could occur as a result of an increase in exports. (The shift from AD_1 to AD_2 includes the multiplied effect of the increase in exports.) At the price level of 1.14, there is now excess demand and pressure on prices to rise. If all prices in the economy adjusted quickly, the economy would quickly settle at potential output of $12,000 billion, but at a higher price level (1.18 in this case).

Is it possible to expand output above potential? Yes. It may be the case, for example, that some people who were in the labor force but were frictionally or structurally unemployed find work because of the ease of getting jobs at the going nominal wage in such an environment. The result is an economy operating at point A in Figure 7.7 "Deriving the Short-Run Aggregate Supply Curve" at a higher price level and with output temporarily above potential.

Consider next the effect of a reduction in aggregate demand (to AD_3), possibly due to a reduction in investment. As the price level starts to fall, output also falls. The economy finds itself at a price level–output combination at which real GDP is below potential, at point C. Again, price stickiness is to blame. The prices firms receive are falling with the reduction in demand. Without corresponding reductions in nominal wages, there will be an increase in the real wage. Firms will employ less labor and produce less output.

By examining what happens as aggregate demand shifts over a period when price adjustment is incomplete, we can trace out the short-run aggregate supply curve by drawing a line through points A, B, and C. The short-run aggregate supply (SRAS) curve is a

graphical representation of the relationship between production and the price level in the short run. Among the factors held constant in drawing a short-run aggregate supply curve are the capital stock, the stock of natural resources, the level of technology, and the prices of factors of production.

A change in the price level produces a change in the aggregate quantity of goods and services supplied is illustrated by the movement along the short-run aggregate supply curve. This occurs between points A, B, and C in Figure 7.7 "Deriving the Short-Run Aggregate Supply Curve."

A change in the quantity of goods and services supplied at every price level in the short run is a change in short-run aggregate supply. Changes in the factors held constant in drawing the short-run aggregate supply curve shift the curve. (These factors may also shift the long-run aggregate supply curve; we will discuss them along with other determinants of long-run aggregate supply in the next module.)

One type of event that would shift the short-run aggregate supply curve is an increase in the price of a natural resource such as oil. An increase in the price of natural resources or any other factor of production, all other things unchanged, raises the cost of production and leads to a reduction in short-run aggregate supply. In Panel (a) of Figure 7.8 "Changes in Short-Run Aggregate Supply," $SRAS_1$ shifts leftward to $SRAS_2$. A decrease in the price of a natural resource would lower the cost of production and, other things unchanged, would allow greater production from the economy's stock of resources and would shift the short-run aggregate supply curve to the right; such a shift is shown in Panel (b) by a shift from $SRAS_1$ to $SRAS_3$.

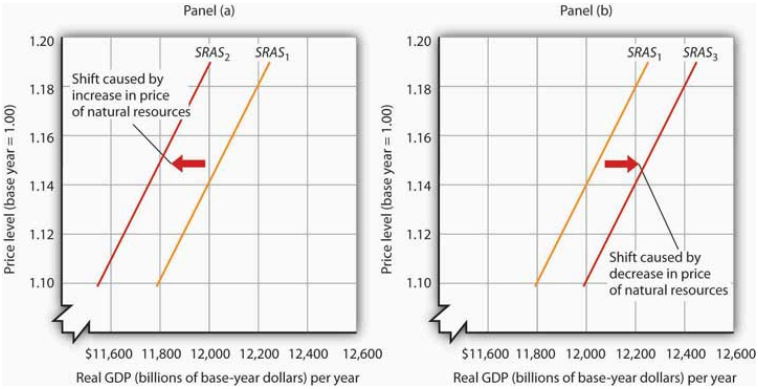

Figure 7.8. *Changes in Short-Run Aggregate Supply. A reduction in short-run aggregate supply shifts the curve from SRAS1 to SRAS2 in Panel (a). An increase shifts it to the right to SRAS3, as shown in Panel (b).*

Reasons for Wage and Price Stickiness

Wage or price stickiness means that the economy may not always be operating at potential. Rather, the economy may operate either above or below potential output in the short run. Correspondingly, the overall unemployment rate will be below or above the natural level.

Many prices observed throughout the economy do adjust quickly to changes in market conditions so that equilibrium, once lost, is quickly regained. Prices for fresh food and shares of common stock are two such examples.

Other prices, though, adjust more slowly. Nominal wages, the price of labor, adjust very slowly. We will first look at why nominal wages are sticky, due to their association with the unemployment rate, a variable of great interest in macroeconomics, and then at other prices that may be sticky.

Wage Stickiness

Wage contracts fix nominal wages for the life of the contract. The length of wage contracts varies from one week or one month for temporary employees, to one year (teachers and professors often have such contracts), to three years (for most union workers employed under major collective bargaining agreements). The existence of such explicit contracts means that both workers and firms accept some wage at the time of negotiating, even though economic conditions could change while the agreement is still in force.

Think about your own job or a job you once had. Chances are you go to work each day knowing what your wage will be. Your wage does not fluctuate from one day to the next with changes in demand or supply. You may have a formal contract with your employer that specifies what your wage will be over some period. Or you may have an informal understanding that sets your wage. Whatever the nature of your agreement, your wage is "stuck" over the period of the agreement. Your wage is an example of a sticky price.

One reason workers and firms may be willing to accept long-term nominal wage contracts is that negotiating a contract is a costly process. Both parties must keep themselves adequately informed about market conditions. Where unions are involved, wage negotiations raise the possibility of a labor strike, an eventuality that firms may prepare for by accumulating additional inventories, also a costly process. Even when unions are not involved, time and energy spent discussing wages takes away from time and energy spent producing goods and services. In addition, workers may simply prefer knowing that their nominal wage will be fixed for some period of time.

Some contracts do attempt to take into account changing economic conditions, such as inflation, through cost-of-living adjustments, but even these relatively simple contingencies are not as widespread as one might think. One reason might be that a firm

is concerned that while the aggregate price level is rising, the prices for the goods and services it sells might not be moving at the same rate. Also, cost-of-living or other contingencies add complexity to contracts that both sides may want to avoid.

Even markets where workers are not employed under explicit contracts seem to behave as if such contracts existed. In these cases, wage stickiness may stem from a desire to avoid the same uncertainty and adjustment costs that explicit contracts avert.

Finally, minimum wage laws prevent wages from falling below a legal minimum, even if unemployment is rising. Unskilled workers are particularly vulnerable to shifts in aggregate demand.

136. Reading: Shifts in Aggregate Demand

Shifts in Aggregate Demand

As mentioned previously, the components of aggregate demand are consumption spending (C), investment spending (I), government spending (G), and spending on exports (X) minus imports (M). (Read the following Clear It Up feature for explanation of why imports are subtracted from exports and what this means for aggregate demand.) A shift of the AD curve to the right means that at least one of these components increased so that a greater amount of total spending would occur at every price level. A shift of the AD curve to the left means that at least one of these components decreased so that a lesser amount of total spending would occur at every price level. The Keynesian Perspective will discuss the components of aggregate demand and the factors that affect them. Here, the discussion will sketch two broad categories that could cause AD curves to shift: changes in the behavior of consumers or firms and changes in government tax or spending policy.

Do Imports Diminish Aggregate Demand?

We have seen that the formula for aggregate demand is AD = C + I + G + X − M, where M is the total value of exported goods. Why is there a minus sign in front of imports? Does this mean that more imports will result in a lower level of aggregate demand?

Actually, imports are already included in the formula in the form of consumption (C). When an American consumer buys a foreign

product, it gets counted along with all other consumption. Since the income generated does not go to American producers, but rather to producers in another country, it would be wrong to count this as part of domestic demand. Therefore, imports added in consumption are subtracted back out in the M term of the equation.

Because of the way in which the demand equation is written, it is easy to make the mistake of thinking that imports are bad for the economy. Just keep in mind that every negative number in the M term has a corresponding positive number in the C term, and they always cancel out.

How Changes by Consumers and Firms Can Affect AD

When consumers feel more confident about the future of the economy, they tend to consume more. If *business confidence* is high, then firms tend to spend more on investment, believing that the future payoff from that investment will be substantial. Conversely, if consumer or business confidence drops, then consumption and investment spending decline.

The *Conference Board*, a business-funded research organization, carries out national surveys of consumers and executives to gauge their degree of optimism about the near-term future economy. The Conference Board asks a number of questions about how consumers and business executives perceive the economy and then combines the answers into an overall measure of confidence, rather like creating an index number to represent the price level from a variety of individual prices. For *consumer confidence*, the overall level of confidence in 1985 is used as a base year and set equal to 100, and confidence in every other year can be compared to that base year. Measured on this scale, for example, consumer confidence rose from 100 in August 2006 to 111 in February 2007, but had plummeted to 56 by early 2010.

Business confidence is measured on a scale from 0 to 100, so that a score of 50 represents a neutral view, 100 would represent extreme confidence, and 0 would represent an extreme lack of confidence. Business confidence sank from 57 in the first quarter of 2006 to 44 in the third quarter of 2006 before rebounding to 53 in the first quarter of 2007. It sank as low as 35 in early 2009 before bouncing back to 58 by early 2010. Of course such survey measures are not precise. They can, however, suggest when confidence is rising or falling, or when it is relatively high or low compared to the past.

Because a rise in confidence is associated with higher consumption and investment demand, it will lead to an outward shift in the AD curve, and a move of the equilibrium, from E_0 to E_1, to a higher quantity of output and a higher price level, as shown in Figure 10.8 (a).

Consumer and business confidence often reflect macroeconomic realities; for example, confidence is usually high when the economy is growing briskly and low during a recession. However, economic confidence can sometimes rise or fall for reasons that do not have a close connection to the immediate economy, like a risk of war, election results, foreign policy events, or a pessimistic prediction about the future by a prominent public figure. U.S. presidents, for example, must be careful in their public pronouncements about the economy. If they offer economic pessimism, they risk provoking a decline in confidence that reduces consumption and investment and shifts AD to the left, and in a self-fulfilling prophecy, contributes to causing the recession that the president warned against in the first place. A shift of AD to the left, and the corresponding movement of the equilibrium, from E_0 to E_1, to a lower quantity of output and a lower price level, is shown in Figure 10.8 (b).

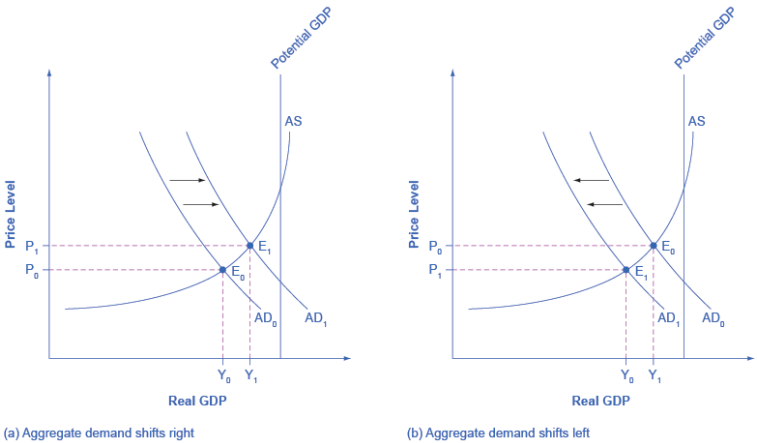

Figure 10.8. *Shifts in Aggregate Demand (a) An increase in consumer confidence or business confidence can shift AD to the right, from AD0 to AD1. When AD shifts to the right, the new equilibrium (E1) will have a higher quantity of output and also a higher price level compared with the original equilibrium (E0). In this example, the new equilibrium (E1) is also closer to potential GDP. An increase in government spending or a cut in taxes that leads to a rise in consumer spending can also shift AD to the right. (b) A decrease in consumer confidence or business confidence can shift AD to the left, from AD0 to AD1. When AD shifts to the left, the new equilibrium (E1) will have a lower quantity of output and also a lower price level compared with the original equilibrium (E0). In this example, the new equilibrium (E1) is also farther below potential GDP. A decrease in government spending or higher taxes that leads to a fall in consumer spending can also shift AD to the left.*

How Government Macroeconomic Policy Choices Can Shift AD

Government spending is one component of AD. Thus, higher government spending will cause AD to shift to the right, as in Figure 10.8 (a), while lower government spending will cause AD to shift to the left, as in Figure 10.8 (b). For example, U.S. government spending declined by 3.6% of GDP during the 1990s, from 22.2% of GDP in 1992 to 18.6% of GDP in 1999. However, from 2008 to 2009, U.S. government spending increased from 20.7% of GDP to 24.7%

of GDP. If changes of a few percentage points of GDP seem small to you, remember that since GDP exceeded $14 trillion in 2009, a seemingly small change of 1.0% of GDP in annual spending is equal to more than $140 billion.

Tax policy can affect consumption and investment spending, too. Tax cuts for individuals will tend to increase consumption demand, while *tax* increases will tend to diminish it. Tax policy can also pump up investment demand by offering lower tax rates for corporations or tax reductions that benefit specific kinds of investment. Shifting C or I will shift the AD curve as a whole.

During a *recession*, when unemployment is high and many businesses are suffering low profits or even losses, the U.S. Congress often passes tax cuts. During the recession of 2001, for example, a tax cut was enacted into law. At such times, the political rhetoric often focuses on how people going through hard times need relief from taxes. The aggregate supply and aggregate demand framework, however, offers a complementary rationale, as illustrated in Figure 10.9. The original equilibrium during a recession is at point E_0, relatively far from the full employment level of output. The tax cut, by increasing consumption, shifts the AD curve to the right. At the new equilibrium (E_1), real GDP rises and unemployment falls and, because in this diagram the economy has not yet reached its potential or full employment level of GDP, any rise in the price level remains muted. Read the following Clear It Up feature to consider the question of whether economists favor tax cuts or oppose them.

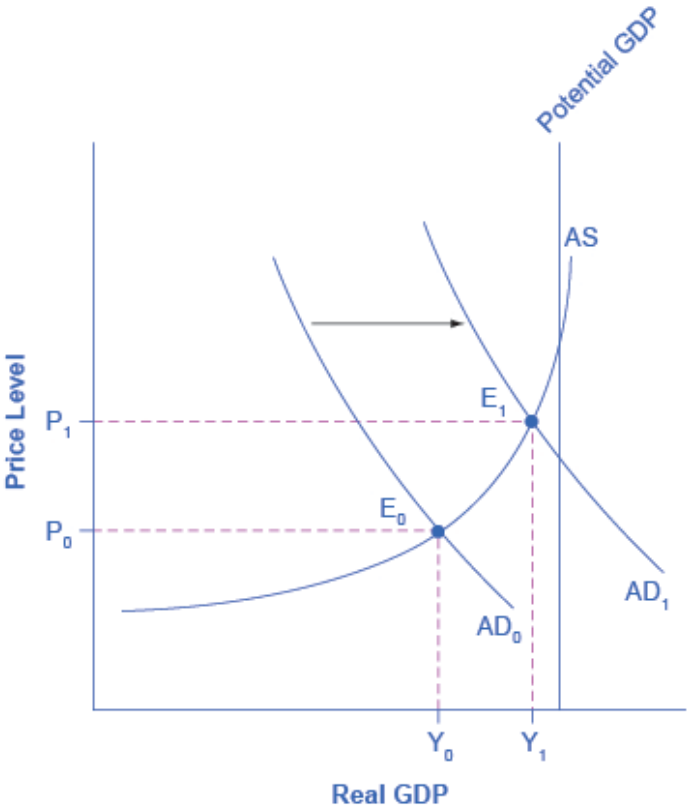

Figure 10.9. *Recession and Full Employment in the AS–AD Model Whether the economy is in a recession is illustrated in the AS–AD model by how close the equilibrium is to the potential GDP line. In this example, the level of output Y0 at the equilibrium E0 is relatively far from the potential GDP line, so it can represent an economy in recession, well below the full employment level of GDP. In contrast, the level of output Y1 at the equilibrium E1 is relatively close to potential GDP, and so it would represent an economy with a lower unemployment rate.*

DO ECONOMISTS FAVOR TAX CUTS OR OPPOSE THEM?

One of the most fundamental divisions in American politics over the last few decades has been between those who believe that the government should cut taxes substantially and those who disagree. Ronald Reagan rode into the presidency in 1980 partly because of his promise, soon carried out, to enact a substantial tax cut. George Bush lost his bid for reelection against Bill Clinton in 1992 partly because he had broken his 1988 promise: "Read my lips! No new taxes!" In the 2000 presidential election, both George W. Bush and Al Gore advocated substantial tax cuts and Bush succeeded in pushing a package of tax cuts through Congress early in 2001. Disputes over tax cuts often ignite at the state and local level as well.

What side are economists on? Do they support broad tax cuts or oppose them? The answer, unsatisfying to zealots on both sides, is that it depends. One issue is whether the tax cuts are accompanied by equally large government spending cuts. Economists differ, as does any broad cross-section of the public, on how large government spending should be and what programs might be cut back. A second issue, more relevant to the discussion in this chapter, concerns how close the economy is to the full employment level of output. In a recession, when the intersection of the AD and AS curves is far below the full employment level, tax cuts can make sense as a way of shifting AD to the right. However, when the economy is already doing extremely well, tax cuts may shift AD so far to the right as to generate inflationary pressures, with little gain to GDP.

With the AS–AD framework in mind, many economists might readily believe that the Reagan tax cuts of 1981, which took effect just after two serious recessions, were beneficial economic policy. Similarly, the Bush tax cuts of 2001 and the Obama tax cuts of 2009 were enacted during recessions. However, some of the same economists who favor tax cuts in time of recession would be much

more dubious about identical tax cuts at a time the economy is performing well and cyclical unemployment is low.

Government Policy Options

The use of government spending and tax cuts can be a useful tool to affect aggregate demand and it will be discussed in greater detail later in the course. Other policy tools can shift the aggregate demand curve as well. For example, the Federal Reserve can affect interest rates and the availability of credit. Higher interest rates tend to discourage borrowing and thus reduce both household spending on big-ticket items like houses and cars and investment spending by business. Conversely, lower interest rates will stimulate consumption and investment demand. Interest rates can also affect exchange rates, which in turn will have effects on the export and import components of aggregate demand.

Spelling out the details of these alternative policies and how they affect the components of aggregate demand can wait until we learn about the Keynesian Perspective in greater detail. Here, the key lesson is that a shift of the aggregate demand curve to the right leads to a greater real GDP and to upward pressure on the price level. Conversely, a shift of aggregate demand to the left leads to a lower real GDP and a lower price level. Whether these changes in output and price level are relatively large or relatively small, and how the change in equilibrium relates to potential GDP, depends on whether the shift in the AD curve is happening in the relatively flat or relatively steep portion of the AS curve.

Self Check: The Aggregate Demand-Aggregate Supply Model

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the seven Readings in this section.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

An interactive or media element has been excluded from this version of the text. You can view it online here: https://pressbooks.ccconline.org/accmacro/?p=412

137. Reading: Growth and Recession in the AS–AD Diagram

Growth and Recession in the AS–AD Diagram

In the AS–AD diagram, long-run economic growth due to productivity increases over time will be represented by a gradual shift to the right of aggregate supply. The vertical line representing potential GDP (or the "full employment level of GDP") will gradually shift to the right over time as well. A pattern of economic growth over three years, with the AS curve shifting slightly out to the right each year, was shown earlier in Figure 10.7 (a).

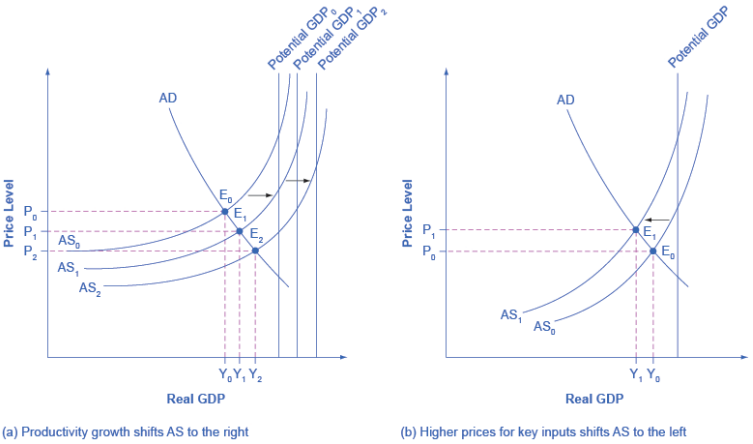

Figure 10.7. *Shifts in Aggregate Supply (a) The rise in productivity causes the AS curve to shift to the right. The original equilibrium E0 is at the intersection of AD and AS0. When AS shifts right, then the new equilibrium E1 is at the intersection of AD and AS1, and then yet another equilibrium, E2, is at the intersection of AD and AS2. Shifts in AS to the right, lead to a greater level of output and to downward pressure on the price level. (b) A higher price for inputs means that at any given price level for outputs, a lower quantity will be produced so aggregate supply will shift to the left from AS0 to AS1. The new equilibrium, E1, has a reduced quantity of output and a higher price level than the original equilibrium (E0).*

However, the factors that determine the speed of this long-term economic growth rate—like investment in physical and human capital, technology, and whether an economy can take advantage of catch-up growth—do not appear directly in the AS–AD diagram. In the short run, GDP falls and rises in every economy, as the economy dips into recession or expands out of recession. Recessions are illustrated in the AS–AD diagram when the equilibrium level of real GDP is substantially below potential GDP, as occurred at the equilibrium point E_0 in Figure 10.9. On the other hand, in years of resurgent economic growth the equilibrium will typically be close to potential GDP, as shown at equilibrium point E_1 in that earlier figure.

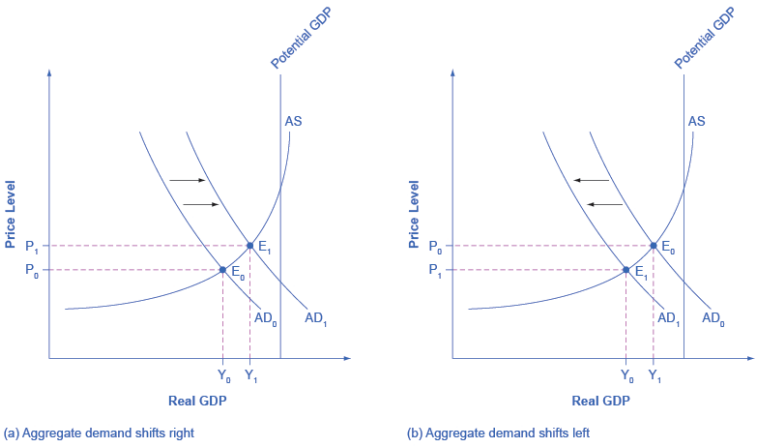

Figure 10.8. *Shifts in Aggregate Demand (a) An increase in consumer confidence or business confidence can shift AD to the right, from AD0 to AD1. When AD shifts to the right, the new equilibrium (E1) will have a higher quantity of output and also a higher price level compared with the original equilibrium (E0). In this example, the new equilibrium (E1) is also closer to potential GDP. An increase in government spending or a cut in taxes that leads to a rise in consumer spending can also shift AD to the right. (b) A decrease in consumer confidence or business confidence can shift AD to the left, from AD0 to AD1. When AD shifts to the left, the new equilibrium (E1) will have a lower quantity of output and also a lower price level compared with the original equilibrium (E0). In this example, the new equilibrium (E1) is also farther below potential GDP. A decrease in government spending or higher taxes that leads to a fall in consumer spending can also shift AD to the left.*

Unemployment in the AS–AD Diagram

Two types of unemployment were described in the Unemployment chapter. *Cyclical unemployment*bounces up and down according to the short-run movements of GDP. Over the long run, in the United States, the unemployment rate typically hovers around 5% (give or take one percentage point or so), when the economy is healthy. In many of the national economies across Europe, the rate of unemployment in recent decades has only dropped to about 10% or a bit lower, even in good economic years. This baseline level

of unemployment that occurs year-in and year-out is called the *natural rate of unemployment* and is determined by how well the structures of market and government institutions in the economy lead to a matching of workers and employers in the labor market. Potential GDP can imply different unemployment rates in different economies, depending on the natural rate of unemployment for that economy. In the AS–AD diagram, cyclical unemployment is shown by how close the economy is to the potential or full employment level of GDP. Returning to Figure 10.9, relatively low cyclical unemployment for an economy occurs when the level of output is close to potential GDP, as in the equilibrium point E_1. Conversely, high cyclical unemployment arises when the output is substantially to the left of potential GDP on the AS–AD diagram, as at the equilibrium point E_0. The factors that determine the natural rate of unemployment are not shown separately in the AS–AD model, although they are implicitly part of what determines potential GDP or full employment GDP in a given economy.

LINK IT UP

What is the level of consumer confidence today? Visit this website for quick look at current data on consumer confidence.

Inflationary Pressures in the AS–AD Diagram

Inflation fluctuates in the short run. Higher inflation rates have typically occurred either during or just after economic booms: for example, the biggest spurts of inflation in the U.S. economy during the twentieth century followed the wartime booms of World War I and World War II. Conversely, rates of inflation decline during recessions. As an extreme example, inflation actually became

negative—a situation called "deflation"—during the Great Depression. Even during the relatively short recession of 1991–1992, the rate of inflation declined from 5.4% in 1990 to 3.0% in 1992. During the relatively short recession of 2001, the rate of inflation declined from 3.4% in 2000 to 1.6% in 2002. During the deep recession of 2007–2009, the rate of inflation declined from 3.8% in 2008 to −0.4% in 2009. Some countries have experienced bouts of high inflation that lasted for years. In the U.S. economy since the mid–1980s, inflation does not seem to have had any long-term trend to be substantially higher or lower; instead, it has stayed in the range of 1–5% annually.

The AS–AD framework implies two ways that inflationary pressures may arise. One possible trigger is if aggregate demand continues to shift to the right when the economy is already at or near potential GDP and full employment, thus pushing the macroeconomic equilibrium into the steep portion of the AS curve. In Figure 10.10 (a), there is a shift of aggregate demand to the right; the new equilibrium E_1 is clearly at a higher price level than the original equilibrium E_0. In this situation, the aggregate demand in the economy has soared so high that firms in the economy are not capable of producing additional goods, because labor and physical capital are fully employed, and so additional increases in aggregate demand can only result in a rise in the price level.

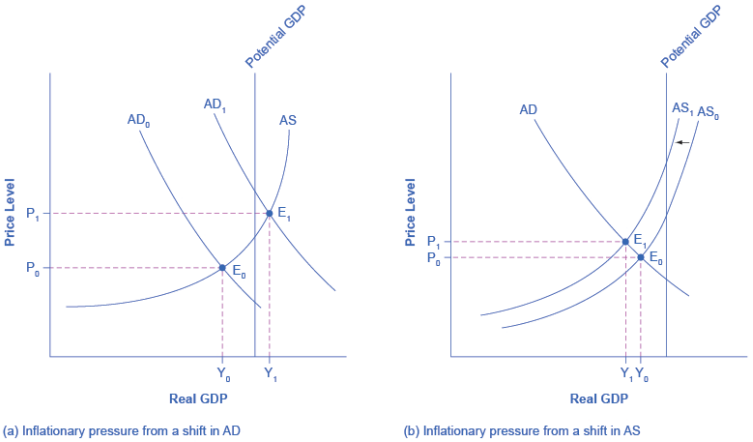

Figure 10.10. *Sources of Inflationary Pressure in the AS–AD Model (a) A shift in aggregate demand, from AD0 to AD1, when it happens in the area of the AS curve that is near potential GDP, will lead to a higher price level and to pressure for a higher price level and inflation. The new equilibrium (E1) is at a higher price level (P1) than the original equilibrium. (b) A shift in aggregate supply, from AS0 to AS1, will lead to a lower real GDP and to pressure for a higher price level and inflation. The new equilibrium (E1) is at a higher price level (P1), while the original equilibrium (E0) is at the lower price level (P0).*

An alternative source of inflationary pressures can occur due to a rise in input prices that affects many or most firms across the economy—perhaps an important input to production like oil or labor—and causes the aggregate supply curve to shift back to the left. In Figure 10.10 (b), the shift of the AS curve to the left also increases the price level from P_0 at the original equilibrium (E_0) to a higher price level of P_1 at the new equilibrium (E_1). In effect, the rise in input prices ends up, after the final output is produced and sold, being passed along in the form of a higher price level for outputs. The AS–AD diagram shows only a one-time shift in the price level. It does not address the question of what would cause inflation either to vanish after a year, or to sustain itself for several years. There are two explanations for why inflation

may persist over time. One way that continual inflationary price increases can occur is if the government continually attempts to stimulate aggregate demand in a way that keeps pushing the AD curve when it is already in the steep portion of the AS curve. A second possibility is that, if inflation has been occurring for several years, a certain level of inflation may come to be expected. For example, if consumers, workers, and businesses all expect prices and wages to rise by a certain amount, then these expected rises in the price level can become built into the annual increases of prices, wages, and interest rates of the economy. These two reasons are interrelated, because if a government fosters a macroeconomic environment with inflationary pressures, then people will grow to expect inflation. However, the AS–AD diagram does not show these patterns of ongoing or expected inflation in a direct way.

LINK IT UP

Visit this website for current data on business confidence.

Importance of the Aggregate Supply–Aggregate Demand Model

Macroeconomics takes an overall view of the economy, which means that it needs to juggle many different concepts. For example, start with the three macroeconomic goals of growth, low inflation, and low unemployment. Aggregate demand has four elements: consumption, investment, government spending, and exports less imports. Aggregate supply reveals how businesses throughout the economy will react to a higher price level for outputs. Finally, a wide array of economic events and policy decisions can affect aggregate demand and aggregate supply, including government tax and

spending decisions; consumer and business confidence; changes in prices of key inputs like oil; and technology that brings higher levels of productivity. The aggregate supply–aggregate demand model is one of the fundamental diagrams in this text because it provides an overall framework for bringing these factors together in one diagram. Indeed, some version of the AS–AD model will appear in every module in the rest of this text.

138. Reading: The AS–AD Model and Economic Growth

The ASAD Model and Economic Growth

The AS–AD model can convey a number of interlocking relationships between the three macroeconomic goals of *growth*, *unemployment*, and *inflation*. Moreover, the AS–AD framework is flexible enough to accommodate both the Keynes' law approach that focuses on aggregate demand and the short run, while also including the Say's law approach that focuses on aggregate supply and the long run. These advantages are considerable. Every model is a simplified version of the deeper reality and, in the context of the AS–AD model, the three macroeconomic goals arise in ways that are sometimes indirect or incomplete. In this module, we consider how the AS–AD model illustrates the three macroeconomic goals of economic growth, low unemployment, and low inflation.

139. Simulation: Spend or Save—Government Edition

Try It

Play the simulation below multiple times to see how different choices lead to different outcomes. All simulations allow unlimited attempts so that you can gain experience applying the concepts.

An interactive or media element has been excluded from this version of the text. You can view it online here: https://pressbooks.ccconline.org/accmacro/?p=418

140. Self Check: The AD-AS Model and Growth, Recession, Expansion, and Inflation

Check Your Understanding

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the two Readings in this section.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

An interactive or media element has been excluded from this version of the text. You can view it online here: https://pressbooks.ccconline.org/accmacro/?p=420

141. Putting It Together: Macro Workings

Summary

The goal of this module was ambitious: to teach you how the macro economy changes over time, and then how to analyze the workings of the economy using the most important macro model we will learn in this course. You learned how to:

- Describe the business cycle and its primary phases
- Define economic growth
- Use the AD-AS model to explain the equilibrium levels of real GDP and price level.

Examples

You learned that economic activity whether measured by production, income, spending or employment tends to grow over time. Sometimes economic activity grows faster than average, sometimes it grows slower than average, and sometimes it even declines. This growth (or decline) is the result of the interaction between changes in total spending by consumers, businesses, governments and the rest of the world, and changes in factors of production such as labor supply, capital and technology. While the presentation was technical and mechanical in this module, the real world is anything but that. Economics is, after all, a social science and human beings do not behave like molecules. Rather, their behavior is influenced by institutions, culture and feelings.

Beginning in the next module, you will see that economists differ on the relative importance they place on changes in spending versus changes in factors of production as drivers of economic activity. They also differ on what they see as the appropriate role of government in the process.

While you may not feel you fully understand this material yet, as you work with it during the remainder of this text, your learning will be reinforced and your understanding will become more complete.

142. Glossary: Macro Workings

aggregate demand (AD) curve
the relationship between the total spending on domestic goods and services and the price level for output

aggregate demand (AD)
the relationship between the total spending in an economy on domestic goods and services and the price level for output

aggregate production function
the process whereby an economy as a whole turns economic inputs such as human capital, physical capital, and technology into output measured as GDP per capita

aggregate supply (AS) curve
the relationship between real GDP and the price level for output, holding the price of inputs fixed

aggregate supply (AS)
the relationship between real GDP and the price level for output, holding the price of inputs fixed

aggregate supply–aggregate demand model
a model that shows what determines total supply or total demand for the economy, and how total demand and total supply interact at the macroeconomic level

business cycle
the relatively short-term movement of the economy in and out of recession

capital deepening
an increase by society in the average level of physical and/or

human capital per person

compound growth rate
the rate of growth when multiplied by a base that includes past GDP growth

contractual rights
the rights of individuals to enter into agreements with others regarding the use of their property providing recourse through the legal system in the event of noncompliance

convergence
pattern in which economies with low per capita incomes grow faster than economies with high per capita incomes

depression
an especially lengthy and deep decline in output

full-employment GDP
another name for potential GDP, when the economy is producing at its potential and unemployment is at the natural rate of unemployment

human capital
the accumulated skills and education of workers

Industrial Revolution
the widespread use of power-driven machinery and the economic and social changes that occurred in the first half of the 1800s

infrastructure
a component of physical capital such as roads, rail systems, and so on

innovation
putting advances in knowledge to use in a new product or service

intermediate zone
portion of the AS curve where GDP is below potential but not so far below as in the Keynesian zone; the AS curve is upward-sloping, but not vertical in the intermediate zone

invention
advances in knowledge

Keynesian zone
portion of the AS curve where GDP is far below potential and the AS curve is flat

Keynes' law
"demand creates its own supply"

labor productivity
the value of what is produced per worker, or per hour worked (sometimes called worker productivity)

modern economic growth
the period of rapid economic growth from 1870 onward

neoclassical economists
economists who generally emphasize the importance of aggregate supply in determining the size of the macroeconomy over the long run

neoclassical zone
portion of the AS curve where GDP is at or near potential output where the AS curve is steep

peak
during the business cycle, the highest point of output before a recession begins

physical capital
the plant and equipment used by firms in production; this includes infrastructure

potential GDP
: the maximum quantity that an economy can produce given full employment of its existing levels of labor, physical capital, technology, and institutions

production function
: the process whereby a firm turns economic inputs like labor, machinery, and raw materials into outputs like goods and services used by consumers

recession
: a significant decline in national output

rule of law
: the process of enacting laws that protect individual and entity rights to use their property as they see fit. Laws must be clear, public, fair, and enforced, and applicable to all members of society

Say's law
: "supply creates its own demand"

special economic zone (SEZ)
: area of a country, usually with access to a port where, among other benefits, the government does not tax trade

stagflation
: an economy experiences stagnant growth and high inflation at the same time

technological change
: a combination of invention—advances in knowledge—and innovation

technology
: all the ways in which existing inputs produce more or higher quality, as well as different and altogether new products

trough

during the business cycle, the lowest point of output in a recession, before a recovery begins

143. Discussion: Business Cycle

Thinking back to the discussion on the state of the macroeconomy, would you describe the economy as booming, recovering, or in recession during the last few years? Why? Use the AD/AS model to illustrate this graphically. Which curve do you think caused the change? Explain your reasoning.

PART VIII

LESSON 7: UNEMPLOYMENT AND INFLATION

144. Outcome: The Unemployment Rate

What you'll learn to do: explain how the unemployment rate is calculated

In this outcome, you'll learn to calculate the unemployment rate and understand the complications in determining exactly who is unemployed.

The specific things you'll learn in this section include:

- Critique the unemployment rate as a measure of the unemployment problem

LEARNING ACTIVITIES

The learning activities for this section include:

- Reading: Unemployment
- Reading: Calculating Unemployment
- Self Check: The Unemployment Rate
- Reading: Criticisms of Measuring Unemployment
- Reading: Difficulties Measuring Unemployment
- Self Check: Critiquing the Unemployment Rate

Take time to review and reflect on each of these activities in order to improve your performance on the assessment for this section.

145. Reading: Unemployment

The Mysterious Case of the Missing Candidates

Figure 7.1. *Out of Business Borders was one of the many companies unable to recover from the economic recession of 2008-2009. (Credit: modification of work by Luis Villa del Campo/Flickr Creative Commons)*

Nearly eight million U.S. jobs were lost during the Great Recession of 2008-2009, with unemployment peaking at 10% in October 2009, according to the Bureau of Labor Statistics (BLS). That is a huge number of positions gone. During the tepid recovery, some positions were added, but as of summer 2013, unemployment had remained persistently higher than the pre-recession rate of less than 5%. Some economists and policymakers worried the recovery would be "jobless." With the economy growing, albeit slowly, why wasn't the unemployment number falling? Why were firms not hiring?

Peter Cappelli, noted Wharton management professor and

Director of Wharton's Center for Human Resources, does not believe the job search process is akin to what he terms the "Home Depot" view of hiring. According to him, this view "basically says that filling a job is like replacing a part in a washing machine. You simply find someone who does the exact same job as that broken part, plug him or her into the washing machine and that is it." The job search, for both the prospective employee and the employer, is more complex than that.

In a hiring situation, employers hold all the cards. They write the job descriptions, determine the salaries, decide when and how to advertise positions, and set the controls on employment application screening software. Advertising for positions has increased as the economic recovery progresses, yet here's the kicker: Employers say there are no applicants out there who meet their needs. With unemployment still over 7% (as of the first half of 2013), where are the job candidates?

That question leads us to the topic of this module—unemployment. What constitutes it? How is it measured? And if the economy is growing, why isn't the pool of job openings growing along with it? Sounds like the economy has a case of "missing" candidates.

Introduction to Unemployment

Unemployment can be a terrible and wrenching life experience—like a serious automobile accident or a messy divorce—whose consequences can be fully understood only by someone who has gone through it. For unemployed individuals and their families, there is the day-to-day financial stress of not knowing where the next paycheck is coming from. There are painful adjustments, like watching your savings account dwindle, selling a car and buying a cheaper one, or moving to a less expensive place to live. Even when the unemployed person finds a new job, it may pay less than the

previous one. For many people, their job is an important part of their self worth. When unemployment separates people from the workforce, it can affect family relationships as well as mental and physical health.

The human costs of unemployment alone would justify making a low level of unemployment an important public policy priority. But unemployment also includes economic costs to the broader society. When millions of unemployed but willing workers cannot find jobs, an economic resource is going unused. An economy with high unemployment is like a company operating with a functional but unused factory. The *opportunity cost* of unemployment is the output that could have been produced by the unemployed workers.

This module will discuss how the unemployment rate is defined and computed. It will examine the patterns of unemployment over time, for the U.S. economy as a whole, for different demographic groups in the U.S. economy, and for other countries. It will then consider an economic explanation for unemployment, and how it explains the patterns of unemployment and suggests public policies for reducing it.

Self Check: The Unemployment Rate

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the two Readings in this section.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

An interactive or media element has been excluded from this version of the text. You can view it online here: https://pressbooks.ccconline.org/accmacro/?p=292

146. Reading: Calculating Unemployment

Calculating Unemployment

Unemployment is typically described in newspaper or television reports as a percentage or a rate. A recent report might have said, for example, from January 2013 to December 2013, the U.S. unemployment rate dropped from 8.0% to 6.7%, and by the close of 2015, it had fallen to 5.0%. At a glance, the changes between the percentages may seem small. But remember that the U.S. economy has about 155 million adults who either have jobs or are looking for them. A rise or fall of just 0.1% in the unemployment rate of 155 million potential workers translates into 155,000 people, which is roughly the total population of a city like Syracuse, New York, Brownsville, Texas, or Pasadena, California. Large rises in the unemployment rate mean large numbers of job losses. The decrease in unemployment from 8% in 2013 to 6.7% meant an additional 2.02 million people were employed who had previously been looking for work.

Link It Up

The Bureau of Labor Statistics tracks and reports all data related to unemployment.

Who's In or Out of the Labor Force?

Should everyone without a job be counted as unemployed? Of course not. Children, for example, should not be counted as unemployed. Surely, the retired should not be counted as unemployed. Many full-time college students have only a part-time job, or no job at all, but it seems inappropriate to count them as suffering the pains of unemployment. Some people are not working because they are rearing children, ill, on vacation, or on parental leave.

The point is that the adult population is not just divided into employed and unemployed. A third group exists: people who do not have a job, and for some reason—retirement, looking after children, taking a voluntary break before a new job—are not interested in having a job, either. It also includes those who do want a job but have quit looking, often due to being discouraged by their inability to find suitable employment. Economists refer to this third group of those who are not working and not looking for work as **out of the labor force** or not in the labor force.

The U.S. unemployment rate, which is based on a monthly survey carried out by the U.S. Bureau of the Census, asks a series of questions to divide up the adult population into employed, unemployed, or not in the labor force. To be classified as unemployed, a person must be without a job, currently available to work, and actively looking for work in the previous four weeks. Thus, a person who does not have a job but who is not currently available to work or has not actively looked for work in the last four weeks is counted as out of the labor force.

- Employed: currently working for pay
- Unemployed: Out of work and actively looking for a job
- Out of the labor force: Out of paid work and not actively looking for a job
- Labor force: the number of employed plus the unemployed

Calculating the Unemployment Rate

Figure 7.2 shows the three-way division of the over-16 adult population. In 2012, 63.7% of the adult population was "in the labor force;" that is, either employed or without a job but looking for work. Those in the labor force can be divided into the employed and the unemployed. These values are also shown in Table 7.1. The *unemployment rate* is not the percentage of the total adult population without jobs, but rather the percentage of adults who are in the labor force but who do not have jobs:

[latex]\text{Unemployment rate}=\frac{\text{Unemployed people}}{\text{Total labor force}}\times{100}[/latex]

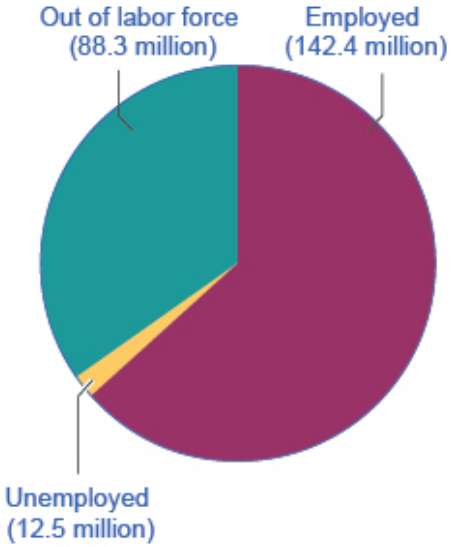

Figure 7.2. *Employed, Unemployed, and Out of the Labor Force Distribution of Adult Population (age 16 and older), 2012 The total adult, working-age population in 2012 was 243.2 million. Out of this total population, 142.4 million were classified as employed and 12.5 million were classified as unemployed. The remaining 88.3 million were classified as out of the labor force. As you will learn, however, this seemingly simple chart does not tell the whole story.*

Table 7.1. U.S. Employment and Unemployment, 2012	
Total adult population over the age of 16	243.2 million
In the labor force	154.9 million (63.7%)
Employed	142.4 million
Unemployed	12.5 million
Out of the labor force	88.3 million (36.3%)
Source: www.bls.gov	

In this example, the unemployment rate can be calculated as 12.5 million unemployed people divided by 155.0 million people in the labor force, which works out to an 8.1% rate of unemployment.

Calculating Labor Force Percentages

So how do economists arrive at the percentages in and out of the labor force and the unemployment rate? We will use the values in Table 7.1 to illustrate the steps. To determine the percentage in the labor force:

Step 1. Divide the number of people in the labor force (154.9 million) by the total adult (working-age) population (243.2 million).

Step 2. Multiply by 100 to obtain the percentage.

[latex]\begin{array}{l}\text{Percentage in the labor force}=\frac{154.9}{243.2}\\\text{Percentage in the labor force}=0.6369\\\text{Percentage in the labor force}=63.7\text{ percent}\end{array}[/latex]

To determine the percentage out of the labor force:

Step 1. Divide the number of people out the labor force (88.3 million) by the total adult (working-age) population (243.2 million).

Step 2. Multiply by 100 to obtain the percentage.

[latex]\begin{array}{l}\text{Percentage in the labor force}=\frac{88.3}{243.2}\\\text{Percentage in the labor

force}=0.3631\\\text{Percentage in the labor force}=36.3\text{
percent}\end{array}[/latex]

To determine the unemployment rate:

Step 1. Divide the number of unemployed people (12.5 million) by the total labor force (154.9 million).

Step 2. Multiply by 100 to obtain the rate.

[latex]\begin{array}{l}\text{Unemployment
rate}=\frac{12.5}{154.9}\\\text{Unemployment
rate}=0.0807\\\text{Unemployment rate}=8.1\text{
percent}\end{array}[/latex]

Hidden Unemployment

Even with the "out of the labor force" category, there are still some people that are mislabeled in the categorization of employed, unemployed, or out of the labor force. There are some people who have only part time or temporary jobs and who are looking for full time and permanent employment that are counted as employed, though they are not employed in the way they would like or need to be. Additionally, there are individuals who are *underemployed*. This includes those that are trained or skilled for one type or level of work who are working in a lower paying job or one that does not utilize their skills. For example, an individual with a college degree in finance who is working as a sales clerk would be considered underemployed. They are, however, also counted in the employed group. All of these individuals fall under the umbrella of the term "*hidden unemployment*." *Discouraged workers*, those who have stopped looking for employment and, hence, are no longer counted in the unemployed also fall into this group

Labor Force Participation Rate

Another important statistic is the *labor force participation rate*. This is the percentage of adults in an economy who are either employed or who are unemployed and looking for a job. So, using the data in Figure 7.2 and Table 7.1, those included in this calculation would be the 154.9 million individuals in the labor force. The rate is calculated by taking the number employed, divided by the total adult population and multiplying by 100 to get the percentage. For the data from 2012, the labor force participation rate is 63.7%. In the United States the labor force participation rate is usually around 67-68%.

The Establishment Payroll Survey

When the unemployment report comes out each month, the Bureau of Labor Statistics (BLS) also reports on the number of jobs created—which comes from the establishment payroll survey. The payroll survey is based on a survey of about 140,000 businesses and government agencies throughout the United States. It generates payroll employment estimates by the following criteria: all employees, average weekly hours worked, and average hourly, weekly, and overtime earnings. One of the criticisms of this survey is that it does not count the self-employed. It also does not make a distinction between new, minimum wage, part time or temporary jobs and full time jobs with "decent" pay.

How Is the U.S. Unemployment Data Collected?

The unemployment rate announced by the U.S. Bureau of Labor Statistics each month is based on the Current Population Survey

(CPS), which has been carried out every month since 1940. Great care is taken to make this survey representative of the country as a whole. The country is first divided into 3,137 areas. The U.S. Bureau of the Census then selects 729 of these areas to survey. The 729 areas are then divided into districts of about 300 households each, and each district is divided into clusters of about four dwelling units. Every month, Census Bureau employees call about 15,000 of the four-household clusters, for a total of 60,000 households. Households are interviewed for four consecutive months, then rotated out of the survey for eight months, and then interviewed again for the same four months the following year, before leaving the sample permanently.

Based on this survey, unemployment rates are calculated by state, industry, urban and rural areas, gender, age, race or ethnicity, and level of education. A wide variety of other information is available, too. For example, how long have people been unemployed? Did they become unemployed because they quit, or were laid off, or their employer went out of business? Is the unemployed person the only wage earner in the family? The Current Population Survey is a treasure trove of information about employment and unemployment.

What is the difference between CPS and EPS?

The Current Population Survey (CPS) conducted by the United States Census Bureau measures the percentage of the labor force that is unemployed. The establishment payroll survey (EPS) by the Bureau of Labor Statistics is a payroll survey that measures the net change in jobs created for the month.

147. Reading: Criticisms of Measuring Unemployment

Criticisms of Measuring Unemployment

There are always complications in measuring the number of unemployed. For example, what about people who do not have jobs and would be available to work, but have gotten discouraged at the lack of available jobs in their area and stopped looking? Such people, and their families, may be suffering the pains of unemployment. But the survey counts them as out of the labor force because they are not actively looking for work. Other people may tell the Census Bureau that they are ready to work and looking for a job but, truly, they are not that eager to work and are not looking very hard at all. They are counted as unemployed, although they might more accurately be classified as out of the labor force. Still other people may have a job, perhaps doing something like yard work, child care, or cleaning houses, but are not reporting the income earned to the tax authorities. They may report being unemployed, when they actually are working.

Although the unemployment rate gets most of the public and media attention, economic researchers at the Bureau of Labor Statistics publish a wide array of surveys and reports that try to measure these kinds of issues and to develop a more nuanced and complete view of the labor market. It is not exactly a hot news flash that economic statistics are imperfect. Even imperfect measures like the unemployment rate, however, can still be quite informative, when interpreted knowledgeably and sensibly.

LINK IT UP

Click here to learn more about the CPS to read frequently asked questions about employment and labor.

148. Reading: Difficulties Measuring Unemployment

Measuring Unemployment

The Bureau of Labor Statistics defines a person as unemployed if he or she is not working but is looking for and available for work. The labor force is the total number of people working or unemployed. The unemployment rate is the percentage of the labor force that is unemployed.

To estimate the unemployment rate, government surveyors fan out across the country each month to visit roughly 60,000 households. At each of these randomly selected households, the surveyor asks about the employment status of each adult (everyone age 16 or over) who lives there. Many households include more than one adult; the survey gathers information on about roughly 100,000 adults. The surveyor asks if each adult is working. If the answer is yes, the person is counted as employed. If the answer is no, the surveyor asks if that person has looked for work at some time during the previous four weeks and is available for work at the time of the survey. If the answer to that question is yes, the person is counted as unemployed. If the answer is no, that person is not counted as a member of the labor force. Figure 5.8 "Computing the Unemployment Rate" shows the survey's results for the civilian (nonmilitary) population for October 2008. The unemployment rate is then computed as the number of people unemployed divided by the labor force—the sum of the number of people not working but available and looking for work plus the number of people working. In October 2008, the unemployment rate was 6.5%.

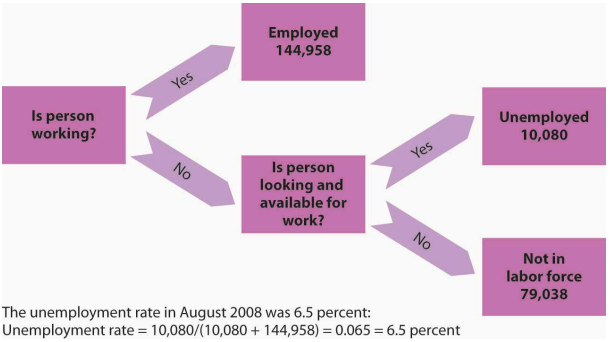

Figure 5.8 *Computing the Unemployment Rate. A monthly survey of households divides the civilian adult population into three groups. Those who have jobs are counted as employed; those who do not have jobs but are looking for them and are available for work are counted as unemployed; and those who are not working and are not looking for work are not counted as members of the labor force. The unemployment rate equals the number of people looking for work divided by the sum of the number of people looking for work and the number of people employed.*

Values are for October 2008. All numbers are in thousands.

There are several difficulties with the survey. The old survey, designed during the 1930s, put the "Are you working?" question differently depending on whether the respondent was a man or woman. A man was asked, "Last week, did you do any work for pay or profit?" A woman was asked, "What were you doing for work last week, keeping house or something else?" Consequently, many women who were looking for paid work stated that they were "keeping house"; those women were not counted as unemployed. The BLS did not get around to fixing the survey—asking women the same question it asked men—until 1994. The first time the new survey question was used, the unemployment rate among women rose by 0.5 percentage point. More than 50 million women are in the labor force; the change added more than a quarter of a million workers to the official count of the unemployed.[1]

The problem of understating unemployment among women has been fixed, but others remain. A worker who has been cut back to part-time work still counts as employed, even if that worker would prefer to work full time. A person who is out of work, would like to work, has looked for work in the past year, and is available for work, but who has given up looking, is considered a discouraged worker. Discouraged workers are not counted as unemployed, but a tally is kept each month of the number of discouraged workers.

The official measures of employment and unemployment can yield unexpected results. For example, when firms expand output, they may be reluctant to hire additional workers until they can be sure the demand for increased output will be sustained. They

1. For a description of the new survey and other changes introduced in the method of counting unemployment, see Janet L. Norwood and Judith M. Tanur, "Unemployment Measures for the Nineties," *Public Opinion Quarterly* 58, no. 2 (Summer 1994): 277–94.

may respond first by extending the hours of employees previously reduced to part-time work or by asking full-time personnel to work overtime. None of that will increase employment, because people are simply counted as "employed" if they are working, regardless of how much or how little they are working. In addition, an economic expansion may make discouraged workers more optimistic about job prospects, and they may resume their job searches. Engaging in a search makes them unemployed again—and increases unemployment. Thus, an economic expansion may have little effect initially on employment and may even increase unemployment.

Self Check: Critiquing the Unemployment Rate

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the two Readings in this section.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

An interactive or media element has been excluded from this version of the text. You can view it online here: https://pressbooks.ccconline.org/accmacro/?p=298

149. Outcome: Types of Unemployment

What you'll learn to do: identify and differentiate between the different types of unemployment

In this section, you will take a deep look into employment to analyze how employment is measured and what it means for an economy when there is a high unemployment rate.

LEARNING ACTIVITIES

The learning activities for this section include:

- Reading: Types of Employment
- Reading: Patterns of Unemployment
- Reading: Changes in Unemployment over the Short Run
- Reading: Changes in Unemployment over the Long Run
- Self Check: Types of Unemployment

Take time to review and reflect on each of these activities in order to improve your performance on the assessment for this section.

150. Reading: Types of Unemployment

Types of Unemployment

Workers may find themselves unemployed for different reasons. Each source of unemployment has quite different implications, not only for the workers it affects but also for public policy.

Figure 5.9 "The Natural Level of Employment" applies the demand and supply model to the labor market. The price of labor is taken as the real wage, which is the nominal wage divided by the price level; the symbol used to represent the real wage is the Greek letter omega, ω. The supply curve is drawn as upward sloping, though steep, to reflect studies showing that the quantity of labor supplied at any one time is nearly fixed. Thus, an increase in the real wage induces a relatively small increase in the quantity of labor supplied. The demand curve shows the quantity of labor demanded at each real wage. The lower the real wage, the greater the quantity of labor firms will demand. In the case shown here, the real wage, ω_e, equals the equilibrium solution defined by the intersection of the demand curve D_1 and the supply curve S_1. The quantity of labor demanded, L_e, equals the quantity supplied. The employment level at which the quantity of labor demanded equals the quantity supplied is called the natural level of employment. It is sometimes referred to as full employment.

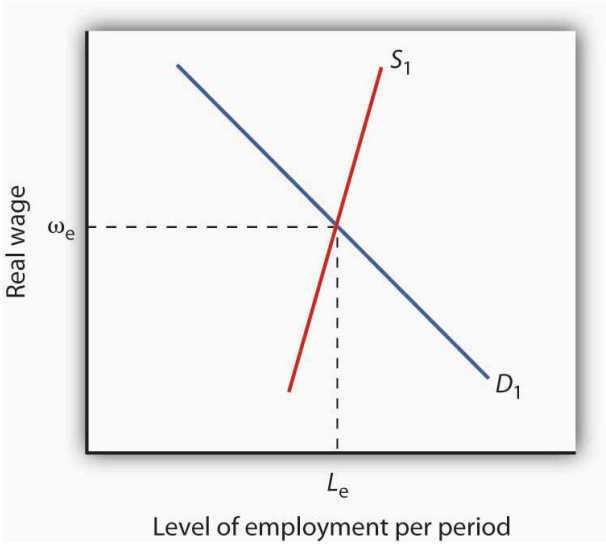

Figure 5.9 *The Natural Level of Employment. The employment level at which the quantity of labor demanded equals the quantity supplied is called the natural level of employment. Here, the natural level of employment is Le, which is achieved at a real wage ωe.*

Even if the economy is operating at its natural level of employment, there will still be some unemployment. The rate of unemployment consistent with the natural level of employment is called the natural rate of unemployment. Business cycles may generate additional unemployment. We discuss these various sources of unemployment below.

Frictional Unemployment

Even when the quantity of labor demanded equals the quantity of

labor supplied, not all employers and potential workers have found each other. Some workers are looking for jobs, and some employers are looking for workers. During the time it takes to match them up, the workers are unemployed. Unemployment that occurs because it takes time for employers and workers to find each other is called frictional unemployment.

The case of college graduates engaged in job searches is a good example of frictional unemployment. Those who did not land a job while still in school will seek work. Most of them will find jobs, but it will take time. During that time, these new graduates will be unemployed. If information about the labor market were costless, firms and potential workers would instantly know everything they needed to know about each other and there would be no need for searches on the part of workers and firms. There would be no frictional unemployment. But information is costly. Job searches are needed to produce this information, and frictional unemployment exists while the searches continue.

The government may attempt to reduce frictional unemployment by focusing on its source: information costs. Many state agencies, for example, serve as clearinghouses for job market information. They encourage firms seeking workers and workers seeking jobs to register with them. To the extent that such efforts make labor-market information more readily available, they reduce frictional unemployment.

Structural Unemployment

Another reason there can be unemployment even if employment equals its natural level stems from potential mismatches between the skills employers seek and the skills potential workers offer. Every worker is different; every job has its special characteristics and requirements. The qualifications of job seekers may not match those that firms require. Even if the number of employees firms

demand equals the number of workers available, people whose qualifications do not satisfy what firms are seeking will find themselves without work. Unemployment that results from a mismatch between worker qualifications and the characteristics employers require is called structural unemployment.

Structural unemployment emerges for several reasons. Technological change may make some skills obsolete or require new ones. The widespread introduction of personal computers since the 1980s, for example, has lowered demand for typists who lacked computer skills.

Structural unemployment can occur if too many or too few workers seek training or education that matches job requirements. Students cannot predict precisely how many jobs there will be in a particular category when they graduate, and they are not likely to know how many of their fellow students are training for these jobs. Structural unemployment can easily occur if students guess wrong about how many workers will be needed or how many will be supplied.

Structural unemployment can also result from geographical mismatches. Economic activity may be booming in one region and slumping in another. It will take time for unemployed workers to relocate and find new jobs. And poor or costly transportation may block some urban residents from obtaining jobs only a few miles away.

Public policy responses to structural unemployment generally focus on job training and education to equip workers with the skills firms demand. The government publishes regional labor-market information, helping to inform unemployed workers of where jobs can be found. The North American Free Trade Agreement (NAFTA), which created a free trade region encompassing Mexico, the United States, and Canada, has created some structural unemployment in the three countries. In the United States, the legislation authorizing the pact also provided for job training programs for displaced U.S. workers.

Although government programs may reduce frictional and

structural unemployment, they cannot eliminate it. Information in the labor market will always have a cost, and that cost creates frictional unemployment. An economy with changing demands for goods and services, changing technology, and changing production costs will always have some sectors expanding and others contracting—structural unemployment is inevitable. An economy at its natural level of employment will therefore have frictional and structural unemployment.

Cyclical Unemployment

Of course, the economy may not be operating at its natural level of employment, so unemployment may be above or below its natural level. In a later chapter we will explore what happens when the economy generates employment greater or less than the natural level. Cyclical unemployment is unemployment in excess of the unemployment that exists at the natural level of employment.

Figure 5.10 "Unemployment Rate, 1960–2008" shows the unemployment rate in the United States for the period from 1960 through October 2008. We see that it has fluctuated considerably. How much of it corresponds to the natural rate of unemployment varies over time with changing circumstances. For example, in a country with a demographic "bulge" of new entrants into the labor force, frictional unemployment is likely to be high, because it takes the new entrants some time to find their first jobs. This factor alone would raise the natural rate of unemployment. A demographic shift toward more mature workers would lower the natural rate. During recessions, highlighted in Figure 5.10 "Unemployment Rate, 1960–2008," the part of unemployment that is cyclical unemployment grows. The analysis of fluctuations in the unemployment rate, and the government's responses to them, are an important macroeconomic topic that will recur throughout this course.

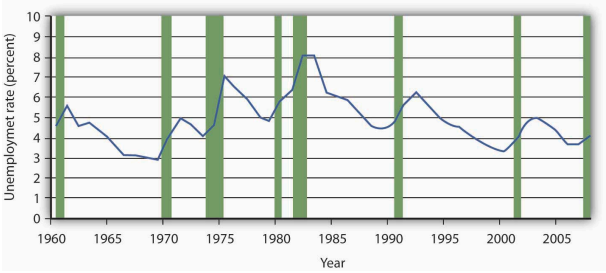

Figure 5.10 *Unemployment Rate, 1960–2008. The chart shows the unemployment rate for each year from 1960 to 2008. Recessions are shown as shaded areas. Source: Economic Report of the President, 2008, Table B-42. Date for 2008 is average of first ten months from the Bureau of Labor Statistics home page.*

KEY TAKEAWAYS

- People who are not working but are looking and available for work at any one time are considered unemployed. The unemployment rate is the percentage of the labor force that is unemployed.
- When the labor market is in equilibrium, employment is at the natural level and the unemployment rate equals the natural rate of unemployment.
- Even if employment is at the natural level, the economy will experience frictional and structural unemployment. Cyclical

unemployment is unemployment in excess of that associated with the natural level of employment.

151. Reading: Patterns of Unemployment

The Historical U.S. Unemployment Rate

Let's look at how unemployment rates have changed over time and how various groups of people are affected by unemployment differently. Figure 7.3 shows the historical pattern of U.S. unemployment since 1948.

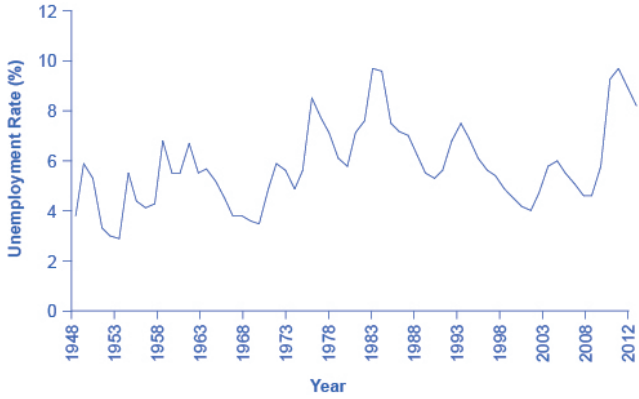

Figure 7.3. *The U.S. Unemployment Rate, 1948–2012 The U.S. unemployment rate moves up and down as the economy moves in and out of recessions. But over time, the unemployment rate seems to return to a range of 4% to 6%. There does not seem to be a long-term trend toward the rate moving generally higher or generally lower. (Source: www.census.gov/cps).*

As we look at this data, several patterns stand out:

1. Unemployment rates do fluctuate over time. During the deep recessions of the early 1980s and of 2007–2009, unemployment

reached roughly 10%. For comparison, during the Great Depression of the 1930s, the unemployment rate reached almost 25% of the labor force.

2. Unemployment rates in the late 1990s and into the mid-2000s were rather low by historical standards. The unemployment rate was below 5% from 1997 to 2000 and near 5% during almost all of 2006–2007. The previous time unemployment had been less than 5% for three consecutive years was three decades earlier, from 1968 to 1970.
3. The unemployment rate never falls all the way to zero. Indeed, it never seems to get below 3%—and it stays that low only for very short periods. (Reasons why this is the case are discussed later in this chapter.)
4. The timing of rises and falls in unemployment matches fairly well with the timing of upswings and downswings in the overall economy. During periods of *recession* and *depression*, unemployment is high. During periods of economic growth, unemployment tends to be lower.
5. No significant upward or downward trend in unemployment rates is apparent. This point is especially worth noting because the U.S. population nearly quadrupled from 76 million in 1900 to over 314 million by 2012. Moreover, a higher proportion of U.S. adults are now in the paid workforce, because women have entered the paid labor force in significant numbers in recent decades. Women composed 18% of the paid workforce in 1900 and nearly half of the paid workforce in 2012. But despite the increased number of workers, as well as other economic events like globalization and the continuous invention of new technologies, the economy has provided jobs without causing any long-term upward or downward trend in unemployment rates.

Unemployment Rates by Group

Unemployment is not distributed evenly across the U.S. population. Figure 7.4 shows unemployment rates broken down in various ways: by gender, age, and race/ethnicity.

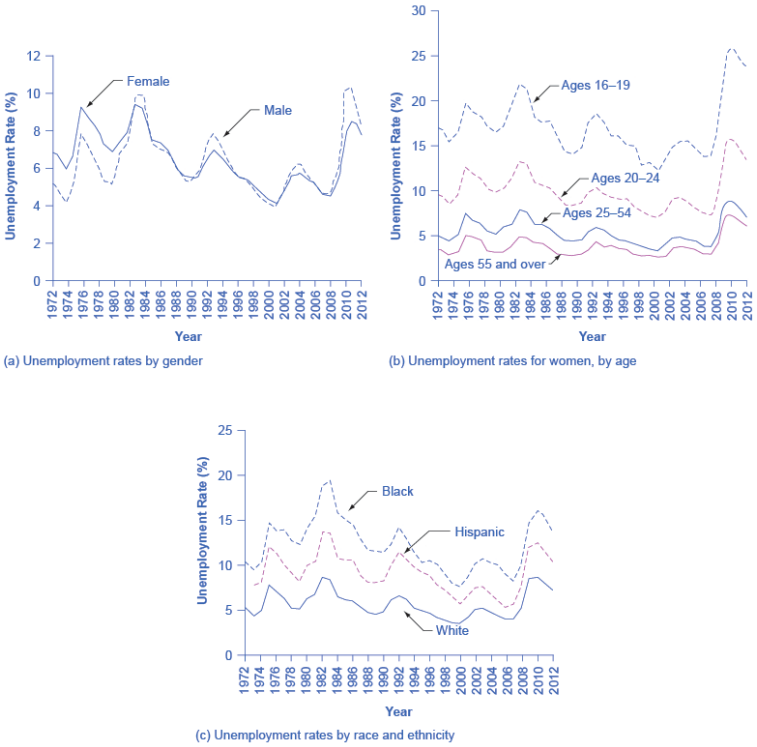

Figure 7.4. *Unemployment Rate by Demographic Group (a) By gender, 1972–2012. Unemployment rates for men used to be lower than unemployment rates for women, but in recent decades, the two rates have been very close, often with the unemployment rate for men somewhat higher. (b) By age, 1972–2012. Unemployment rates are highest for the very young and become lower with age. (c) By race and ethnicity, 1972–2012. Although unemployment rates for all groups tend to rise and fall together, the unemployment rate for whites has been lower than the unemployment rate for blacks and Hispanics in recent decades. (Source: www.census.gov/bls).*

The unemployment rate for women had historically tended to be higher than the unemployment rate for men, perhaps reflecting the historical pattern that women were seen as "secondary" earners. By about 1980, however, the unemployment rate for women was essentially the same as that for men, as shown in Figure 7.4 (a). During the recession of 2008–2009, however, the unemployment rate climbed higher for men than for women.

LINK IT UP

Read this report for detailed information on the recession of 2008–2009. It also provides some very useful information on the statistics of unemployment.

Younger workers tend to have higher unemployment, while middle-aged workers tend to have lower unemployment, probably because the middle-aged workers feel the responsibility of needing to have a job more heavily. Younger workers move in and out of jobs (and in and out of the labor force) more easily. Elderly workers have extremely low rates of unemployment, because those who do not have jobs often exit the labor force by retiring, and thus are not counted in the unemployment statistics. Figure 7.4 (b) shows unemployment rates for women divided by age; the pattern for men is similar.

The unemployment rate for African-Americans is substantially higher than the rate for other racial or ethnic groups, a fact that surely reflects, to some extent, a pattern of discrimination that has constrained blacks' labor market opportunities. However, the gaps between unemployment rates for whites and for blacks and Hispanics diminished in the 1990s, as shown in Figure 7.4 (c). In fact, unemployment rates for blacks and Hispanics were at the lowest levels for several decades in the mid-2000s before rising during the recent Great Recession.

Finally, those with less education typically suffer higher unemployment. In early 2013, for example, the unemployment rate for those with a college degree was 3.7%; for those with some college but not a four-year degree, the unemployment rate was 6.0%; for high school graduates with no additional degree, the unemployment rate was 7.6%; and for those without a high school diploma, the unemployment rate was 10.3%. This pattern may arise because additional education offers better connections to the labor market and higher demand, or it may occur because the labor market opportunities for low-skilled workers are less attractive than the opportunities for the more highly-skilled. Because of lower pay, low-skilled workers may be less motivated to find jobs.

Breaking Down Unemployment in Other Ways

The Bureau of Labor Statistics also gives information about the reasons for being unemployed as well as the length of time individuals have been unemployed. Table 7.2, for example, shows the four reasons for being unemployed and the percentages of the currently unemployed that fall into each category. Table 7.3 shows the length of unemployment. For both of these, the data is from May of 2013. (bls.gov)

Table 7.2. Reasons for Being Unemployed, May 2013

Reason	**Percentage**
New Entrants	10.8%
Re-entrants	28.5%
Job Leavers	8.1%
Job Losers: Temporary	8.5%
Job Losers: Non Temporary	44.1%

Table 7.3. Length of Unemployment, May 2013	
Length of Time	**Percentage**
Under 5 weeks	23.2%
5 to 14 weeks	22.8%
15 to 26 weeks	16.7%
Over 27 weeks	37.3%

LINK IT UP

Watch this speech on the impact of droids on the labor market.

International Unemployment Comparisons

From an international perspective, the U.S. unemployment rate typically has looked a little better than average. Table 7.4 compares unemployment rates for 1991, 1996, 2001, 2006 (just before the recession), and 2011 (somewhat after the recession) from several other high-income countries.

Table 7.4. International Comparisons of Unemployment Rates					
Country	**1991**	**1996**	**2001**	**2006**	**2012**
United States	6.8%	5.4%	4.8%	4.4%	8.1%
Canada	9.8%	8.8%	6.4%	6.2%	6.3%
Japan	2.1%	3.4%	5.1%	4.5%	3.9%
France	9.5%	12.5%	8.7%	10.1%	10.0%
Germany	5.6%	9.0%	8.9%	9.8%	5.5%
Italy	6.9%	11.7%	9.6%	7.8%	10.8%
Sweden	3.1%	9.9%	5.0%	5.2%	7.9%
United Kingdom	8.8%	8.1%	5.1%	5.5%	8.0%

However, cross-country comparisons of unemployment rates need to be treated with care, because each country has slightly different survey tools for measuring unemployment and also different labor markets. For example, Japan's unemployment rates appear quite low, but Japan's economy has been mired in slow growth and recession since the late 1980s, and Japan's unemployment rate probably paints too rosy a picture of its labor market. In Japan, workers who lose their jobs are often quick to exit the labor force and not look for a new job, in which case they are not counted as unemployed. In addition, Japanese firms are often quite reluctant to fire workers, and so firms have substantial numbers of workers who are on reduced hours or officially employed, but doing very little. This Japanese pattern is perhaps best viewed as an unusual method for society to provide support for the unemployed, rather than a sign of a healthy economy.

LINK IT UP

We hear about the Chinese economy in the news all the time. The value of the Chinese yuan in comparison to the U.S. dollar is likely to be part of the nightly business report. So why is the Chinese economy not included in this discussion of international unemployment? The lack of reliable statistics is probably the reason. This article explains why.

Comparing unemployment rates in the United States and other high-income economies with unemployment rates in Latin America, Africa, Eastern Europe, and Asia is very difficult. One reason is that the statistical agencies in many poorer countries lack the resources and technical capabilities of the U.S. Bureau of the Census. But a more difficult problem with international comparisons is that in many *low-income countries*, most workers are not involved in the labor market through an employer who pays them regularly.

Instead, workers in these countries are engaged in short-term work, subsistence activities, and barter. Moreover, the effect of unemployment is very different in high-income and low-income countries. Unemployed workers in the developed economies have access to various government programs like unemployment insurance, welfare, and food stamps; such programs may barely exist in poorer countries. Although unemployment is a serious problem in many low-income countries, it manifests itself in a different way than in high-income countries.

152. Reading: Changes in Unemployment over the Short Run

Cyclical Unemployment

We have seen that unemployment varies across times and places. What causes changes in unemployment? There are different answers in the short run and in the long run. Let's look at the short run first.

Let's make the plausible assumption that in the short run, from a few months to a few years, the quantity of hours that the average person is willing to work for a given wage does not change much, so the labor supply curve does not shift much. In addition, make the standard *ceteris paribus* assumption that there is no substantial short-term change in the age structure of the labor force, institutions and laws affecting the labor market, or other possibly relevant factors.

One primary determinant of the demand for labor from firms is how they perceive the state of the *macro economy*. If firms believe that business is expanding, then at any given wage they will desire to hire a greater quantity of labor, and the labor demand curve shifts to the right. Conversely, if firms perceive that the economy is slowing down or entering a recession, then they will wish to hire a lower quantity of labor at any given wage, and the labor demand curve will shift to the left. The variation in unemployment caused by the economy moving from expansion to recession or from recession to expansion (i.e. the business cycle) is known as *cyclical unemployment*.

From the standpoint of the supply-and-demand model of competitive and flexible labor markets, unemployment represents something of a puzzle. In a supply-and-demand model of a labor market, as illustrated in Figure 7.5, the *labor market* should move toward an equilibrium wage and quantity. At the equilibrium wage (We), the equilibrium quantity (Qe) of labor supplied by workers should be equal to the quantity of labor demanded by employers.

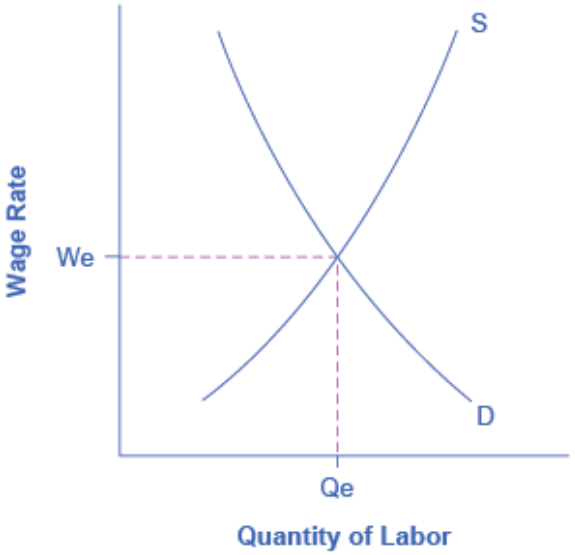

Figure 7.5. *The Unemployment and Equilibrium in the Labor Market In a labor market with flexible wages, the equilibrium will occur at wage We and quantity Qe, where the number of people looking for jobs (shown by S) equals the number of jobs available (shown by D).*

One possibility for unemployment is that people who are unemployed are those who are not willing to work at the current equilibrium wage, say $10 an hour, but would be willing to work at a higher wage, like $20 per hour. The monthly Current Population Survey would count these people as unemployed, because they say

they are ready and looking for work (at $20 per hour). But from an economist's point of view, these people are choosing to be unemployed. Probably a few people are unemployed because of unrealistic expectations about wages, but they do not represent the majority of the unemployed. Instead, unemployed people often have friends or acquaintances of similar skill levels who are employed, and the unemployed would be willing to work at the jobs and wages similar to what is being received by those people. But the employers of their friends and acquaintances do not seem to be hiring. In other words, these people are involuntarily unemployed. What causes *involuntary unemployment*?

Why Wages Might Be Sticky Downward

If a labor market model with flexible wages does not describe unemployment very well—because it predicts that anyone willing to work at the going wage can always find a job—then it may prove useful to consider economic models in which wages are not flexible or adjust only very slowly. In particular, even though wage increases may occur with relative ease, wage decreases are few and far between.

One set of reasons why wages may be "sticky downward," as economists put it, involves economic laws and institutions. For low-skilled workers being paid the ***minimum wage***, it is illegal to reduce their wages. For union workers operating under a multiyear contract with a company, wage cuts might violate the contract and create a labor dispute or a strike. However, minimum wages and union contracts are not a sufficient reason why wages would be sticky downward for the U.S. economy as a whole. After all, out of the 150 million or so workers in the U.S. economy, only about 1.4 million—less than 2% of the total—are paid the minimum wage. Similarly, only about 12% of American wage and salary workers are represented by a labor union. In other high-income countries, more

workers may have their wages determined by unions or the minimum wage may be set at a level that applies to a larger share of workers. But for the United States, these two factors combined affect only about one-fifth or less of the labor force.

Economists looking for reasons why wages might be ***sticky*** downwards have focused on factors that may characterize most labor relationships in the economy, not just a few. A number of different theories have been proposed, but they share a common tone.

One argument is that even employees who are not union members often work under an ***implicit contract***, which is that the employer will try to keep wages from falling when the economy is weak or the business is having trouble, and the employee will not expect huge salary increases when the economy or the business is strong. This wage-setting behavior acts like a form of insurance: the employee has some protection against wage declines in bad times, but pays for that protection with lower wages in good times. Clearly, this sort of implicit contract means that firms will be hesitant to cut wages, lest workers feel betrayed and work less hard or even leave the firm.

Efficiency wage theory argues that the productivity of workers depends on their pay, and so employers will often find it worthwhile to pay their employees somewhat more than market conditions might dictate. One reason is that employees who are paid better than others will be more productive because they recognize that if they were to lose their current jobs, they would suffer a decline in salary. As a result, they are motivated to work harder and to stay with the current employer. In addition, employers know that it is costly and time-consuming to hire and train new employees, so they would prefer to pay workers a little extra now rather than to lose them and have to hire and train new workers. Thus, by avoiding wage cuts, the employer minimizes costs of training and hiring new workers, and reaps the benefits of well-motivated employees.

The ***adverse selection of wage cuts argument*** points out that if an employer reacts to poor business conditions by reducing wages for

all workers, then the best workers, those with the best employment alternatives at other firms, are the most likely to leave. The least attractive workers, with fewer employment alternatives, are more likely to stay. Consequently, firms are more likely to choose which workers should depart, through layoffs and firings, rather than trimming wages across the board. Sometimes companies that are going through tough times can persuade workers to take a pay cut for the short term, and still retain most of the firm's workers. But these stories are notable because they are so uncommon. It is far more typical for companies to lay off some workers, rather than to cut wages for everyone.

The ***insider-outsider model*** of the labor force, in simple terms, argues that those already working for firms are "insiders," while new employees, at least for a time, are "outsiders." A firm depends on its insiders to grease the wheels of the organization, to be familiar with routine procedures, to train new employees, and so on. However, cutting wages will alienate the insiders and damage the firm's productivity and prospects.

Finally, the ***relative wage coordination argument*** points out that even if most workers were hypothetically willing to see a decline in their own wages in bad economic times as long as everyone else also experiences such a decline, there is no obvious way for a decentralized economy to implement such a plan. Instead, workers confronted with the possibility of a wage cut will worry that other workers will not have such a wage cut, and so a wage cut means being worse off both in absolute terms and relative to others. As a result, workers fight hard against wage cuts.

These theories of why wages tend not to move downward differ in their logic and their implications, and figuring out the strengths and weaknesses of each theory is an ongoing subject of research and controversy among economists. All tend to imply that wages will decline only very slowly, if at all, even when the economy or a business is having tough times. When wages are inflexible and unlikely to fall, then either short-run or long-run unemployment can result. This can be seen in Figure 7.6.

Figure 7.6. *Sticky Wages in the Labor Market Because the wage rate is stuck at W, above the equilibrium, the number of job seekers (Qs) is greater than the number of job openings (Qd). The result is unemployment, shown by the bracket in the figure.*

The interaction between shifts in labor demand and wages that are sticky downward are shown in Figure 7.7. Figure 7.7 (a) illustrates the situation in which the demand for labor shifts to the right from D_0 to D_1. In this case, the equilibrium wage rises from W_0 to W_1 and the equilibrium quantity of labor hired increases from Q_0 to Q_1. It does not hurt employee morale at all for wages to rise.

Figure 7.7 (b) shows the situation in which the demand for labor shifts to the left, from D_0 to D_1, as it would tend to do in a recession. Because wages are sticky downward, they do not adjust toward what would have been the new equilibrium wage (Q_1), at least not in the short run. Instead, after the shift in the labor demand curve, the same quantity of workers is willing to work at that wage as

before; however, the quantity of workers demanded at that wage has declined from the original equilibrium (Q_0) to Q_2. The gap between the original equilibrium quantity (Q_0) and the new quantity demanded of labor (Q_2) represents workers who would be willing to work at the going wage but cannot find jobs. The gap represents the economic meaning of unemployment.

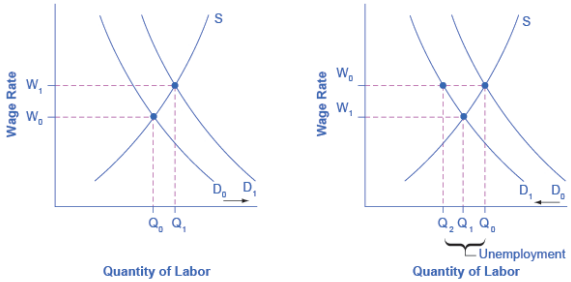

Figure 7.7. *Rising Wage and Low Unemployment: Where Is the Unemployment in Supply and Demand? (a) In a labor market where wages are able to rise, an increase in the demand for labor from D0 to D1leads to an increase in equilibrium quantity of labor hired from Q0 to Q1 and a rise in the equilibrium wage from W0 to W1. (b) In a labor market where wages do not decline, a fall in the demand for labor from D0 to D1 leads to a decline in the quantity of labor demanded at the original wage (W0) from Q0to Q2. These workers will want to work at the prevailing wage (W0), but will not be able to find jobs.*

This analysis helps to explain the connection noted earlier: that unemployment tends to rise in recessions and to decline during expansions. The overall state of the economy shifts the labor demand curve and, combined with wages that are sticky downwards, unemployment changes. The rise in unemployment that occurs because of a recession is cyclical unemployment.

LINK IT UP

The St. Louis Federal Reserve Bank is the best resource for macroeconomic time series data, known as the Federal Reserve Economic Data (FRED). FRED provides complete data sets on various measures of the unemployment rate as well as the monthly Bureau of Labor Statistics report on the results of the household and employment surveys.

153. Reading: Changes in Unemployment over the Long Run

Changes in Unemployment over the Long Run

Cyclical unemployment explains why unemployment rises during a recession and falls during an economic expansion. But what explains the remaining level of unemployment even in good economic times? Why is the unemployment rate never zero? Even when the U.S. economy is growing strongly, the unemployment rate only rarely dips as low as 4% (although it hovers around 5% in 2015). Moreover, the discussion earlier in this module pointed out that unemployment rates in many European countries like Italy, France, and Germany have often been remarkably high at various times in the last few decades. Why does some level of unemployment persist even when economies are growing strongly? Why are unemployment rates continually higher in certain economies, through good economic years and bad? Economists have a term to describe the remaining level of unemployment that occurs even when the economy is healthy: it is called the *natural rate of unemployment*.

The Long Run: The Natural Rate of Unemployment

The natural rate of unemployment is not "natural" in the sense that water freezes at 32 degrees Fahrenheit or boils at 212 degrees

Fahrenheit. It is not a physical and unchanging law of nature. Instead, it is only the "natural" rate because it is the unemployment rate that would result from the combination of economic, social, and political factors that exist at a time—assuming the economy was neither booming nor in recession. These forces include the usual pattern of companies expanding and contracting their workforces in a dynamic economy, social and economic forces that affect the labor market, or public policies that affect either the eagerness of people to work or the willingness of businesses to hire. Let's discuss these factors in more detail.

Frictional Unemployment

In a *market economy*, some companies are always going broke for a variety of reasons: old technology; poor management; good management that happened to make bad decisions; shifts in tastes of consumers so that less of the firm's product is desired; a large customer who went broke; or tough domestic or foreign competitors. Conversely, other companies will be doing very well for just the opposite reasons and looking to hire more employees. In a perfect world, all of those who lost jobs would immediately find new ones. But in the real world, even if the number of job seekers is equal to the number of job vacancies, it takes time to find out about new jobs, to interview and figure out if the new job is a good match, or perhaps to sell a house and buy another in proximity to a new job. The unemployment that occurs in the meantime, as workers move between jobs, is called *frictional unemployment*. Frictional unemployment is not inherently a bad thing. It takes time on part of both the employer and the individual to match those looking for employment with the correct job openings. For individuals and companies to be successful and productive, you want people to find the job for which they are best suited, not just the first job offered.

In the mid-2000s, before the recession of 2008–2009, it was true that about 7% of U.S. workers saw their jobs disappear in any three-month period. But in periods of economic growth, these destroyed jobs are counterbalanced for the economy as a whole by a larger number of jobs created. In 2005, for example, there were typically about 7.5 million unemployed people at any given time in the U.S. economy. Even though about two-thirds of those unemployed people found a job in 14 weeks or fewer, the unemployment rate did not change much during the year, because those who found new jobs were largely offset by others who lost jobs.

Of course, it would be preferable if people who were losing jobs could immediately and easily move into the new jobs being created, but in the real world, that is not possible. Someone who is laid off by a textile mill in South Carolina cannot turn around and immediately start working for a textile mill in California. Instead, the adjustment process happens in ripples. Some people find new jobs near their old ones, while others find that they must move to new locations. Some people can do a very similar job with a different company, while others must start new career paths. Some people may be near retirement and decide to look only for part-time work, while others want an employer that offers a long-term career path. The frictional unemployment that results from people moving between jobs in a dynamic economy may account for one to two percentage points of total unemployment.

The level of frictional unemployment will depend on how easy it is for workers to learn about alternative jobs, which may reflect the ease of communications about job prospects in the economy. The extent of frictional unemployment will also depend to some extent on how willing people are to move to new areas to find jobs—which in turn may depend on history and culture.

Frictional unemployment and the natural rate of unemployment also seem to depend on the age distribution of the population. Figure 7.4 (b) showed that unemployment rates are typically lower for people between 25–54 years of age than they are for those who are either younger or older. “Prime-age workers,” as those in the

25–54 age bracket are sometimes called, are typically at a place in their lives when they want to have a job and income arriving at all times. But some proportion of those who are under 30 may still be trying out jobs and life options and some proportion of those over 55 are eyeing retirement. In both cases, the relatively young or old tend to worry less about unemployment than those in-between, and their periods of frictional unemployment may be longer as a result. Thus, a society with a relatively high proportion of relatively young or old workers will tend to have a higher unemployment rate than a society with a higher proportion of its workers in middle age.

Structural Unemployment

Another factor that influences the natural rate of unemployment is the amount of *structural unemployment*. The structurally unemployed are individuals who have no jobs because they lack skills valued by the labor market, either because demand has shifted away from the skills they do have, or because they never learned any skills. An example of the former would be the unemployment among aerospace engineers after the U.S. space program downsized in the 1970s. An example of the latter would be high school dropouts.

Some people worry that technology causes structural unemployment. In the past, new technologies have put lower skilled employees out of work, but at the same time they create demand for higher skilled workers to use the new technologies. Education seems to be the key in minimizing the amount of structural unemployment. Individuals who have degrees can be retrained if they become structurally unemployed. For people with no skills and little education, that option is more limited.

Natural Unemployment and Potential Real GDP

The natural unemployment rate is related to two other important concepts: full employment and potential real GDP. The economy is considered to be at full employment when the actual unemployment rate is equal to the natural unemployment. When the economy is at full employment, real GPD is equal to potential real GDP. By contrast, when the economy is below full employment, the unemployment rate is greater than the natural unemployment rate and real GDP is less than potential. Finally, when the economy above full employment, then the unemployment rate is less than the natural unemployment rate and real GDP is greater than potential. Operating above potential is only possible for a short while, since it is analogous to all workers working overtime.

Productivity Shifts and the Natural Rate of Unemployment

Unexpected shifts in productivity can have a powerful effect on the natural rate of unemployment. Over time, the level of wages in an economy will be determined by the productivity of workers. After all, if a business paid workers more than could be justified by their productivity, the business will ultimately lose money and go bankrupt. Conversely, if a business tries to pay workers less than their productivity then, in a competitive labor market, other businesses will find it worthwhile to hire away those workers and pay them more.

However, adjustments of wages to productivity levels will not happen quickly or smoothly. *Wages* are typically reviewed only once or twice a year. In many modern jobs, it is difficult to measure productivity at the individual level. For example, how precisely would one measure the quantity produced by an accountant who

is one of many people working in the tax department of a large corporation? Because productivity is difficult to observe, wage increases are often determined based on recent experience with productivity; if productivity has been rising at, say, 2% per year, then wages rise at that level as well. However, when productivity changes unexpectedly, it can affect the natural rate of unemployment for a time.

The U.S. economy in the 1970s and 1990s provides two vivid examples of this process. In the 1970s, productivity growth slowed down unexpectedly (as discussed in Economic Growth). For example, output per hour of U.S. workers in the business sector increased at an annual rate of 3.3% per year from 1960 to 1973, but only 0.8% from 1973 to 1982. Figure 7.8 (a) illustrates the situation where the demand for labor—that is, the quantity of labor that business is willing to hire at any given wage—has been shifting out a little each year because of rising productivity, from D_0 to D_1 to D_2. As a result, equilibrium wages have been rising each year from W_0 to W_1 to W_2. But when productivity unexpectedly slows down, the pattern of wage increases does not adjust right away. Wages keep rising each year from W_2 to W_3 to W_4. But the demand for labor is no longer shifting up. A gap opens where the quantity of labor supplied at wage level W_4 is greater than the quantity demanded. The natural rate of unemployment rises; indeed, in the aftermath of this unexpectedly low productivity in the 1970s, the national unemployment rate did not fall below 7% from May, 1980 until 1986. Over time, the rise in wages will adjust to match the slower gains in productivity, and the unemployment rate will ease back down. But this process may take years.

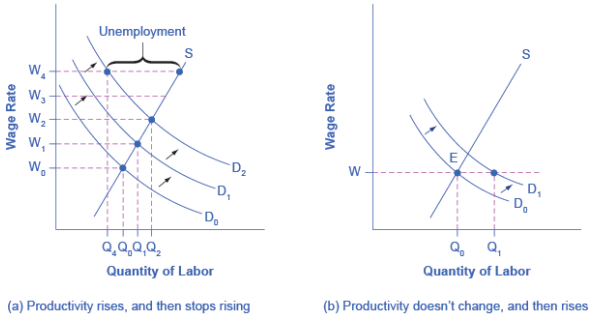

Figure 7.8. *Unexpected Productivity Changes and Unemployment (a) Productivity is rising, increasing the demand for labor. Employers and workers become used to the pattern of wage increases. Then productivity suddenly stops increasing. However, the expectations of employers and workers for wage increases do not shift immediately, so wages keep rising as before. But the demand for labor has not increased, so at wage W4, unemployment exists where the quantity supplied of labor exceeds the quantity demanded. (b) The rate of productivity increase has been zero for a time, so employers and workers have come to accept the equilibrium wage level (W). Then productivity increases unexpectedly, shifting demand for labor from D0 to D1. At the wage (W), this means that the quantity demanded of labor exceeds the quantity supplied, and with job offers plentiful, the unemployment rate will be low.*

The late 1990s provide an opposite example: instead of the surprise decline in productivity in the 1970s, productivity unexpectedly rose in the mid-1990s. The annual growth rate of real output per hour of labor increased from 1.7% from 1980–1995, to an annual rate of 2.6% from 1995–2001. Let's simplify the situation a bit, so that the economic lesson of the story is easier to see graphically, and say that productivity had not been increasing at all in earlier years, so the intersection of the labor market was at point E in Figure 7.8 (b), where the demand curve for labor (D_0) intersects the supply curve for labor. As a result, real wages were not increasing. Now, productivity jumps upward, which shifts the demand for labor out to the right, from D_0 to D_1. At least for a time, however, wages are still

being set according to the earlier expectations of no productivity growth, so wages do not rise. The result is that at the prevailing wage level (W), the quantity of labor demanded (Qd) will for a time exceed the quantity of labor supplied (Qs), and unemployment will be very low—actually below the natural level of unemployment for a time. This pattern of unexpectedly high productivity helps to explain why the unemployment rate stayed below 4.5%—quite a low level by historical standards—from 1998 until after the U.S. economy had entered a recession in 2001.

Average levels of unemployment will tend to be somewhat higher on average when productivity is unexpectedly low, and conversely, will tend to be somewhat lower on average when productivity is unexpectedly high. But over time, wages do eventually adjust to reflect productivity levels.

Public Policy and the Natural Rate of Unemployment

Public policy can also have a powerful effect on the natural rate of unemployment. On the supply side of the labor market, public policies to assist the unemployed can affect how eager people are to find work. For example, if a worker who loses a job is guaranteed a generous package of unemployment insurance, welfare benefits, food stamps, and government medical benefits, then the opportunity cost of being unemployed is lower and that worker will be less eager to seek a new job.

What seems to matter most is not just the amount of these benefits, but how long they last. A society that provides generous help for the unemployed that cuts off after, say, six months, may provide less of an incentive for unemployment than a society that provides less generous help that lasts for several years. Conversely, government assistance for job search or retraining can in some cases encourage people back to work sooner. Reference the

following section to learn how the U.S. handles unemployment insurance.

HOW DOES U.S. UNEMPLOYMENT INSURANCE WORK?

Unemployment insurance is a joint federal–state program, established by federal law in 1935. The federal government sets minimum standards for the program, but most of the administration is done by state governments. The funding for the program is a federal tax collected from employers. The federal government requires that the tax be collected on the first $7,000 in wages paid to each worker; however, states can choose to collect the tax on a higher amount if they wish, and 41 states have set a higher limit. States can choose the length of time that benefits will be paid, although most states limit unemployment benefits to 26 weeks—with extensions possible in times of especially high unemployment. The fund is then used to pay benefits to those who become unemployed. Average unemployment benefits are equal to about one-third of the wage earned by the person in his or her previous job, but the level of unemployment benefits varies considerably across states.

Bottom 10 States that pay the Lowest Benefit per Week		Top 10 States that pay the Highest Benefit per week	
Georgia	$330	Massachusetts	$653
South Carolina	$326	Washington	$604
Missouri	$320	New Jersey	$600
South Dakota	$295	Minnesota	$585
Florida	$275	Pennsylvania	$573
Tennessee	$275	Rhode Island	$566
Alabama	$265	Hawaii	$560
Louisiana	$258	Connecticut	$555
Arizona	$240	Ohio	$524
Mississippi	$235	Oregon	$507

Table 7.5. Average Weekly Unemployment Benefits by State in 2013(Source: jobsearch.about.com/od/unemployment/a/weekly-unemployment-benefits.htm)

One other interesting thing to note about the classifications of unemployment—an individual does not have to collect unemployment benefits to be classified as unemployed. While there are statistics kept and studied relating to how many people are collecting unemployment insurance, this is not the source of unemployment rate information.

LINK IT UP

View this article for an explanation of exactly who is eligible for unemployment benefits.

On the demand side of the labor market, government rules social institutions, and the presence of unions can affect the willingness of firms to hire. For example, if a government makes it hard for businesses to start up or to expand, by wrapping new businesses in bureaucratic red tape, then businesses will become more

discouraged about hiring. Government regulations can make it harder to start a business by requiring that a new business obtain many permits and pay many fees, or by restricting the types and quality of products that can be sold. Other government regulations, like zoning laws, may limit where business can be done, or whether businesses are allowed to be open during evenings or on Sunday.

Whatever defenses may be offered for such laws in terms of social value—like the value some Christians place on not working on Sunday—these kinds of restrictions impose a barrier between some willing workers and other willing employers, and thus contribute to a higher natural rate of unemployment. Similarly, if government makes it difficult to fire or lay off workers, businesses may react by trying not to hire more workers than strictly necessary—since laying these workers off would be costly and difficult. High minimum wages may discourage businesses from hiring low-skill workers. Government rules may encourage and support powerful unions, which can then push up wages for union workers, but at a cost of discouraging businesses from hiring those workers.

The Natural Rate of Unemployment in Recent Years

The underlying economic, social, and political factors that determine the natural rate of unemployment can change over time, which means that the natural rate of unemployment can change over time, too. Estimates by economists of the natural rate of unemployment in the U.S. economy in the early 2000s run at about 4.5% to 5.5%. This is a lower estimate than earlier. Three of the common reasons proposed by economists for this change are outlined below.

1. The Internet has provided a remarkable new tool through which job seekers can find out about jobs at different

companies and can make contact with relative ease. An Internet search is far easier than trying to find a list of local employers and then hunting up phone numbers for all of their human resources departments, requesting a list of jobs and application forms, and so on. Social networking sites such as LinkedIn have changed how people find work as well.

2. The growth of the temporary worker industry has probably helped to reduce the natural rate of unemployment. In the early 1980s, only about 0.5% of all workers held jobs through temp agencies; by the early 2000s, the figure had risen above 2%. Temp agencies can provide jobs for workers while they are looking for permanent work. They can also serve as a clearinghouse, helping workers find out about jobs with certain employers and getting a tryout with the employer. For many workers, a temp job is a stepping-stone to a permanent job that they might not have heard about or gotten any other way, so the growth of temp jobs will also tend to reduce frictional unemployment.
3. The aging of the "baby boom generation"—the especially large generation of Americans born between 1946 and 1963—meant that the proportion of young workers in the economy was relatively high in the 1970s, as the boomers entered the labor market, but is relatively low today. As noted earlier, middle-aged workers are far more likely to keep steady jobs than younger workers, a factor that tends to reduce the natural rate of unemployment.

The combined result of these factors is that the natural rate of unemployment was on average lower in the 1990s and the early 2000s than in the 1980s. The Great Recession of 2008–2009 pushed monthly unemployment rates above 10% in late 2009. But even at that time, the Congressional Budget Office was forecasting that by 2015, unemployment rates would fall back to about 5%.

The Natural Rate of Unemployment in Europe

By the standards of other high-income economies, the natural rate of unemployment in the U.S. economy appears relatively low. Through good economic years and bad, many European economies have had unemployment rates hovering near 10%, or even higher, since the 1970s. European rates of unemployment have been higher not because recessions in Europe have been deeper, but rather because the conditions underlying supply and demand for labor have been different in Europe, in a way that has created a much higher natural rate of unemployment.

Many European countries have a combination of generous welfare and unemployment benefits, together with nests of rules that impose additional costs on businesses when they hire. In addition, many countries have laws that require firms to give workers months of notice before laying them off and to provide substantial severance or retraining packages after laying them off. The legally required notice before laying off a worker can be more than three months in Spain, Germany, Denmark, and Belgium, and the legally required severance package can be as high as a year's salary or more in Austria, Spain, Portugal, Italy, and Greece. Such laws will surely discourage laying off or firing current workers. But when companies know that it will be difficult to fire or lay off workers, they also become hesitant about hiring in the first place.

The typically higher levels of unemployment in many European countries in recent years, which have prevailed even when economies are growing at a solid pace, are attributable to the fact that the sorts of laws and regulations that lead to a high natural rate of unemployment are much more prevalent in Europe than in the United States.

A Preview of Policies to Fight Unemployment

The Government Budgets and Fiscal Policy and Macroeconomic Policy Around the World chapters provide a detailed discussion of how to fight unemployment, when these policies can be discussed in the context of the full array of macroeconomic goals and frameworks for analysis. But even at this preliminary stage, it is useful to preview the main issues concerning policies to fight unemployment.

The remedy for unemployment will depend on the diagnosis. Cyclical unemployment is a short-term problem, caused because the economy is in a recession. Thus, the preferred solution will be to avoid or minimize recessions. As Government Budgets and Fiscal Policy discusses, this policy can be enacted by stimulating the overall buying power in the economy, so that firms perceive that sales and profits are possible, which makes them eager to hire.

Dealing with the natural rate of unemployment is trickier. There is not much to be done about the fact that in a market-oriented economy, firms will hire and fire workers. Nor is there much to be done about how the evolving age structure of the economy, or unexpected shifts in productivity, will affect the natural rate of unemployment for a time. However, as the example of high ongoing unemployment rates for many European countries illustrates, government policy clearly can affect the natural rate of unemployment that will persist even when GDP is growing.

When a government enacts policies that will affect workers or employers, it must examine how these policies will affect the information and incentives employees and employers have to seek each other out. For example, the government may have a role to play in helping some of the unemployed with job searches. The design of government programs that offer assistance to unemployed workers and protections to employed workers may need to be rethought so that they will not unduly discourage the supply of labor. Similarly, rules that make it difficult for businesses to begin or to expand

may need to be redesigned so that they will not unduly discourage the demand for labor. The message is not that all laws affecting labor markets should be repealed, but only that when such laws are enacted, a society that cares about unemployment will need to consider the tradeoffs involved.

THE MYSTERIOUS CASE OF THE MISSING CANDIDATES

After reading the chapter you might think the current unemployment conundrum may be due to structural unemployment. Indeed, there is a mismatch between the skills employers are seeking and the skills the unemployed possess. But Peter Cappelli has a slightly different view on this—it is called the purple squirrel. The what?

In human resource parlance, a purple squirrel is a job candidate who is a perfect fit for all of the many different responsibilities of a position. A purple squirrel candidate could step into a multi-faceted position with no training and permit the firm to higher fewer people because the worker is so versatile. During the Great Recession, Human Resources (HR) positions were reduced. This means today's hiring managers are drafting job descriptions and requirements without much, if any HR feedback. "It turns out it's typically the case that employers' requirements are crazy, they're not paying enough, or their applicant screening is so rigid that nobody gets through," Cappelli stated in a 2012 Knowledge@Wharton interview about the findings in his book, *Why Good People Can't Find Jobs: Chasing After the Purple Squirrel*. In short, managers are searching for "purple squirrels" when what they really need are just versatile workers. There really is not a shortage of "normal squirrels"—candidates who are versatile workers. The managers just cannot find them because their requirements, screening processes, and compensation will filter out all but the "purple" ones.

Self Check: Types of Unemployment

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the four Readings in this section.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

An interactive or media element has been excluded from this version of the text. You can view it online here: https://pressbooks.ccconline.org/accmacro/?p=308

154. Why It Matters: Inflation and Price Indexes

Why evaluate macro economic performance using indicators that include output measures, unemployment, and inflation?

When you go to a doctor's appointment, they check your weight, your heartbeat, and your blood pressure. They ask how you are feeling. They may also do other medical tests. What blood pressure is measuring, or what the laboratories look for in a urinalysis or blood test may not be intrinsically interesting (e.g. how is blood sugar measured?), but the results of the tests are anything but unimportant. Those results indicate how healthy or sick you are. They are necessary diagnostics for you and your doctor to determine what you need to do to improve your health, whether you are currently sick or you just want to improve the quality or length of your life.

That is a good metaphor for thinking about the present module. Up until this point, we've been studying introductory economics. This module is the first on macroeconomics per se. The module introduces the most important economic indicators for determining the state of a nation's macro economy. Are you planning to start a career or make a career change in the future? Are you interesting in purchasing a home, or selling one that you already own. How about buying a new car? What about saving for retirement? If so, what's the best place to put your savings? These are all questions that require some knowledge of how the economy is doing, now and in the future. This module will help you come up with better answers to those questions.

As you go through this module, here are a few questions to keep in mind:

- When have recessions occurred in your lifetime?
- When was the last time inflation was a significant problem for the U.S.?
- What is the average rate of unemployment during good times?
- Overall, how is the economy doing right now?

There is no doubt that this material contains some technical aspects. The idea is to give you enough technical detail to understand where the most important economic indicators come from and how they should be interpreted. Ultimately, you need to learn enough to be able to draw your own conclusions about the state of the economy from the statistics you hear about in the news.

This is completely doable, so let's get started.

LEARNING OUTCOMES

- Explain the concept of a price index and explain how price indices are derived.
- Define the rate of inflation; Explain how the rate of inflation is calculated
- Identify the consequences of price instability (i.e. inflation)
- Use a price index to translate between real and nominal data
- Define the GDP price index (also known as the GDP deflator or the Implicit Price Deflator)
- Differentiate between nominal GDP and real GDP

155. Outcome: Rate of Inflation

What you'll learn to do: define the rate of inflation; Explain how the rate of inflation is calculated

It is expected that the value of money will evolve over time, and even normal for an economy to experience inflation, but sometimes inflation gets out of control and leads to hyperinflation. Hyperinflation occurred in post-WWI Germany (then the Weimar Republic). Stories have it that the money became so worthless, even thieves would steal a basket but leave the hundreds of bills inside the basket untouched. In this section, you'll learn about why and how this happens.

LEARNING ACTIVITIES

The learning activities for this section include:

- Reading: Introduction to Inflation
- Reading: Computing the Rate of Inflation
- Self Check: Rate of Inflation

Take time to review and reflect on each of these activities in order to improve your performance on the assessment for this section.

156. Reading: Introduction to Inflation

Figure 8.1. *Big Bucks in Zimbabwe This bill was worth 100 billion Zimbabwean dollars when issued in 2008. There were even bills issued with a face value of 100 trillion Zimbabwean dollars. The bills had $100,000,000,000,000 written on them. Unfortunately, they were almost worthless. At one point, 621,984,228 Zimbabwean dollars were equal to one U.S. dollar. Eventually, the country abandoned its own currency and allowed foreign currency to be used for purchases. (Credit: modification of work by Samantha Marx/Flickr Creative Commons)*

A $550 MILLION LOAF OF BREAD?

If you were born within the last three decades in the United States, Canada, or many other countries in the developed world, you probably have no real experience with a high rate of inflation. Inflation is when most prices in an entire economy are rising. But there is an extreme form of inflation called hyperinflation. This occurred in Germany between 1921 and 1928, and more recently in Zimbabwe between 2008 and 2009. In November of 2008, Zimbabwe had an inflation rate of 79.6 billion percent. In contrast, in 2012, the United States had an average annual rate of inflation of 2.1%.

Zimbabwe's inflation rate was so high it is difficult to comprehend. So, let's put it into context. It is equivalent to price increases of 98% per day. This means that, from one day to the next, prices essentially double. What is life like in an economy afflicted with hyperinflation? Not like anything you are familiar with. Prices for commodities in Zimbabwean dollars were adjusted several times *each day*. There was no desire to hold on to currency since it lost value by the minute. The people there spent a great deal of time getting rid of any cash they acquired by purchasing whatever food or other commodities they could find. At one point, a loaf of bread cost 550 million Zimbabwean dollars. Teachers were paid in the trillions a month; however this was equivalent to only one U.S. dollar a day. At its height, it took 621,984,228 Zimbabwean dollars to purchase one U.S. dollar.

Government agencies had no money to pay their workers so they started printing money to pay their bills rather than raising taxes. Rising prices caused the government to enact price controls on private businesses, which led to shortages and the emergence of black markets. In 2009, the country abandoned its currency and allowed foreign currencies to be used for purchases.

How does this happen? How can both government and the economy fail to function at the most basic level? Before we consider these extreme cases of hyperinflation, let's first look at inflation itself.

Inflation

Inflation is a general and ongoing rise in the level of prices in an entire economy. Inflation does not refer to a change in relative prices. A relative price change occurs when you see that the price of tuition has risen, but the price of laptops has fallen. Inflation, on the other hand, means that there is pressure for prices to rise in most markets in the economy. In addition, price increases in the supply-and-demand model were one-time events, representing a shift from a previous equilibrium to a new one. Inflation implies an ongoing rise in prices. If inflation happened for one year and then stopped—well, then it would not be inflation any more.

This module begins by showing how to combine prices of individual goods and services to create a measure of overall inflation. It discusses the historical and recent experience of inflation, both in the United States and in other countries around the world. Other chapters have sometimes included a note under an exhibit or a parenthetical reminder in the text saying that the numbers have been adjusted for inflation. In this module, it is time to show how to use inflation statistics to adjust other economic variables, so that you can tell how much of, say, the rise in GDP over different periods of time can be attributed to an actual increase in the production of goods and services and how much should be attributed to the fact that prices for most things have risen.

Inflation has consequences for people and firms throughout the economy, in their roles as lenders and borrowers, wage-earners, taxpayers, and consumers. The module concludes with a discussion of some imperfections and biases in the inflation statistics, and a

preview of policies for fighting inflation that will be discussed in other modules.

157. Reading: Computing the Rate of Inflation

Price-Level Changes

Concern about changes in the price level has always dominated economic discussion. With inflation in the United States generally averaging only between 2% and 3% each year since 1990, it may seem surprising how much attention the behavior of the price level still commands. Yet inflation was a concern in 2004 when there was fear that the rising price of oil could trigger higher prices in other areas. Just the year before, when inflation fell below 2%, there was talk about the risk of deflation. That did not happen; prices continued rising. Inflation rose substantially in the first half of 2008, renewing fears about subsequent further increases. Just what are inflation and deflation? How are they measured? And most important, why do we care? These are some of the questions we will explore in this section.

Inflation is an increase in the average level of prices, and deflation is a decrease in the average level of prices. In an economy experiencing inflation, most prices are likely to be rising, whereas in an economy experiencing deflation, most prices are likely to be falling.

There are two key points in these definitions:

1. Inflation and deflation refer to changes in the average level of prices, not to changes in particular prices. An increase in medical costs is not inflation. A decrease in gasoline prices is not deflation. Inflation means the average level of prices is rising, and deflation means the average level of prices is falling.
2. Inflation and deflation refer to *rising* prices and *falling* prices,

respectively; therefore, they do not have anything to do with the *level* of prices at any one time. "High" prices do not imply the presence of inflation, nor do "low" prices imply deflation. Inflation means a positive *rate of change* in average prices, and deflation means a negative *rate of change* in average prices.

Computing the Rate of Inflation or Deflation

The rate of inflation or deflation is the percentage rate of change in a price index between two periods. Given price-index values for two periods, we can calculate the rate of inflation or deflation as the change in the index divided by the initial value of the index, stated as a percentage:

Rate of inflation or deflation = Percentage change in index / Initial value of index

To calculate inflation in movie prices over the 2007–2008 period, for example, we could apply Equation 5.4 to the price indexes we computed for those two years as follows:

Movie inflation rate in 2008 = (1.06 − 1.00) / 1.00 = 0.06 = 6%

The CPI is often used for calculating price-level change for the economy. For example, the rate of inflation in 2007 can be computed from the December 2006 price level (2.016) and the December 2007 level (2.073):

Inflation rate = (2.073 − 2.016) / 2.016 = 0.028 = 2.8%

158. Reading: Tracking Inflation

Tracking Inflation

Dinner table conversations where you might have heard about inflation usually entail reminiscing about when "everything seemed to cost so much less. You used to be able to buy three gallons of gasoline for a dollar and then go see an afternoon movie for another dollar." Table 8.1 compares some prices of common goods in 1970 and 2012. Of course, the average prices shown in this table may not reflect the prices where you live. The cost of living in New York City is much higher than in Houston, Texas, for example. In addition, certain products have evolved over recent decades. A new car in 2012, loaded with antipollution equipment, safety gear, computerized engine controls, and many other technological advances, is a more advanced machine (and more fuel efficient) than your typical 1970s car. However, put details like these to one side for the moment, and look at the overall pattern. The primary reason behind the price rises in Table 8.1—and all the price increases for the other products in the economy—is not specific to the market for housing or cars or gasoline or movie tickets. Instead, it is part of a general rise in the level of all prices. In 2012, $1 had about the same purchasing power in overall terms of goods and services as 18 cents did in 1972, because of the amount of inflation that has occurred over that time period.

Table 8.1. Price Comparisons, 1970 and 2012

Items	1970	2012
Pound of ground beef	$0.66	$3.24
Pound of butter	$0.87	$2.80
Movie ticket	$1.55	$7.96
Sales price of existing home	$23,000	$185,283
New car	$3,000	$30,303
Gallon of gasoline	$0.36	$3.48
Average hourly wage for a manufacturing worker	$3.23	$19.17
Per capita GDP	$5,069	$43,063

Sources: See chapter References at end of book.

Moreover, the power of inflation does not affect just goods and services, but *wages* and income levels, too. The second-to-last row of Table 8.1 shows that the average hourly wage for a manufacturing worker increased nearly six-fold from 1970 to 2012. Sure, the average worker in 2012 is better educated and more productive than the average worker in 1970—but not six times more productive. Sure, *per capita GDP* increased substantially from 1970 to 2012, but is the average person in the U.S. economy really more than eight times better off in just 42 years? Not likely.

A modern economy has millions of goods and services whose prices are continually quivering in the breezes of supply and demand. How can all of these shifts in price be boiled down to a single inflation rate? As with many problems in economic measurement, the conceptual answer is reasonably straightforward: Prices of a variety of goods and services are combined into a single price level; the inflation rate is simply the percentage change in the price level. Applying the concept, however, involves some practical difficulties.

The Price of a Basket of Goods

To calculate the *price level*, economists begin with the concept of a *basket of goods and services*, consisting of the different items individuals, businesses, or organizations typically buy. The next step is to look at how the prices of those items change over time. In thinking about how to combine individual prices into an overall price level, many people find that their first impulse is to calculate the average of the prices. Such a calculation, however, could easily be misleading because some products matter more than others.

Changes in the prices of goods for which people spend a larger share of their incomes will matter more than changes in the prices of goods for which people spend a smaller share of their incomes. For example, an increase of 10% in the rental rate on housing matters more to most people than whether the price of carrots rises by 10%. To construct an overall measure of the price level, economists compute a weighted average of the prices of the items in the basket, where the weights are based on the actual quantities of goods and services people buy. The following feature walks you through the steps of calculating the annual rate of inflation based on a few products.

Calculating an Annual Rate of Inflation

Consider the simple basket of goods with only three items, represented in Table 8.2. Say that in any given month, a college student spends money on 20 hamburgers, one bottle of aspirin, and five movies. Prices for these items over four years are given in the table through each time period (Pd). Prices of some goods in the basket may rise while others fall. In this example, the price of aspirin does not change over the four years, while movies increase in price and hamburgers bounce up and down. Each year, the cost of buying

the given basket of goods at the prices prevailing at that time is shown.

Table 8.2. A College Student's Basket of Goods

Items	Hamburger	Aspirin	Movies	Total	Inflation Rate
Qty	20	1 bottle	5	–	–
(Pd 1) Price	$3.00	$10.00	$6.00	–	–
(Pd 1) Amount Spent	$60.00	$10.00	$30.00	$100.00	–
(Pd 2) Price	$3.20	$10.00	$6.50	–	–
(Pd 2) Amount Spent	$64.00	$10.00	$32.50	$106.50	6.5%
(Pd 3) Price	$3.10	$10.00	$7.00	–	–
(Pd 3) Amount Spent	$62.00	$10.00	$35.00	$107.00	0.5%
(Pd 4) Price	$3.50	$10.00	$7.50	–	–
(Pd 4) Amount Spent	$70.00	$10.00	$37.50	$117.50	9.8%

To calculate the annual rate of inflation in this example: Step 1. Find the *percentage change* in the cost of purchasing the overall basket of goods between the time periods. The general equation for percentage changes between two years, whether in the context of inflation or in any other calculation, is:

[latex]\displaystyle\frac{(\text{Level in new year}-\text{Level in previous year})}{\text{Level in previous year}}=\text{Percentage change}[/latex]

Step 2. From period 1 to period 2, the total cost of purchasing the basket of goods in Table 8.2 rises from $100 to $106.50. Therefore, the percentage change over this time—the inflation rate—is:

[latex]\displaystyle\frac{(106.50-100)}{100.0}=0.065=6.5\text{ percent}[/latex]

Step 3. From period 2 to period 3, the overall change in the cost of purchasing the basket rises from $106.50 to $107. Thus, the inflation

rate over this time, again calculated by the percentage change, is approximately:

[latex]\displaystyle\frac{(107-106.50)}{106.50}=0.0047=0.47\text{ percent}[/latex]

Step 4. From period 3 to period 4, the overall cost rises from $107 to $117.50. The inflation rate is thus:

[latex]\displaystyle\frac{(117.50-107)}{107}=0.098=9.8\text{ percent}[/latex]

This calculation of the change in the total cost of purchasing a basket of goods takes into account how much is spent on each good. Hamburgers are the lowest-priced good in this example, and aspirin is the highest-priced. If an individual buys a greater quantity of a low-price good, then it makes sense that changes in the price of that good should have a larger impact on the buying power of that person's money. The larger impact of hamburgers shows up in the "amount spent" row, where, in all time periods, hamburgers are the largest item within the amount spent row.

Index Numbers

The numerical results of a calculation based on a basket of goods can get a little messy. The simplified example in Table 8.2 has only three goods and the prices are in even dollars, not numbers like 79 cents or $124.99. If the list of products was much longer, and more realistic prices were used, the total quantity spent over a year might be some messy-looking number like $17,147.51 or $27,654.92. To simplify the task of interpreting the price levels for more realistic and complex baskets of goods, the price level in each period is typically reported as an *index number*, rather than as the dollar amount for buying the basket of goods. Price indices are created to calculate an overall average change in relative prices over time. To convert the money spent on the basket to an index number, economists arbitrarily choose one year to be the *base year*, or

starting point from which we measure changes in prices. The base year, by definition, has an index number equal to 100. This sounds complicated, but it is really a simple math trick.

In the example above, say that time period 3 is chosen as the base year. Since the total amount of spending in that year is $107, we divide that amount by itself ($107) and multiply by 100. Mathematically, that is equivalent to dividing $107 by 100, or $1.07. Doing either will give us an index in the base year of 100. Again, this is because the index number in the base year *always* has to have a value of 100. Then, to figure out the values of the index number for the other years, we divide the dollar amounts for the other years by 1.07 as well. Note also that the dollar signs cancel out so that index numbers have no units. Calculations for the other values of the index number, based on the example presented in Table 8.2 are shown in Table 8.3. Because the index numbers are calculated so that they are in exactly the same proportion as the total dollar cost of purchasing the basket of goods, the inflation rate can be calculated based on the index numbers, using the percentage change formula. So, the inflation rate from period 1 to period 2 would be

[latex]\displaystyle\frac{(99.5-93.4)}{93.4}=0.065=6.5\text{ percent}[/latex]

This is the same answer that was derived when measuring inflation based on the dollar cost of the basket of goods for the same time period.

Table 8.3. Calculating Index Numbers When Period 3 is the Base Year

	Total Spending	Index Number	Inflation Rate Since Previous
Period 1	$100	[latex]\frac{100}{1.07}=93.4[/latex]	
Period 2	$106.50	[latex]\frac{106.50}{1.07}=99.5[/latex]	[latex]\frac{(99.5-93.4)}{93.4}= text{ percent}[/latex]
Period 3	$107	[latex]\frac{107}{1.07}=100.0[/latex]	[latex]\frac{(100-99.5)}{99.5}= text{ percent}[/latex]
Period 4	$117.50	[latex]\frac{117.50}{1.07}=109.8[/latex]	[latex]\frac{(109.8-100)}{100}= text{ percent}[/latex]

If the inflation rate is the same whether it is based on dollar values or index numbers, then why bother with the index numbers? The advantage is that indexing allows easier eyeballing of the inflation numbers. If you glance at two index numbers like 107 and 110, you know automatically that the rate of inflation between the two years is about, but not quite exactly equal to, 3%. By contrast, imagine that the price levels were expressed in absolute dollars of a large basket of goods, so that when you looked at the data, the numbers were $19,493.62 and $20,009.32. Most people find it difficult to eyeball those kinds of numbers and say that it is a change of about 3%. However, the two numbers expressed in absolute dollars are exactly in the same proportion of 107 to 110 as the previous example. If you're wondering why simple subtraction of the index numbers wouldn't work, read the following feature.

Why do you not just subtract index numbers?

A word of warning: When a price index moves from, say, 107 to 110, the rate of inflation is not *exactly* 3%. Remember, the inflation rate is not derived by subtracting the index numbers, but rather through the percentage-change calculation. The precise inflation rate as the price index moves from 107 to 110 is calculated as (110

– 107) / 107 = 0.028 = 2.8%. When the base year is fairly close to 100, a quick subtraction is not a terrible shortcut to calculating the inflation rate—but when precision matters down to tenths of a percent, subtracting will not give the right answer.

Two final points about index numbers are worth remembering. First, index numbers have no dollar signs or other units attached to them. Although index numbers can be used to calculate a percentage inflation rate, the index numbers themselves do not have percentage signs. Index numbers just mirror the proportions found in other data. They transform the other data so that the data are easier to work with.

Second, the choice of a base year for the index number—that is, the year that is automatically set equal to 100—is arbitrary. It is chosen as a starting point from which changes in prices are tracked. In the official inflation statistics, it is common to use one base year for a few years, and then to update it, so that the base year of 100 is relatively close to the present. But any base year that is chosen for the index numbers will result in exactly the same inflation rate. To see this in the previous example, imagine that period 1, when total spending was $100, was also chosen as the base year, and given an index number of 100. At a glance, you can see that the index numbers would now exactly match the dollar figures, the inflation rate in the first period would be 6.5%, and so on.

LINK IT UP

Watch this video from the cartoon *Duck Tales* to view a mini-lesson on inflation.

Reflection Questions

- What learning outcome relates to this content?
- What are the key topics covered in this content?
- How can the content in this section help you demonstrate mastery of the learning outcome?
- What questions do you have about this content?

159. Reading: How Changes in the Cost of Living are Measured

How Changes in the Cost of Living are Measured

The most commonly cited measure of inflation in the United States is the *Consumer Price Index (CPI)*. The CPI is calculated by government statisticians at the U.S. Bureau of Labor Statistics based on the prices in a fixed basket of goods and services that represents the purchases of the average family of four. In recent years, the statisticians have paid considerable attention to a subtle problem: that the change in the total cost of buying a fixed basket of goods and services over time is conceptually not quite the same as the change in the *cost of living*, because the cost of living represents how much it costs for a person to feel that his or her consumption provides an equal level of satisfaction or utility.

To understand the distinction, imagine that over the past 10 years, the cost of purchasing a fixed basket of goods increased by 25% and your salary also increased by 25%. Has your personal standard of living held constant? If you do not necessarily purchase an identical fixed basket of goods every year, then an inflation calculation based on the cost of a fixed basket of goods may be a misleading measure of how your cost of living has changed. Two problems arise here: substitution bias and quality/new goods bias.

When the price of a good rises, consumers tend to purchase less of it and to seek out substitutes instead. Conversely, as the price of a good falls, people will tend to purchase more of it. This pattern implies that goods with generally rising prices should tend over time to become less important in the overall basket of goods used to

calculate inflation, while goods with falling prices should tend to become more important. Consider, as an example, a rise in the price of peaches by $100 per pound. If consumers were utterly inflexible in their demand for peaches, this would lead to a big rise in the price of food for consumers. Alternatively, imagine that people are utterly indifferent to whether they have peaches or other types of fruit. Now, if peach prices rise, people completely switch to other fruit choices and the average price of food does not change at all. A fixed and unchanging basket of goods assumes that consumers are locked into buying exactly the same goods, regardless of price changes—not a very likely assumption. Thus, *substitution bias*—the rise in the price of a fixed basket of goods over time—tends to overstate the rise in a consumer's true cost of living, because it does not take into account that the person can substitute away from goods whose relative prices have risen.

The other major problem in using a fixed basket of goods as the basis for calculating inflation is how to deal with the arrival of improved versions of older goods or altogether new goods. Consider the problem that arises if a cereal is improved by adding 12 essential vitamins and minerals—and also if a box of the cereal costs 5% more. It would clearly be misleading to count the entire resulting higher price as inflation, because the new price is being charged for a product of higher (or at least different) quality. Ideally, one would like to know how much of the higher price is due to the quality change, and how much of it is just a higher price. The Bureau of Labor Statistics, which is responsible for the computation of the Consumer Price Index, must deal with these difficulties in adjusting for quality changes.

LINK IT UP

Visit this website to view a list of Ford car prices between 1909 and

1927. Consider how these prices compare to today's models. Is the product today of a different quality?

A new product can be thought of as an extreme improvement in quality—from something that did not exist to something that does. However, the basket of goods that was fixed in the past obviously does not include new goods created since then. The basket of goods and services used in the Consumer Price Index (CPI) is revised and updated over time, and so new products are gradually included. But the process takes some time. For example, room air conditioners were widely sold in the early 1950s, but were not introduced into the basket of goods behind the Consumer Price Index until 1964. The VCR and personal computer were available in the late 1970s and widely sold by the early 1980s, but did not enter the CPI basket of goods until 1987. By 1996, there were more than 40 million cellular phone subscribers in the United States—but cell phones were not yet part of the CPI basket of goods. The parade of inventions has continued, with the CPI inevitably lagging a few years behind.

The arrival of new goods creates problems with respect to the accuracy of measuring inflation. The reason people buy new goods, presumably, is that the new goods offer better value for money than existing goods. Thus, if the price index leaves out new goods, it overlooks one of the ways in which the cost of living is improving. In addition, the price of a new good is often higher when it is first introduced and then declines over time. If the new good is not included in the CPI for some years, until its price is already lower, the CPI may miss counting this price decline altogether. Taking these arguments together, the *quality/new goods bias* means that the rise in the price of a fixed basket of goods over time tends to overstate the rise in a consumer's true cost of living, because it does not take into account how improvements in the quality of existing goods or the invention of new goods improves the standard of living. The following Clear It Up feature is a must-read on how the CPI is comprised and calculated.

HOW DO U.S. GOVERNMENT STATISTICIANS MEASURE THE CONSUMER PRICE INDEX?

When the U.S. Bureau of Labor Statistics (BLS) calculates the Consumer Price Index, the first task is to decide on a basket of goods that is representative of the purchases of the average household. This is done by using the Consumer Expenditure Survey, a national survey of about 7,000 households, which provides detailed information on spending habits. Consumer expenditures are broken up into eight major groups, which in turn are broken up into more than 200 individual item categories. The BLS currently uses 1982–1984 as the base period.

The Eight Major Categories in the Consumer Price Index

1. Food and beverages (breakfast cereal, milk, coffee, chicken, wine, full-service meals, and snacks)
2. Housing (renter's cost of housing, homeowner's cost of housing, fuel oil, bedroom furniture)
3. Apparel (men's shirts and sweaters, women's dresses, jewelry)
4. Transportation (new vehicles, airline fares, gasoline, motor vehicle insurance)
5. Medical care (prescription drugs and medical supplies, physicians' services, eyeglasses and eye care, hospital services)
6. Recreation (televisions, cable television, pets and pet products, sports equipment, admissions)
7. Education and communication (college tuition, postage, telephone services, computer software and accessories)
8. Other goods and services (tobacco and smoking products, haircuts and other personal services, funeral expenses)

For each of the 200 individual expenditure items, the BLS chooses several hundred very specific examples of that item and looks at the prices of those examples. So, in figuring out the "breakfast cereal"

item under the overall category of "foods and beverages," the BLS picks several hundred examples of breakfast cereal. One example might be the price of a 24-oz. box of a particular brand of cereal sold at a particular store. The specific products and sizes and stores chosen are statistically selected to reflect what people buy and where they shop. The basket of goods in the Consumer Price Index thus consists of about 80,000 products; that is, several hundred specific products in over 200 broad-item categories. About one-quarter of these 80,000 specific products are rotated out of the sample each year, and replaced with a different set of products.

The next step is to collect data on prices. Data collectors visit or call about 23,000 stores in 87 urban areas all over the United States every month to collect prices on these 80,000 specific products. A survey of 50,000 landlords or tenants is also carried out to collect information about rents. The Consumer Price Index is then calculated by taking the 80,000 prices of individual products and combining them, using weights (as shown in Figure 8.2) determined by the quantities of these products that people buy and allowing for factors like substitution between goods and quality improvements, into price indices for the 200 or so overall items. Then, the price indices for the 200 items are combined into an overall Consumer Price Index.

The CPI and Core Inflation Index

Imagine if you were driving a company truck across the country- you probably would care about things like the prices of available roadside food and motel rooms as well as the truck's operating condition.

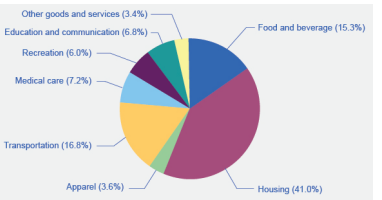

Figure 8.2. *The Weighting of CPI Components Of the eight categories used to generate the Consumer Price Index, housing is the highest at 41%. The next highest category, transportation at 16.8%, is less than half the size of housing. Other goods and services, and apparel, are the lowest at 3.4% and 3.6%, respectively. (Source: www.bls.gov/cpi)*

However, the manager of the firm might have different priorities. He would care mostly about the truck's on-time performance and much less so about the food you were eating and the places you were staying. In other words, the company manager would be paying attention to the production of the firm, while ignoring transitory elements that impacted you, but did not affect the company's bottom line.

In a sense, a similar situation occurs with regard to measures of inflation. As we've learned, CPI measures prices as they affect everyday household spending. Well, a core inflation index is typically calculated by taking the CPI and excluding volatile economic variables. In this way, economists have a better sense of the underlying trends in prices that affect the cost of living.

Examples of excluded variables include energy and food prices, which can jump around from month to month because of the weather. According to an article by Kent Bernhard, during Hurricane Katrina in 2005, a key supply point for the nation's gasoline was nearly knocked out. Gas prices quickly shot up across the nation, in some places up to 40 cents a gallon in one day. This was not the cause of an economic policy but rather a short-lived event until the pumps were restored in the region. In this case, the CPI that month would register the change as a cost of living event to households, but the core inflation index would remain unchanged. As a result, the Federal Reserve's decisions on interest rates would not be influenced. Similarly, droughts can cause world-wide spikes in food prices that, if temporary, do not affect the nation's economic capability.

As former Chairman of the Federal Reserve Ben Bernanke noted in 1999 about the core inflation index, "It provide(s) a better guide to monetary policy than the other indices, since it measures the more persistent underlying inflation rather than transitory influences on the price level." Bernanke also noted that it helps communicate that every inflationary shock need not be responded to by the Federal Reserve since some price changes are transitory and not part of a structural change in the economy.

In sum, both the CPI and the core inflation index are important, but serve different audiences. The CPI helps households understand their overall cost of living from month to month, while the core inflation index is a preferred gauge from which to make important government policy changes.

Practical Solutions for the Substitution and the Quality/New Goods Biases

By the early 2000s, the Bureau of Labor Statistics was using alternative mathematical methods for calculating the Consumer Price Index, more complicated than just adding up the cost of a fixed basket of goods, to allow for some substitution between goods. It was also updating the basket of goods behind the CPI more frequently, so that new and improved goods will be included more rapidly. For certain products, the BLS was carrying out studies to try to measure the quality improvement. For example, with computers, an economic study can try to adjust for changes in speed, memory, screen size, and other characteristics of the product, and then calculate the change in price after these product changes are taken into account. But these adjustments are inevitably imperfect, and exactly how to make these adjustments is often a source of controversy among professional economists.

By the early 2000s, the substitution bias and quality/new goods bias had been somewhat reduced, so that since then the rise in the CPI probably overstates the true rise in inflation by only about 0.5% per year. Over one or a few years, this is not much; over a period of a decade or two, even half of a percent per year compounds to a more significant amount. In addition, the CPI tracks prices from physical locations, and not at online sites like Amazon, where prices can be lower.

When measuring inflation (and other economic statistics, too), a tradeoff arises between simplicity and interpretation. If the inflation

rate is calculated with a basket of goods that is fixed and unchanging, then the calculation of an inflation rate is straightforward, but the problems of substitution bias and quality/new goods bias will arise. However, when the basket of goods is allowed to shift and evolve to reflect substitution toward lower relative prices, quality improvements, and new goods, the technical details of calculating the inflation rate grow more complex.

Additional Price Indices: PPI, GDP Deflator, and More

The basket of goods behind the Consumer Price Index represents an average hypothetical U.S. household, which is to say that it does not exactly capture anyone's personal experience. When the task is to calculate an average level of inflation, this approach works fine. What if, however, you are concerned about inflation experienced by a certain group, like the elderly, or the poor, or single-parent families with children, or Hispanic-Americans? In specific situations, a price index based on the buying power of the average consumer may not feel quite right.

This problem has a straightforward solution. If the Consumer Price Index does not serve the desired purpose, then invent another index, based on a basket of goods appropriate for the group of interest. Indeed, the Bureau of Labor Statistics publishes a number of experimental price indices: some for particular groups like the elderly or the poor, some for different geographic areas, and some for certain broad categories of goods like food or housing.

The BLS also calculates several price indices that are not based on baskets of consumer goods. For example, the *Producer Price Index* (*PPI*) is based on prices paid for supplies and inputs by producers of goods and services. It can be broken down into price indices for different industries, commodities, and stages of processing (like finished goods, intermediate goods, crude materials for further

processing, and so on). There is an *International Price Index* based on the prices of merchandise that is exported or imported. An *Employment Cost Index* measures wage inflation in the labor market. The *GDP deflator*, measured by the Bureau of Economic Analysis, is a price index that includes all the components of GDP (that is, consumption plus investment plus government plus exports minus imports). Unlike the CPI, its baskets are not fixed but re-calculate what that year's GDP would have been worth using the base-year's prices.

What's the best measure of inflation? If concerned with the most accurate measure of inflation, use the GDP deflator as it picks up the prices of goods and services produced. However, it is not a good measure of cost of living as it includes prices of many products not purchased by households (for example, aircraft, fire engines, factory buildings, office complexes, and bulldozers). If one wants the most accurate measure of inflation as it impacts households, use the CPI, as it only picks up prices of products purchased by households. That is why the CPI is sometimes referred to as the cost-of-living index. As the Bureau of Labor Statistics states on its website: "The 'best' measure of inflation for a given application depends on the intended use of the data."

Self Check: Consumer Price Index vs. Producer Price Index

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the four Readings in this section.

Use this quiz to check your understanding and decide whether

to (1) study the previous section further or (2) move on to the next section.

An interactive or media element has been excluded from this version of the text. You can view it online here: https://pressbooks.ccconline.org/accmacro/?p=327

160. Outcome: Consequences of Price Instability

What you'll learn to do: identify the consequences of price instability (i.e. inflation)

In this section, you will examine some of the various opinions about the necessity of and the consequences of inflation.

LEARNING ACTIVITIES

The learning activities for this section include:

- Reading: The Confusion Over Inflation
- Reading: Why Care about Inflation?
- Self Check: Consequences of Price Instability

Take time to review and reflect on each of these activities in order to improve your performance on the assessment for this section.

161. Reading: The Confusion Over Inflation

The Confusion Over Inflation

Economists usually oppose high inflation, but they oppose it in a milder way than many non-economists. *Robert Shiller*, one of 2013's Nobel Prize winners in economics, carried out several surveys during the 1990s about attitudes toward inflation. One of his questions asked, "Do you agree that preventing high inflation is an important national priority, as important as preventing drug abuse or preventing deterioration in the quality of our schools?" Answers were on a scale of 1–5, where 1 meant "Fully agree" and 5 meant "Completely disagree." For the U.S. population as a whole, 52% answered "Fully agree" that preventing high inflation was a highly important national priority and just 4% said "Completely disagree." However, among professional economists, only 18% answered "Fully agree," while the same percentage of 18% answered "Completely disagree."

The Land of Funny Money

What are the economic problems caused by inflation, and why do economists often regard them with less concern than the general public? Consider a very short story: "*The Land of Funny Money*."

One morning, everyone in the Land of Funny Money awakened to find that everything denominated in money had increased by 20%. The change was completely unexpected. Every price in every store was 20% higher. Paychecks were 20% higher. Interest rates were 20

% higher. The amount of money, everywhere from wallets to savings accounts, was 20% larger. This overnight inflation of prices made newspaper headlines everywhere in the Land of Funny Money. But the headlines quickly disappeared, as people realized that in terms of what they could actually buy with their incomes, this inflation had no economic impact. Everyone's pay could still buy exactly the same set of goods as it did before. Everyone's savings were still sufficient to buy exactly the same car, vacation, or retirement that they could have bought before. Equal levels of inflation in all wages and prices ended up not mattering much at all.

When the people in Robert Shiller's surveys explained their concern about inflation, one typical reason was that they feared that as prices rose, they would not be able to afford to buy as much. In other words, people were worried because they did not live in a place like the Land of Funny Money, where all prices and wages rose simultaneously. Instead, people live here on Planet Earth, where prices might rise while wages do not rise at all, or where wages rise more slowly than prices.

Economists note that over most periods, the inflation level in prices is roughly similar to the inflation level in *wages*, and so they reason that, on average, over time, people's economic status is not greatly changed by inflation. If all prices, wages, and interest rates adjusted automatically and immediately with inflation, as in the Land of Funny Money, then no one's purchasing power, profits, or real loan payments would change. However, if other economic variables do not move exactly in sync with inflation, or if they adjust for inflation only after a time lag, then inflation can cause three types of problems: unintended *redistributions* of purchasing power, blurred price signals, and difficulties in long-term planning.

Unintended Redistributions of Purchasing Power

Inflation can cause redistributions of purchasing power that hurt

some and help others. People who are hurt by inflation include those who are holding a lot of cash, whether it is in a safe deposit box or in a cardboard box under the bed. When inflation happens, the buying power of cash is diminished. But cash is only an example of a more general problem: anyone who has financial assets invested in a way that the nominal return does not keep up with inflation will tend to suffer from inflation. For example, if a person has money in a bank account that pays 4% interest, but inflation rises to 5%, then the real rate of return for the money invested in that bank account is negative 1%.

The problem of a good-looking *nominal interest rate* being transformed into an ugly-looking *real interest rate* can be worsened by taxes. The U.S. income tax is charged on the nominal interest received in dollar terms, without an adjustment for inflation. So, a person who invests $10,000 and receives a 5% nominal rate of interest is taxed on the $500 received—no matter whether the inflation rate is 0%, 5%, or 10%. If inflation is 0%, then the real interest rate is 5% and all $500 is a gain in buying power. But if inflation is 5%, then the real interest rate is zero and the person had no real gain—but owes income tax on the nominal gain anyway. If inflation is 10%, then the real interest rate is *negative* 5% and the person is actually falling behind in buying power, but would still owe taxes on the $500 in nominal gains.

Inflation can cause unintended redistributions for wage earners, too. Wages do typically creep up with inflation over time eventually. The last row of the first table in Tracking Inflation at the start of this chapter showed that average hourly wage in the U.S. economy increased from $3.23 in 1970 to $19.20 in 2012, which is an increase by a factor of almost six. Over that time period, the Consumer Price Index increased by an almost identical amount. However, increases in wages may lag behind inflation for a year or two, since wage adjustments are often somewhat sticky and occur only once or twice a year. Moreover, the extent to which wages keep up with inflation creates insecurity for workers and may involve painful, prolonged conflicts between employers and employees. If the

minimum wage is adjusted for inflation only infrequently, minimum wage workers are losing purchasing power from their nominal wages, as shown in Figure 8.6.

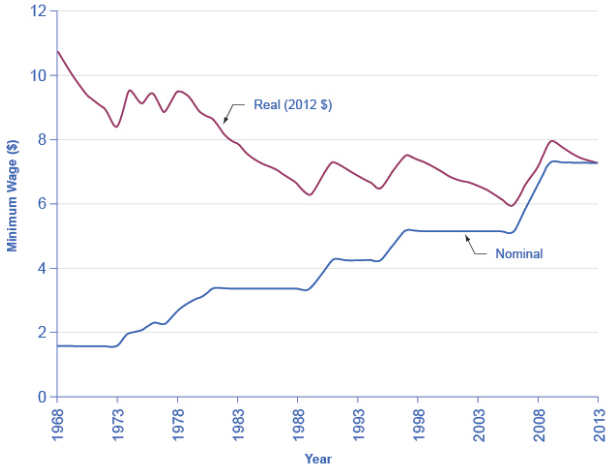

Figure 8.6. *U.S. Minimum Wage and Inflation After adjusting for inflation, the federal minimum wage dropped more than 30 percent from 1967 to 2010, even though the nominal figure climbed from $1.40 to $7.25 per hour. Increases in the minimum wage in between 2008 and 2010 kept the decline from being worse—as it would have been if the wage had remained the same as it did from 1997 through 2007. (Sources: http://www.dol.gov/whd/minwage/chart.htm; http://data.bls.gov/cgi-bin/surveymost?cu)*

One sizable group of people has often received a large share of their income in a form that does not increase over time: retirees who receive a private company pension. Most *pensions* have traditionally been set as a fixed nominal dollar amount per year at retirement. For this reason, pensions are called "defined benefits" plans. Even if inflation is low, the combination of inflation and a fixed income can create a substantial problem over time. A person who retires on a fixed income at age 65 will find that losing just 1% to 2% of buying

power per year to inflation compounds to a considerable loss of buying power after a decade or two.

Fortunately, pensions and other defined benefits retirement plans are increasingly rare, replaced instead by "defined contribution" plans, such as 401(k)s and 403(b)s. In these plans, the employer contributes a fixed amount to the worker's retirement account on a regular basis (usually every pay check). The employer often contributes as well. The worker invests these funds in a wide range of investment vehicles. These plans are tax deferred, and they are portable so that if the individual takes a job with a different employer, their 401(k) comes with them. To the extent that the investments made generate real rates of return, retirees do not suffer from the inflation costs of traditional pensioners.

However, ordinary people can sometimes benefit from the unintended redistributions of inflation. Consider someone who borrows $10,000 to buy a car at a fixed interest rate of 9%. If inflation is 3% at the time the loan is made, then the loan must be repaid at a real interest rate of 6%. But if inflation rises to 9%, then the real interest rate on the loan is zero. In this case, the borrower's benefit from inflation is the lender's loss. A borrower paying a fixed interest rate, who benefits from inflation, is just the flip side of an investor receiving a fixed interest rate, who suffers from inflation. The lesson is that when interest rates are fixed, rises in the rate of inflation tend to penalize suppliers of financial capital, who end up being repaid in dollars that are worth less because of inflation, while demanders of financial capital end up better off, because they can repay their loans in dollars that are worth less than originally expected.

The unintended redistributions of buying power caused by inflation may have a broader effect on society. America's widespread acceptance of market forces rests on a perception that people's actions have a reasonable connection to market outcomes. When inflation causes a retiree who built up a pension or invested at a fixed interest rate to suffer, however, while someone who borrowed

at a fixed interest rate benefits from inflation, it is hard to believe that this outcome was deserved in any way. Similarly, when homeowners benefit from inflation because the price of their homes rises, while renters suffer because they are paying higher rent, it is hard to see any useful incentive effects. One of the reasons that inflation is so disliked by the general public is a sense that it makes economic rewards and penalties more arbitrary—and therefore likely to be perceived as unfair—even dangerous, as the next Clear It Up feature shows.

Is there a connection between German hyperinflation and Hitler's rise to power?

Germany suffered an intense hyperinflation of its currency, the Mark, in the years after World War I, when the Weimar Republic in Germany resorted to printing money to pay its bills and the onset of the Great Depression created the social turmoil that Adolf Hitler could take advantage of in his rise to power. Shiller described the connection this way in a National Bureau of Economic Research 1996 Working Paper:

> A fact that is probably little known to young people today, even in Germany, is that the final collapse of the Mark in 1923, the time when the Mark's inflation reached astronomical levels (inflation of 35,974.9% in November 1923 alone, for an annual rate that month of 4.69×10^{28}%), came in the same month as did Hitler's Beer Hall Putsch, his Nazi Party's armed attempt to overthrow the German government. This failed putsch resulted in Hitler's imprisonment, at which time he wrote his book *Mein Kampf*, setting forth an inspirational plan for Germany's future, suggesting plans for world domination. . .

> . . . Most people in Germany today probably do not clearly remember these events; this lack of attention to it may be because its memory is blurred by the more dramatic events that succeeded it (the Nazi seizure of power and World War II). However, to someone living through these historical events in sequence . . . [the putsch] may have been remembered as vivid evidence of the potential effects of inflation.

Blurred Price Signals

Prices are the messengers in a *market economy*, conveying information about conditions of demand and supply. Inflation blurs those price messages. Inflation means that price signals are perceived more vaguely, like a radio program received with a lot of static. If the static becomes severe, it is hard to tell what is happening.

In Israel, when inflation accelerated to an annual rate of 500% in 1985, some stores stopped posting prices directly on items, since they would have had to put new labels on the items or shelves every few days to reflect inflation. Instead, a shopper just took items from a shelf and went up to the checkout register to find out the price for that day. Obviously, this situation makes comparing prices and shopping for the best deal rather difficult. When the levels and changes of prices become uncertain, businesses and individuals find it harder to react to economic signals. In a world where inflation is at a high rate, but bouncing up and down to some extent, does a higher price of a good mean that inflation has risen, or that supply of that good has decreased, or that demand for that good has increased? Should a buyer of the good take the higher prices as an economic hint to start substituting other products—or have the prices of the substitutes risen by an equal amount? Should a seller of

the good take a higher price as a reason to increase production—or is the higher price only a sign of a general inflation in which the prices of all inputs to production are rising as well? The true story will presumably become clear over time, but at a given moment, who can say?

High and variable inflation means that the incentives in the economy to adjust in response to changes in prices are weaker. Markets will adjust toward their equilibrium prices and quantities more erratically and slowly, and many individual markets will experience a greater chance of *surpluses* and *shortages*.

Problems of Long-Term Planning

Inflation can make long-term planning difficult. In discussing unintended *redistributions*, we considered the case of someone trying to plan for retirement with a pension that is fixed in nominal terms and a high rate of inflation. Similar problems arise for all people trying to save for retirement, because they must consider what their money will really buy several decades in the future when the rate of future inflation cannot be known with certainty.

Inflation, especially at moderate or high levels, will pose substantial planning problems for businesses, too. A firm can make money from inflation—for example, by paying bills and wages as late as possible so that it can pay in inflated dollars, while collecting revenues as soon as possible. A firm can also suffer losses from inflation, as in the case of a retail business that gets stuck holding too much cash, only to see the value of that cash eroded by inflation. But when a business spends its time focusing on how to profit by inflation, or at least how to avoid suffering from it, an inevitable tradeoff strikes: less time is spent on improving products and services or on figuring out how to make existing products and services more cheaply. An economy with high inflation rewards businesses that have found clever ways of profiting from inflation,

which are not necessarily the businesses that excel at productivity, innovation, or quality of service.

In the short term, low or moderate levels of inflation may not pose an overwhelming difficulty for business planning, because costs of doing business and sales revenues may rise at similar rates. If, however, inflation varies substantially over the short or medium term, then it may make sense for businesses to stick to shorter-term strategies. The evidence as to whether relatively low rates of inflation reduce productivity is controversial among economists. There is some evidence that if inflation can be held to moderate levels of less than 3% per year, it need not prevent a nation's real economy from growing at a healthy pace. For some countries that have experienced hyperinflation of several thousand percent per year, an annual inflation rate of 20–30% may feel basically the same as zero. However, several economists have pointed to the suggestive fact that when U.S. inflation heated up in the early 1970s—to 10%—U.S. growth in productivity slowed down, and when inflation slowed down in the 1980s, productivity edged up again not long thereafter, as shown in Figure 8.7.

Figure 8.7. *U.S. Inflation Rate and U.S. Labor Productivity, 1961–2012 Over the last several decades in the United States, there have been times when rising inflation rates have been closely followed by lower productivity rates and lower inflation rates have corresponded to increasing productivity rates. As the graph shows, however, this correlation does not always exist.*

Any Benefits of Inflation?

Although the economic effects of inflation are primarily negative, two countervailing points are worth noting. First, the impact of inflation will differ considerably according to whether it is creeping up slowly at 0% to 2% per year, galloping along at 10% to 20% per year, or racing to the point of hyperinflation at, say, 40% per month. Hyperinflation can rip an economy and a society apart. An annual inflation rate of 2%, 3%, or 4%, however, is a long way from a national crisis. Low inflation is also better than deflation which occurs with severe recessions.

Second, an argument is sometimes made that moderate inflation may help the economy by making wages in *labor markets* more flexible. The discussion in Unemployment pointed out that wages tend to be sticky in their downward movements and that unemployment can result. A little inflation could nibble away at real wages, and thus help real wages to decline if necessary. In this way, even if a moderate or high rate of inflation may act as sand in the gears of the economy, perhaps a low rate of inflation serves as oil for the gears of the labor market. This argument is controversial. A full analysis would have to take all the effects of inflation into account. It does, however, offer another reason to believe that, all things considered, very low rates of inflation may not be especially harmful.

162. Reading: Why Care about Inflation?

Why Do We Care?

What difference does it make if the average level of prices changes? First, consider the impact of inflation.

Inflation is measured as the annual rate of increase in the average level of prices. Figure 5.6 "Inflation, 1960–2008" shows how volatile inflation has been in the United States over the past four decades. In the 1960s the inflation rate rose, and it became dramatically worse in the 1970s. The inflation rate plunged in the 1980s and continued to ease downward in the 1990s. It remained low in the early 2000s and began to accelerate in 2007 and during most of 2008.

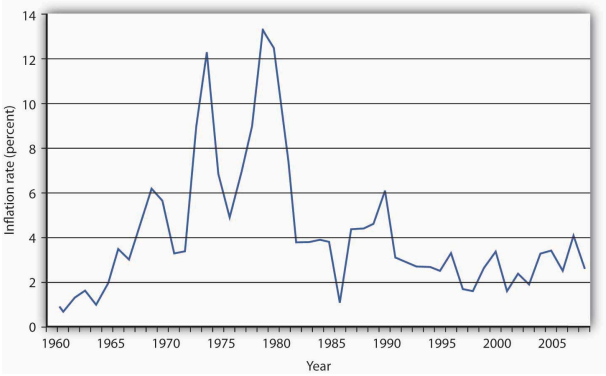

Figure 5.6. *Inflation, 1960–2008. The U.S. inflation rate, measured as the annual rate of change in the average level of prices paid by consumers, varied considerably over the 1960–2008 period.* ***Source***: *Bureau of Labor Statistics, All Urban Consumers CPI-U, 1982–84 = 100, Dec.–Dec. inflation rate. Data for 2008 is through October.*

Whether one regards inflation as a "good" thing or a "bad" thing depends very much on one's economic situation. If you are a borrower, unexpected inflation is a good thing—it reduces the value of money that you must repay. If you are a lender, it is a bad thing because it reduces the value of future payments you will receive. Whatever any particular person's situation may be, inflation always produces the following effects on the economy: it reduces the value

of money and it reduces the value of future monetary obligations. It can also create uncertainty about the future.

Suppose that you have just found a $10 bill you stashed away in 1990. Prices have increased by about 50% since then; your money will buy less than what it would have purchased when you put it away. Your money has thus lost value.

Money loses value when its purchasing power falls. Since inflation is a rise in the level of prices, the amount of goods and services a given amount of money can buy falls with inflation.

Just as inflation reduces the value of money, it reduces the value of future claims on money. Suppose you have borrowed $100 from a friend and have agreed to pay it back in one year. During the year, however, prices double. That means that when you pay the money back, it will buy only half as much as it could have bought when you borrowed it. That is good for you but tough on the person who lent you the money. Of course, if you and your friend had anticipated such rapid inflation, you might have agreed to pay back a larger sum to adjust for it. When people anticipate inflation, they can adjust for its consequences in determining future obligations. But *unanticipated* inflation helps borrowers and hurts lenders.

Inflation's impact on future claims can be particularly hard on people who must live on a fixed income, that is, on an income that is predetermined through some contractual arrangement and does not change with economic conditions. An annuity, for example, typically provides a fixed stream of money payments. Retirement pensions sometimes generate fixed income. Inflation erodes the value of such payments.

Given the danger posed by inflation for people on fixed incomes, many retirement plans provide for indexed payments. An indexed payment is one whose dollar amount changes with the rate of change in the price level. If a payment changes at the same rate as the rate of change in the price level, the purchasing power of the payment remains constant. Social Security payments, for example, are indexed to maintain their purchasing power.

Because inflation reduces the purchasing power of money, the threat of future inflation can make people reluctant to lend for long periods. From a lender's point of view, the danger of a long-term commitment of funds is that future inflation will wipe out the value of the amount that will eventually be paid back. Lenders are reluctant to make such commitments.

Uncertainty can be particularly pronounced in countries where extremely high inflation is a threat. Hyperinflation is generally defined as an inflation rate in excess of 200% per year. Inflation of that magnitude erodes the value of money very quickly. Hyperinflations occurred in Germany in the 1920s and in Yugoslavia in the early 1990s. There are stories about how people in Germany during the hyperinflation brought wheelbarrows full of money to stores to pay for ordinary items. In Yugoslavia in 1993 there was a report of a shop owner barring the entrance to his store with a mop while he changed his prices.

The inflation rate rose to an astronomical rate in 2008 in Zimbabwe. As the government printed more money and put it in circulation, prices rose. When inflation began to accelerate, the government found it "necessary" to print more and more money, causing prices to rise very fast. The inflation rate in Zimbabwe reached an astonishing 11.2 million percent in July of 2008, according to Zimbabwe's Central Statistics Office. A loaf of bread cost 200,000 Zimbabwe dollars in February 2008. That same loaf cost 1.6 trillion Zimbabwe dollars by August.[1]

Do the problems associated with inflation imply that deflation would be a good thing? The answer is simple: no. Like inflation, deflation changes the value of money and the value of future obligations. It also creates uncertainty about the future.

If there is deflation, the real value of a given amount of money rises. In other words, if there had been deflation since 2000, a

1. "Zimbabwe Inflation Hits 11,200,000%," CNN.com, August 19, 2008.

$10 bill you had stashed away in 2000 would buy more goods and services today. That sounds good, but should you buy $10 worth of goods and services now when you would be able to buy even more for your $10 in the future if the deflation continues? When Japan experienced deflation in the late 1990s and early 2000s, Japanese consumers seemed to be doing just that—waiting to see if prices would fall further. They were spending less per person and, as we will see throughout our study of macroeconomics, less consumption often meant less output, fewer jobs, and the prospect of a recurring recessions.

And, if you had to use the $10 to pay back a debt you owed, the purchasing power of your money would be higher than when you borrowed the money. The lender would feel good about being able to buy more with the $10 than you were able to, but you would feel like you had gotten a raw deal.

Unanticipated deflation hurts borrowers and helps lenders. If the parties anticipate the deflation, a loan agreement can be written to reflect expected changes in the price level.

The threat of deflation can make people reluctant to borrow for long periods. Borrowers become reluctant to enter into long-term contracts because they fear that deflation will raise the value of the money they must pay back in the future. In such an environment, firms may be reluctant to borrow to build new factories, for example. This is because they fear that the prices at which they can sell their output will drop, making it difficult for them to repay their loans.

Deflation was common in the United States in the latter third of the 19th century. In the 20th century, there was a period of deflation after World War I and again during the Great Depression in the 1930s.

Self Check: Consequences of Price Instability

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the two Readings in this section.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

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163. Outcome: Price Indexes

What you'll learn to do: explain the concept of a price index and explain how price indices are derived

In this section, you will learn about the basics behind price indexes and how to calculate the general price of a good or service while accounting for the rate of inflation and changes in costs and prices.

The specific things you'll learn in this section include:

- Define the consumer price index and the producer price index
- Calculate a price index number given a basket of goods & services and the nominal price of each in a base year and at some later time

LEARNING ACTIVITIES

The learning activities for this section include:

- Reading: Price Indexes
- Self Check: Price Indexes
- Reading: The CPI and PCE
- Reading: How Changes in the Cost of Living are Measured
- Self Check: Consumer Price Index vs. Producer Price Index
- Reading: Tracking Inflation
- Self Check: Calculating Price Indexes

Take time to review and reflect on each of these activities in order to improve your performance on the assessment for this section.

164. Reading: Price Indexes

Price Indexes

How do we actually measure inflation and deflation (that is, changes in the price level)? Price-level change is measured as the percentage rate of change in the level of prices. But how do we find a price level?

Economists measure the price level with a price index. A price index is a number whose movement reflects movement in the average level of prices. If a price index rises 10%, it means the average level of prices has risen 10%.

There are four steps one must take in computing a price index:

1. Select the kinds and quantities of goods and services to be included in the index. A list of these goods and services, and the quantities of each, is the "market basket" for the index.
2. Determine what it would cost to buy the goods and services in the market basket in some period that is the base period for the index. A base period is a time period against which costs of the market basket in other periods will be compared in computing a price index. Most often, the base period for an index is a single year. If, for example, a price index had a base period of 1990, costs of the basket in other periods would be compared to the cost of the basket in 1990. We will encounter one index, however, whose base period stretches over three years.
3. Compute the cost of the market basket in the current period.
4. Compute the price index. It equals the current cost divided by the base-period cost of the market basket.

Price index = Current cost of basket / Base-period cost of basket

(While published price indexes are typically reported with this number multiplied by 100, our work with indexes will be simplified by omitting this step.)

Suppose that we want to compute a price index for movie fans, and a survey of movie watchers tells us that a typical fan rents 4 movies on DVD and sees 3 movies in theaters each month. At the theater, this viewer consumes a medium-sized soft drink and a medium-sized box of popcorn. Our market basket thus might include 4 DVD rentals, 3 movie admissions, 3 medium soft drinks, and 3 medium servings of popcorn.

Our next step in computing the movie price index is to determine the cost of the market basket. Suppose we surveyed movie theaters and DVD-rental stores in 2007 to determine the average prices of these items, finding the values given in Table 5.1 "Pricing a Market Basket." At those prices, the total monthly cost of our movie market basket in 2007 was $48. Now suppose that in 2008 the prices of movie admissions and DVD rentals rise, soft-drink prices at movies fall, and popcorn prices remain unchanged. The combined effect of these changes pushes the 2008 cost of the basket to $50.88.

Table 5.1 Pricing a Market Basket

Item	Quantity in Basket	2007 Price	Cost in 2007 Basket	2008 Price	Cost in 2008 Basket
DVD rental	4	$2.25	$9.00	$2.97	$11.88
Movie admission	3	7.75	23.25	8.00	24.00
Popcorn	3	2.25	6.75	2.25	6.75
Soft drink	3	3.00	9.00	2.75	8.25
Total cost of basket		**2007**	$48.00	**2008**	$50.88

To compute a price index, we need to define a market basket and determine its price. The table gives the composition of the movie market basket and prices for 2007 and 2008. The cost of the entire basket rises from $48 in 2007 to $50.88 in 2008.

Using the data in Table 5.1 “Pricing a Market Basket”, we could compute price indexes for each year. Recall that a price index is the ratio of the current cost of the basket to the base-period cost. We can select any year we wish as the base year; take 2007. The 2008 movie price index (MPI) is thus

$$MPI_{2008} = \$50.88/\$48 = 1.06$$

The value of any price index in the base period is always 1. In the case of our movie price index, the 2007 index would be the current (2007) cost of the basket, $48, divided by the base-period cost, which is the same thing: $48/$48 = 1.

165. Reading: The CPI and PCE

The Consumer Price Index (CPI)

One widely used price index in the United States is the consumer price index (CPI), a price index whose movement reflects changes in the prices of goods and services typically purchased by consumers. When the media report the U.S. inflation rate, the number cited is usually a rate computed using the CPI. The CPI is also used to determine whether people's incomes are keeping up with the costs of the things they buy. The CPI is often used to measure changes in the cost of living, though as we shall see, there are problems in using it for this purpose.

The market basket for the CPI contains thousands of goods and services. The composition of the basket is determined by the Bureau of Labor Statistics (BLS), an agency of the Department of Labor, based on Census Bureau surveys of household buying behavior. Surveyors tally the prices of the goods and services in the basket each month in cities all over the United States to determine the current cost of the basket. The major categories of items in the CPI are food and beverages, housing, apparel, transportation, medical care, recreation, education and communication, and other goods and services.

The current cost of the basket of consumer goods and services is then compared to the base-period cost of that same basket. The base period for the CPI is 1982–1984; the base-period cost of the basket is its average cost over this period. Each month's CPI thus reflects the ratio of the current cost of the basket divided by its base-period cost.

$$\text{CPI} = \text{current cost of basket}/\text{1982–1984 cost of basket}$$

Equation 5.2.

Like many other price indexes, the CPI is computed with a fixed market basket. The composition of the basket generally remains unchanged from one period to the next. Because buying patterns change, however, the basket is revised accordingly. The data in Table 5.1 "Pricing a Market Basket," for example, are based on 2005–2006 expenditure weights. The base period, though, was still 1982–1984.

The PCE Price Index

The Bureau of Economic Analysis also produces price index information for each of the components of GDP (that is, a separate price index for consumer prices, prices for different components of gross private domestic investment, and government spending). The personal consumption expenditures price index, or PCE price index, includes durable goods, nondurable goods, and services and is provided along with estimates for prices of each component of consumption spending. Because prices for food and energy can be volatile, the price measure that excludes food and energy is often used as a measure of underlying, or "core," inflation. Note that the PCE price index differs substantially from the consumer price index, primarily because it is not a "fixed basket" index.[1] The PCE price

1. For a comparison of price measures, including a comparison of the PCE price index and the Consumer Price Index, see Brain C. Moyer, "Comparing Price

index has become a politically important measure of inflation since the Federal Reserve uses it as its primary measure of price levels in the United States.

Self Check: Price Indexes

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the two Readings in this section.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

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Measures–The CPI and PCE Price Index" (lecture, National Association for Business Economics, 2006 Washington Economic Policy Conference, March 13–14, 2006), available at http://www.bea.gov/bea/papers.htm.

166. Outcome: Price Indexes and Real Data

What you'll learn to do: use a price index to translate between real and nominal data

In this section, you will learn about the importance of looking at "real" data—information that has been adjusted for inflation, and why doing so can help economists to get a more accurate assessment of a value.

LEARNING ACTIVITIES

The learning activities for this section include:

- Reading: Nominal and Real Values
- Reading: Computing Real Values Using Price Indexes
- Self Check: Price Indexes and Real Data

Take time to review and reflect on each of these activities in order to improve your performance on the assessment for this section.

167. Reading: Nominal and Real Values

Nominal and Real Values

When examining economic statistics, there is a crucial distinction worth emphasizing. The distinction is between nominal and real measurements, which refer to whether or not inflation has distorted a given statistic. Looking at economic statistics without considering inflation is like looking through a pair of binoculars and trying to guess how close something is: unless you know how strong the lenses are, you cannot guess the distance very accurately. Similarly, if you do not know the rate of inflation, it is difficult to figure out if a rise in GDP is due mainly to a rise in the overall level of prices or to a rise in quantities of goods produced. The *nominal value* of any economic statistic means the statistic is measured in terms of actual prices that exist at the time. The *real value* refers to the same statistic after it has been adjusted for inflation. Generally, it is the real value that is more important.

168. Reading: Computing Real Values Using Price Indexes

Computing Real Values Using Price Indexes

Suppose your uncle started college in 1998 and had a job busing dishes that paid $5 per hour. In 2008 you had the same job; it paid $6 per hour. Which job paid more?

At first glance, the answer is straightforward: $6 is a higher wage than $5. But $1 had greater purchasing power in 1998 than in 2008 because prices were lower in 1998 than in 2008. To obtain a valid comparison of the two wages, we must use dollars of equivalent purchasing power. A value expressed in units of constant purchasing power is a real value. A value expressed in dollars of the current period is called a nominal value. The $5 wage in 1998 and the $6 wage in 2008 are nominal wages.

To convert nominal values to real values, we divide by a price index. The real value for a given period is the nominal value for that period divided by the price index for that period. This procedure gives us a value in dollars that have the purchasing power of the base period for the price index used. Using the CPI, for example, yields values expressed in dollars of 1982–1984 purchasing power, the base period for the CPI. The real value of a nominal amount X at time t, X_t, is found using the price index for time t:

$$\text{Real value of } X_t = X_t \,/\, \text{Price index at time } t$$

Let us compute the real value of the $6 wage for busing dishes in 2008 versus the $5 wage paid to your uncle in 1998. The CPI in 1998

was 163.0; in 2008 it was 216.5. Real wages for the two years were thus,

$$\textit{Real wage in } 1998 = \$5 \,/\, 1.630 = \$3.07$$
$$\textit{Real wage in } 2008 = \$6 \,/\, 2.165 = \$2.77$$

Given the nominal wages in our example, you earned about 10% less in real terms in 2008 than your uncle did in 1998.

Price indexes are useful. They allow us to see how the general level of prices has changed. They allow us to estimate the rate of change in prices, which we report as the rate of inflation or deflation. And they give us a tool for converting nominal values to real values so we can make better comparisons of economic performance across time.

Self Check: Price Indexes and Real Data

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the two Readings in this section.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

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169. Outcome: Defining the GDP Price Index

What you'll learn to do: define the GDP price index (also known as the GDP deflator)

In this outcome, you will learn how to find the GDP after it is adjusted for a change in prices.

LEARNING ACTIVITIES

The learning activities for this section include:

- Reading: The Implicit Price Deflator
- Self Check: Defining the GDP Price Index

Take time to review and reflect on each of these activities in order to improve your performance on the assessment for this section.

170. Reading: The Implicit Price Deflator

The Implicit Price Deflator

Values for nominal and real GDP provide us with the information to calculate the most broad-based price index available. The implicit price deflator, a price index for all final goods and services produced, is the ratio of nominal GDP to real GDP.

In computing the implicit price deflator for a particular period, economists define the market basket quite simply: it includes all the final goods and services produced during that period. The nominal GDP gives the current cost of that basket; the real GDP adjusts the nominal GDP for changes in prices. The implicit price deflator is thus given by

Implicit price deflator = nominal GDP / real GDP

For example, in 2007, nominal GDP in the United States was $13,807.5 billion, and real GDP was $11,523.9 billion. Thus, the implicit price deflator was 1.198. Following the convention of multiplying price indexes by 100, the published number for the implicit price deflator was 119.8.

In our analysis of the determination of output and the price level in subsequent modules, we will use the implicit price deflator as the measure of the price level in the economy.

Self Check: Defining the GDP Price Index

Answer the question(s) below to see how well you understand the

topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the Reading in this section.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

An interactive or media element has been excluded from this version of the text. You can view it online here: https://pressbooks.ccconline.org/accmacro/?p=349

171. Outcome: Nominal and Real GDP

What you'll learn to do: differentiate between nominal GDP and real GDP

In this section, you will develop a deeper understanding of GDP as you learn about how it is adjusted for price changes.

The specific things you'll learn in this section include:

- Use the GDP price index to compute real GDP from nominal GDP

LEARNING ACTIVITIES

The learning activities for this section include:

- Reading: Real GDP
- Reading: Converting Nominal to Real GDP
- Self Check: Nominal and Real GDP

Take time to review and reflect on each of these activities in order to improve your performance on the assessment for this section.

172. Reading: Real GDP

Real GDP

To determine whether the economy of a nation is growing or shrinking in size, economists use a measure of total output called real GDP. **Real GDP**, short for real gross domestic product, is the total value of all final goods and services produced during a particular year or period, adjusted to eliminate the effects of changes in prices. Let us break that definition up into parts.

Notice that only "final" goods and services are included in GDP. Many goods and services are purchased for use as inputs in producing something else. For example, a pizza parlor buys flour to make pizzas. If we counted the value of the flour and the value of the pizza, we would end up counting the flour twice and thus overstating the value of total production. Including only final goods avoids double-counting. If the flour is produced during a particular period but has not been sold, then it is a "final good" for that period and is counted.

We want to determine whether the economy's output is growing or shrinking. If each final good or service produced, from hammers to haircuts, were valued at its current market price, and then we were to add the values of all such items produced, we would not know if the total had changed because output changed or because prices changed or both. The market value of all final goods and services produced can rise even if total output falls. To isolate the behavior of total output only, we must hold prices constant at some level. For example, if we measure the value of basketball output over time using a fixed price for valuing the basketballs, then only an increase in the number of basketballs produced could increase the value of the contribution made by basketballs to total output. By making such an adjustment for basketballs and all other goods and

services, we obtain a value for real GDP. In contrast, **nominal GDP**, usually just referred to as gross domestic product (GDP), is the total value of final goods and services for a particular period valued in terms of prices for that period. Real GDP fell in the third quarter of 2008. But, because the price level in the United States was rising, nominal GDP rose 3.6%.

173. Reading: Converting Nominal to Real GDP

Converting Nominal to Real GDP

Table 5.5 shows U.S. GDP at five-year intervals since 1960 in nominal dollars; that is, GDP measured using the actual market prices prevailing in each stated year. This data is also reflected in the graph shown in Figure 5.7

Table 5.5. U.S. Nominal GDP and the GDP Deflator

Year	Nominal GDP (billions of dollars)	GDP Deflator (2005 = 100)
1960	543.3	19.0
1965	743.7	20.3
1970	1,075.9	24.8
1975	1,688.9	34.1
1980	2,862.5	48.3
1985	4,346.7	62.3
1990	5,979.6	72.7
1995	7,664.0	81.7
2000	10,289.7	89.0
2005	13,095.4	100.0
2010	14,958.3	110.0

Source: www.bea.gov

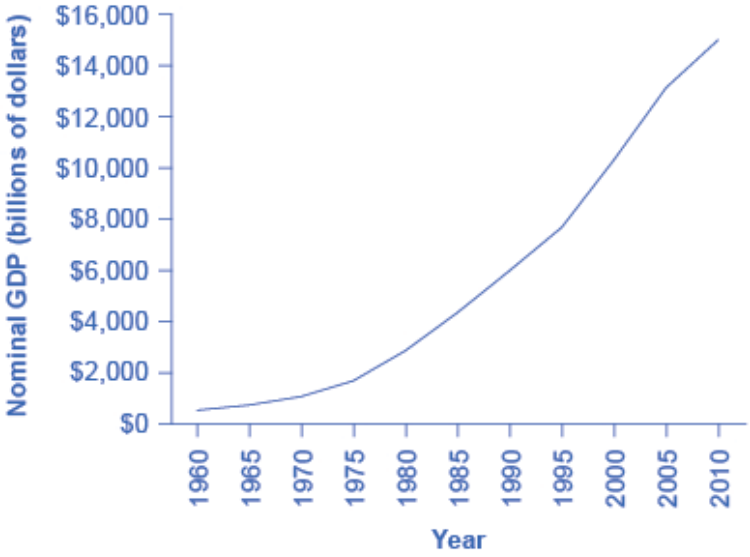


Figure 5.7. *U.S. Nominal GDP, 1960–2010 Nominal GDP values have risen exponentially from 1960 through 2010, according to the BEA.*

If an unwary analyst compared nominal GDP in 1960 to nominal GDP in 2010, it might appear that national output had risen by a factor of twenty-seven over this time (that is, GDP of $14,958 billion in 2010 divided by GDP of $543 billion in 1960). This conclusion would be highly misleading. Recall that nominal GDP is defined as the quantity of every good or service produced multiplied by the price at which it was sold, summed up for all goods and services. In order to see how much production has actually increased, we need to extract the effects of higher prices on nominal GDP. This can be easily done, using the GDP deflator.

GDP deflator is a price index measuring the average prices of all goods and services included in the economy. We explore price indices in detail and how they are computed in Inflation, but this

definition will do in the context of this chapter. The data for the GDP deflator are given in Table 5.5 and shown graphically in Figure 5.8.

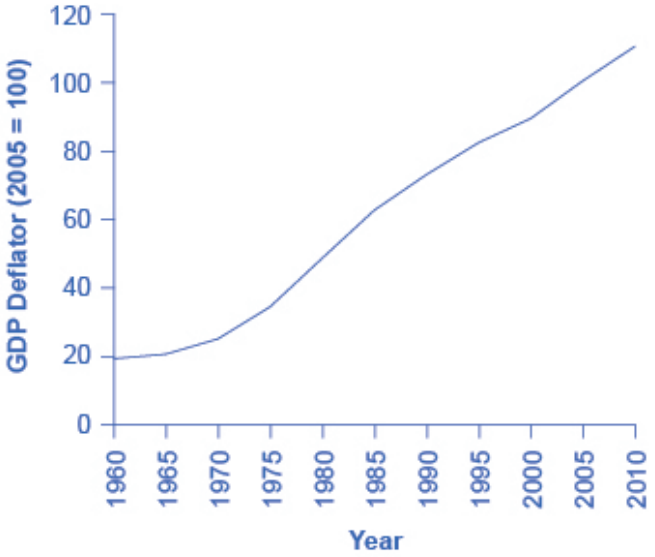


Figure 5.8. *U.S. GDP Deflator, 1960–2010 Much like nominal GDP, the GDP deflator has risen exponentially from 1960 through 2010. (Source: BEA).*

Figure 5.8 shows that the price level has risen dramatically since 1960. The price level in 2010 was almost six times higher than in 1960 (the deflator for 2010 was 110 versus a level of 19 in 1960). Clearly, much of the apparent growth in nominal GDP was due to inflation, not an actual change in the quantity of goods and services produced, in other words, not in real GDP. Recall that nominal GDP can rise for two reasons: an increase in output, and/or an increase in prices. What is needed is to extract the increase in prices from nominal GDP so as to measure only changes in output. After all, the dollars used to measure nominal GDP in 1960 are worth more than the inflated dollars of 1990—and the price index tells exactly how

much more. This adjustment is easy to do if you understand that nominal measurements are in value terms, where

[latex]\text{Value}=\text{Price}\times\text{Quantity}[/latex]

or

[latex]\text{Nominal GDP}=\text{GDP Deflator}\times\text{Real GDP}[/latex]

Let's look at an example at the micro level. Suppose the t-shirt company, Coolshirts, sells 10 t-shirts at a price of $9 each.

[latex]\text{Coolshirt's nominal revenue from sales}=\text{Price}\times\text{Quantity}=9\times{10}=90[/latex]

Then,

[latex]\displaystyle\text{Coolshirt's real income}=\frac{\text{Nominal revenue}}{\text{Price}}=\frac{90}{9}=10[/latex]

In other words, when we compute "real" measurements we are trying to get at actual quantities, in this case, 10 t-shirts.

With GDP, it is just a tiny bit more complicated. We start with the same formula as above:

[latex]\displaystyle\text{Real GDP}=\frac{\text{Nominal GDP}}{\text{Price Index}}[/latex]

For reasons that will be explained in more detail below, mathematically, a price index is a two-digit decimal number like 1.00 or 0.85 or 1.25. Because some people have trouble working with decimals, when the price index is published, it has traditionally been multiplied by 100 to get integer numbers like 100, 85, or 125. What this means is that when we "deflate" nominal figures to get real figures (by dividing the nominal by the price index). We also need to remember to divide the published price index by 100 to make the math work. So the formula becomes:

[latex]\displaystyle\text{Real GDP}=\frac{\text{Nominal GDP}}{\frac{\text{Price Index}}{100}}[/latex]

Computing GDP

Now read the following "Computing GDP" activity for more practice calculating real GDP. It is possible to use the data in Table 5.5 to compute real GDP.

Step 1. Look at Table 5.5, to see that, in 1960, nominal GDP was $543.3 billion and the price index (GDP deflator) was 19.0.

Step 2. To calculate the real GDP in 1960, use the formula:

[latex]\begin{array}{l}\text{Real GDP}=\frac{\text{Nominal GDP}}{\frac{\text{Price Index}}{100}}\\\text{Real GDP}=\frac{543.3\text{ billion}}{\frac{19}{100}}=\$2,859.5\text{ billion}\end{array}[/latex]

We'll do this in two parts to make it clear. First adjust the price index: 19 divided by [latex]100=0.19[/latex]. Then divide into nominal GDP: [latex]\frac{\$543.3\text{ billion}}{0.19}=\$2,859.5\text{ billion}[/latex].

Step 3. Use the same formula to calculate the real GDP in 1965.

[latex]\begin{array}{l}\text{Real GDP}=\frac{\text{Nominal GDP}}{\frac{\text{Price Index}}{100}}\\\text{Real GDP}=\frac{743.7\text{ billion}}{\frac{20.3}{100}}=\$3,663.5\text{ billion}\end{array}[/latex]

Step 4. Continue using this formula to calculate all of the real GDP values from 1960 through 2010. The calculations and the results are shown in Table 5.6.

Table 5.6. Converting Nominal to Real GDP

Year	Nominal GDP (billions of dollars)	GDP Deflator (2005 = 100)	Calculations	Real GDP (billions of 2005 dollars)
1960	543.3	19.0	[latex]\displaystyle\ frac{543.3}{(\frac{19.0}{100})}[/latex]	2859.5
1965	743.7	20.3	743.7 / (20.3/100) [latex]\displaystyle\ frac{743.7}{(\frac{20.3}{100})}[/latex]	3663.5
1970	1075.9	24.8	1,075.9 / (24.8/100) [latex]\displaystyle\ frac{1,075.9}{(\frac{24.8}{100})}[/latex]	4338.3
1975	1688.9	34.1	1,688.9 / (34.1/100) [latex]\displaystyle\ frac{1,688.9}{(\frac{34.1}{100})}[/latex]	4952.8
1980	2862.5	48.3	2,862.5 / (48.3/100) [latex]\displaystyle\ frac{2,862.5}{(\frac{48.3}{100})}[/latex]	5926.5
1985	4346.7	62.3	4,346.7 / (62.3/100) [latex]\displaystyle\ frac{4,346.7}{(\frac{62.3}{100})}[/latex]	6977.0
1990	5979.6	72.7	5,979.6 / (72.7/100) [latex]\displaystyle\ frac{5,979.6}{(\frac{72.7}{100})}[/latex]	8225.0
1995	7664.0	82.0	7,664 / (82.0/100) [latex]\displaystyle\ frac{7,664.0}{(\frac{82.0}{100})}[/latex]	9346.3
2000	10289.7	89.0	10,289.7 / (89.0/100) [latex]\displaystyle\ frac{10,289.7}{(\frac{89.0}{100})}[/latex]	11561.5

Source: Bureau of Economic Analysis, www.bea.gov

Table 5.6. Converting Nominal to Real GDP

2005	13095.4	100.0	13,095.4 / (100.0/100) [latex]\displaystyle\ frac{13,095.4}{(\frac{100.0}{100})}[/latex]	13095.4
2010	14958.3	110.0	14,958.3 / (110.0/100) [latex]\displaystyle\ frac{14,958.3}{(\frac{110.0}{100})}[/latex]	13598.5

Source: Bureau of Economic Analysis, www.bea.gov

There are a couple things to notice here. Whenever you compute a real statistic, one year (or period) plays a special role. It is called the base year (or base period). The base year is the year whose prices are used to compute the real statistic. When we calculate real GDP, for example, we take the quantities of goods and services produced in each year (for example, 1960 or 1973) and multiply them by their prices in the base year (in this case, 2005), so we get a measure of GDP that uses prices that do not change from year to year. That is why real GDP is labeled "Constant Dollars" or "2005 Dollars," which means that real GDP is constructed using prices that existed in 2005. The formula used is:

[latex]\displaystyle\text{GDP deflator}=\frac{\text{Nominal GDP}}{\text{Real GDP}}\times{100}[/latex]

Rearranging the formula and using the data from 2005:

[latex]\begin{array}{l}\text{Real GDP}=\frac{\text{Nominal GDP}}{\frac{\text{Price Index}}{100}}\\\text{Real GDP}=\frac{13,095.4\text{ billion}}{\frac{100}{100}}=\$13,095.4\ text{ billion}\end{array}[/latex]

Comparing real GDP and nominal GDP for 2005, you see they are the same. This is no accident. It is because 2005 has been chosen as the "base year" in this example. Since the price index in the base year always has a value of 100 (by definition), nominal and real GDP are always the same in the base year.

Look at the data for 2010.

[latex]\begin{array}{l}\text{Real GDP}=\frac{\text{Nominal GDP}}{\frac{\text{Price Index}}{100}}\\\text{Real

GDP}=\frac{14,958.3\text{ billion}}{\frac{100}{100}}=\$13,598.5\
text{ billion}\end{array}[/latex]

Use this data to make another observation: As long as inflation is positive, meaning prices increase on average from year to year, real GDP should be less than nominal GDP in any year after the base year. The reason for this should be clear: The value of nominal GDP is "inflated" by inflation. Similarly, as long as inflation is positive, real GDP should be greater than nominal GDP in any year before the base year.

Figure 5.9 shows the U.S. nominal and *real GDP* since 1960. Because 2005 is the base year, the nominal and real values are exactly the same in that year. However, over time, the rise in nominal GDP looks much larger than the rise in real GDP (that is, the *nominal GDP* line rises more steeply than the real GDP line), because the rise in nominal GDP is exaggerated by the presence of inflation, especially in the 1970s.

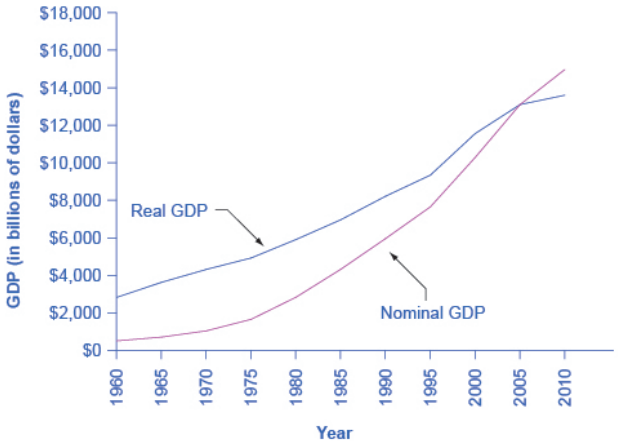


Figure 5.9. *U.S. Nominal and Real GDP, 1960–2012 The red line measures U.S. GDP in nominal dollars. The black line measures U.S. GDP in real dollars, where all dollar values have been converted to 2005 dollars. Since real GDP is expressed in 2005 dollars, the two lines cross in 2005. However, real GDP will appear higher than nominal GDP in the years before 2005, because dollars were worth less in 2005 than in previous years. Conversely, real GDP will appear lower in the years after 2005, because dollars were worth more in 2005 than in later years.*

Let's return to the question posed originally: How much did GDP increase in real terms? What was the rate of growth of real GDP from 1960 to 2010? To find the real growth rate, we apply the formula for percentage change:

[latex]\displaystyle\frac{2010\text{ real GDP}-1960\text{ real GDP}}{1960\text{ real GDP}}\times{100}=\text{ percent change}[/latex]

[latex]\displaystyle\frac{13,598.5-2,859.5}{2,859.5}\times{100}=376\text{ percent}[/latex]

In other words, the U.S. economy has increased real production of goods and services by nearly a factor of four since 1960. Of course, that understates the material improvement since it fails to capture improvements in the quality of products and the invention of new products.

There is a quicker way to answer this question approximately, using another math trick. Because:

Real GDP = Price × Quantity

% change in real GDP = % change in price + % change in quantity

OR

% change in quantity = % change in real GDP − % change in price

Therefore, the growth rate of real GDP (% change in quantity) equals the growth rate in nominal GDP (% change in value) minus the inflation rate (% change in price).

Note that using this equation provides an approximation for small changes in the levels. For more accurate measures, one should use the first formula shown.

Self Check: Nominal and Real GDP

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not**

count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the two Readings in this section.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

An interactive or media element has been excluded from this version of the text. You can view it online here: https://pressbooks.ccconline.org/accmacro/?p=355

174. Putting It Together: Inflation and Price Indexes

Summary

The goal of this module was to teach you how to use economic indicators to assess the state of the economy. You learned how to:

- Define the rate of inflation; Explain how the rate of inflation is calculated
- Identify the consequences of price instability (i.e. inflation)
- Explain the concept of a price index and explain how price indices are derived.
- Use a price index to translate between real and nominal data
- Define the GDP price index (also known as the GDP deflator or the Implicit Price Deflator)
- Differentiate between nominal GDP and real GDP

Examples

Let's return to the questions posed in the Why it Matters feature. This module explained that the economy goes through cycles of speeding up and slowing down. Recession doesn't just mean a slowdown in the economy (a decrease in economic growth), but rather negative economic growth, a decrease in real GDP over at least six months, so that the economy is actually producing less goods and services than in did before. Recessions happen on average about once every five years, and they tend to average one year of recession and four years of expansion. The measured

unemployment rate never gets to zero, because of frictional unemployment, the time it takes for employers and job seekers to find each other. The economy is close to full employment when the measured rate reaches perhaps five percent. The U.S. economy has not experienced significant inflation since the early 1980s. Using what you've learned, you should be able to judge the current state of the economy. Here is one judgment from 2014:

A YouTube element has been excluded from this version of the text. You can view it online here: https://pressbooks.ccconline.org/accmacro/?p=357

Now that you know the most important economic indicators, the rest of this text will explain what causes them to do what they do and how they are related to one another.

175. Putting It Together: Macroeconomic Measures of Performance

Summary

The goal of this module was to teach you how to use economic indicators to assess the state of the economy. You learned how to:

- Define the term “economic indicator”
- Explain GDP, including what it measures and what it excludes
- Describe the relationships among GDP, net domestic product, national income, personal income, and disposable income
- Explain how the unemployment rate is calculated.
- Identify and differentiate between the different types of unemployment
- Explain the concept of a price index and explain how price indices are derived.
- Define the rate of inflation; Explain how the rate of inflation is calculated
- Identify the consequences of price instability (i.e. inflation)
- Use a price index to translate between real and nominal data
- Define the GDP price index (also known as the GDP deflator or the Implicit Price Deflator)
- Differentiate between nominal GDP and real GDP
- Measure the distribution of income using the Lorenz curve

Examples

Let's return to the questions posed in the Why it Matters feature. This module explained that the economy goes through cycles of speeding up and slowing down. Recession doesn't just mean a slowdown in the economy (a decrease in economic growth), but rather negative economic growth, a decrease in real GDP over at least six months, so that the economy is actually producing less goods and services than in did before. Recessions happen on average about once every five years, and they tend to average one year of recession and four years of expansion. The measured unemployment rate never gets to zero, because of frictional unemployment, the time it takes for employers and job seekers to find each other. The economy is close to full employment when the measured rate reaches perhaps five percent. The U.S. economy has not experienced significant inflation since the early 1980s. Using what you've learned, you should be able to judge the current state of the economy. Here is one judgment from 2014:

A YouTube element has been excluded from this version of the text. You can view it online here: https://pressbooks.ccconline.org/accmacro/?p=312

Now that you know the most important economic indicators, the rest of this text will explain what causes them to do what they do and how they are related to one another.

176. Glossary: Inflation and Price Indexes

adjustable-rate mortgage (ARM) a loan used to purchase a home in which the interest rate varies with market interest rates

base year arbitrary year whose value as an index number is defined as 100; inflation from the base year to other years can easily be seen by comparing the index number in the other year to the index number in the base year—for example, 100; so, if the index number for a year is 105, then there has been exactly 5% inflation between that year and the base year

basket of goods and services a hypothetical group of different items, with specified quantities of each one meant to represent a "typical" set of consumer purchases, used as a basis for calculating how the price level changes over time

business cycle the relatively short-term movement of the economy in and out of recession

cost-of-living adjustments (COLAs) a contractual provision that wage increases will keep up with inflation

indexed a price, wage, or interest rate is adjusted automatically for inflation

Consumer Price Index (CPI) a measure of inflation calculated by U.S. government statisticians based on the price level from a fixed basket of goods and services that represents the purchases of the average consumer

core inflation index a measure of inflation typically calculated by taking the CPI and excluding volatile economic variables such as food and energy prices to better measure the underlying and persistent trend in long-term prices

deflation negative inflation; most prices in the economy are falling

depression an especially lengthy and deep decline in output

Employment Cost Index a measure of inflation based on wages paid in the labor market

GDP deflator a measure of inflation based on the prices of all the components of GDP

hyperinflation an outburst of high inflation that is often seen (although not exclusively) when economies shift from a controlled economy to a market-oriented economy

index number a unit-free number derived from the price level over a number of years, which makes computing inflation rates easier, since the index number has values around 100

inflation a general and ongoing rise in the level of prices in an economy

International Price Index a measure of inflation based on the prices of merchandise that is exported or imported

nominal value the economic statistic actually announced at that time, not adjusted for inflation; contrast with real value

peak during the business cycle, the highest point of output before a recession begins

Producer Price Index (PPI) a measure of inflation based on prices paid for supplies and inputs by producers of goods and services

quality/new goods bias inflation calculated using a fixed basket of goods over time tends to overstate the true rise in cost of living, because it does not take into account improvements in the quality of existing goods or the invention of new goods

real value an economic statistic after it has been adjusted for inflation; contrast with nominal value

recession a significant decline in national output

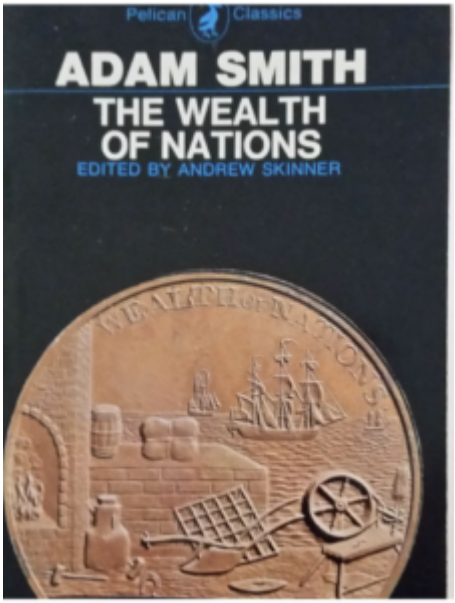
substitution bias an inflation rate calculated using a fixed basket of goods over time tends to overstate the true rise in the cost of living, because it does not take into account that the person can substitute away from goods whose prices rise by a lot

trough during the business cycle, the lowest point of output in a recession, before a recovery begins

PART IX

LESSON 8 CLASSICAL AND NEOCLASSICAL MODEL

177. Why It Matters: Classical and NeoClassical Model



The founding father's built their knowledge of the US economy based on the work of Adam Smith in his book Wealth of Nations. Adam Smith is considered the "Father or Economics". In this lesson you will learn about his model of how the invisible hand allocates scarce resources.

During this lesson you will:

- Understand the tenets of Classical and Neoclassical Economics
- Understand the assumptions of the models
- Apply the tenets through the aggregate supply and demand model

178. Outcome: Classical/ Neoclassical Economics and the AD-AS Model

What you'll learn to do: understand the tenets of Classical and Neoclassical Economics

In this section, you will learn about the foundational concept of the Classical model with Say's law that leads to Neoclassical economics. You'll also learn to analyze aggregate demand and supply through the Classical/Neoclassical perspective.

Here are some of the specific things you'll learn to do in this section:

- Identify the Classical/Neoclassical portion of the AS curve and explain the logic for it
- Differentiate between the long run and short run aggregate supply curves

LEARNING ACTIVITIES

The learning activities for this section include:

- Reading: Introduction to the Classical/Neoclassical Perspective
- Reading: Say's Law and the Macroeconomics of Supply
- Reading: The Neoclassical Perspective and Aggregate Demand and Supply

- Reading: The Neoclassical Perspective and Flexible Prices
- Self Check: The Neoclassical Perspective

Take time to review and reflect on each of these activities in order to improve your performance on the assessment for this section.

179. Reading: The Neoclassical Perspective and Aggregate Demand and Supply

The Importance of Potential GDP in the Long Run

The classical/neoclassical perspective on macroeconomics holds that, in the long run, the economy will fluctuate around its potential GDP and its natural rate of unemployment. This reading begins with two building blocks of neoclassical economics: (1) the size of the economy is determined by potential GDP, and (2) wages and prices will adjust in a flexible manner so that the economy will adjust back to its potential GDP level of output.

The key policy implication is this: Should the government focus more on long-term growth and on controlling inflation than on worrying about recession or cyclical unemployment? This focus on long-run growth rather than the short-run fluctuations in the business cycle means that neoclassical economics is more useful for long-run macroeconomic analysis and Keynesian economics is more useful for analyzing the macroeconomic short run. Let's consider the two neoclassical building blocks in turn, and how they can be embodied in the aggregate demand/aggregate supply model.

Over the long run, the level of potential GDP determines the size of real GDP. When economists refer to "potential GDP" they are referring to that level of output that can be achieved when all resources (land, labor, capital, and entrepreneurial ability) are fully

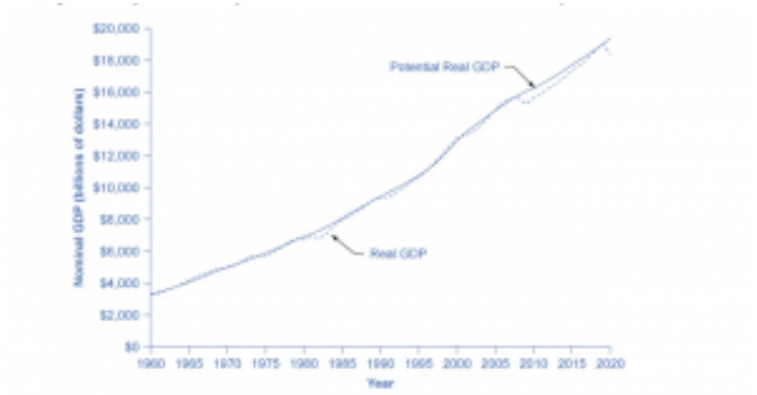
employed. While the unemployment rate in labor markets will never be zero, full employment in the labor market refers to zero cyclical unemployment. There will still be some level of unemployment due to frictional or structural unemployment, but when the economy is operating with zero cyclical unemployment, the economy is said to be at the natural rate of unemployment or at full employment.

Actual or real GDP is benchmarked against the potential GDP to determine how well the economy is performing. Growth in GDP can be explained by increases and investment in physical capital and human capital per person as well as advances in technology. Physical capital per person refers to the amount and kind of machinery and equipment available to help people get work done. Compare, for example, your productivity in typing a term paper on a typewriter to working on your laptop with word processing software. Clearly, you will be able to be more productive using word processing software. The technology and level of capital of your laptop and software has increased your productivity. More broadly, the development of GPS technology and Universal Product Codes (those barcodes on every product we buy) has made it much easier for firms to track shipments, tabulate inventories, and sell and distribute products. These two technological innovations, and many others, have increased a nation's ability to produce goods and services for a given population. Likewise, increasing human capital involves increasing levels of knowledge, education, and skill sets per person through vocational or higher education. Physical and human capital improvements with technological advances will increase overall productivity and, thus, GDP.

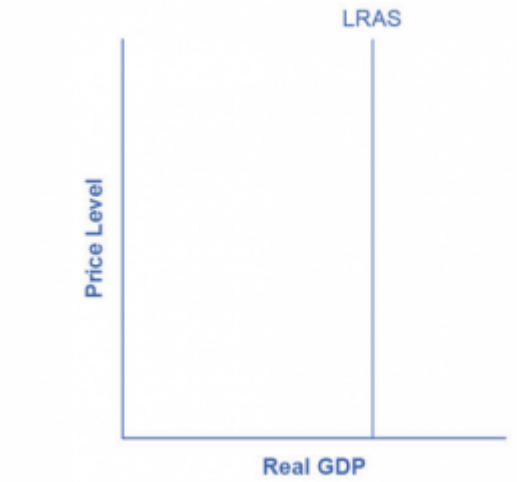
To see how these improvements have increased productivity and output at the national level, we should examine evidence from the United States. The United States experienced significant growth in the twentieth century due to phenomenal changes in infrastructure, equipment, and technological improvements in physical capital and human capital. The population more than tripled in the twentieth century, from 76 million in 1900 to over 300 million in 2012. The human capital of modern workers is far higher today because the

education and skills of workers have risen dramatically. In 1900, only about one-eighth of the U.S. population had completed high school and just one person in 40 had completed a four-year college degree. By 2010, more than 87% of Americans had a high school degree and over 29% had a four-year college degree as well. The average amount of physical capital per worker has grown dramatically. The technology available to modern workers is extraordinarily better than a century ago: cars, airplanes, electrical machinery, smartphones, computers, chemical and biological advances, materials science, health care—the list of technological advances could run on and on. More workers, higher skill levels, larger amounts of physical capital per worker, and amazingly better technology, and potential GDP for the U.S. economy has clearly increased a great deal since 1900.

This growth has fallen below its potential GDP and, at times, has exceeded its potential. For example from 2008 to 2009, the U.S. economy tumbled into recession and remains below its potential. At other times, like in the late 1990s, the economy ran at potential GDP—or even slightly ahead. Figure shows the actual data for the increase in nominal GDP since 1960. The slightly smoother line shows the potential GDP since 1960 as estimated by the nonpartisan Congressional Budget Office. Most economic recessions and upswings are times when the economy is 1–3% below or above potential GDP in a given year. Clearly, short-run fluctuations around potential GDP do exist, but over the long run, the upward trend of potential GDP determines the size of the economy.



In the aggregate demand/aggregate supply model, potential GDP is shown as a vertical line. Neoclassical economists who focus on potential GDP as the primary determinant of real GDP argue that the long-run aggregate supply curve is located at potential GDP—that is, the long-run aggregate supply curve is a vertical line drawn at the level of potential GDP, as shown in Figure. A vertical LRAS curve means that the level of aggregate supply (or potential GDP) will determine the real GDP of the economy, regardless of the level of aggregate demand. Over time, increases in the quantity and quality of physical capital, increases in human capital, and technological advancements shift potential GDP and the vertical LRAS curve gradually to the right. This gradual increase in an economy's potential GDP is often described as a nation's long-term economic growth.


LRAS
Price Level
Real GDP

180. Reading: Introduction to the Classical/Neoclassical Perspective

NAVIGATING UNCHARTERED WATERS

Figure 12.1. *Impact of the Great Recession. The impact of the Great Recession can be seen in many areas of the economy that impact our daily lives. One of the most visible signs can be seen in the housing market where many homes and other buildings are abandoned, including ones that midway through construction. (Credit: modification of work by A McLin, CC BY).*

The Great Recession ended in June 2009 after 18 months, according to the National Bureau of Economic Research (NBER). The NBER examines a variety of measures of economic activity to gauge the overall health of the economy. These measures include real income, wholesale and retail sales, employment, and industrial production. In the years since the official end of this historic economic downturn, it has become clear that the Great Recession was two-

pronged, hitting the U.S. economy with the collapse of the housing market and the failure of the financial system's credit institutions, further contaminating global economies. While the stock market rapidly lost trillions of dollars of value, consumer spending dried up, and companies began cutting jobs, economic policymakers were struggling with how to best combat and prevent a national, and even global economic collapse. In the end, policymakers used a number of controversial monetary and fiscal policies to support the housing market and domestic industries as well as to stabilize the financial sector.

Some of these initiatives included:

- Federal Reserve Bank, sometimes called the Fed as short-hand, purchased of both traditional and nontraditional assets off banks' balance sheets. By doing this, the Fed injected money into the banking system and increased the amounts of funds available to lend to the business sector and consumers. This also dropped short-term interest rates to as low as zero percent and had the effect of devaluing U.S. dollars in the global market and boosting exports.
- The Congress and the President also passed several pieces of legislation that would stabilize the financial market. The Troubled Asset Relief Program (TARP), passed in late 2008, allowed the government to inject cash into troubled banks and other financial institutions and help support General Motors and Chrysler as they faced bankruptcy and threatened job losses throughout their supply chain. The American Recovery and Reinvestment Act in early 2009 provided tax rebates to low- and middle-income households to encourage consumer spending.

Four years after the end of the Great Recession, the economy has yet to return to its pre-recession levels of productivity and growth. Annual productivity increased only 1.9% between 2009 and 2012 compared to its 2.7% annual growth rate between 2000 and 2007,

unemployment remains above the natural rate, and real GDP continues to lag behind potential growth. The actions taken to stabilize the economy are still under scrutiny and debate about their effectiveness continues. In this module, we will discuss the neoclassical perspective on economics and compare it to the Keynesian perspective.

The Big Picture and The Neoclassical Perspective

In Chicago, Illinois, the highest recorded temperature was 105° in July 1995, while the lowest recorded temperature was 27° below zero in January 1958. Understanding why these extreme weather patterns occurred would be interesting. However, if you wanted to understand the typical weather pattern in Chicago, instead of focusing on one-time extremes, you would need to look at the entire pattern of data over time.

A similar lesson applies to the study of macroeconomics. It is interesting to study extreme situations, like the *Great Depression* of the 1930s or what many have called the *Great Recession* of 2008–2009. If you want to understand the whole picture, however, you need to look at the long term. Consider the unemployment rate. The unemployment rate has fluctuated from as low as 3.5% in 1969 to as high as 9.7% in 1982 and 9.6% in 2009. Even as the U.S. unemployment rate rose during recessions and declined during expansions, it kept returning to the general neighborhood of 5.0–5.5%. When the nonpartisan Congressional Budget Office carried out its long-range economic forecasts in 2010, it assumed that from 2015 to 2020, after the recession has passed, the unemployment rate would be 5.0%. From a long-run perspective, the economy seems to keep adjusting back to this rate of unemployment.

As the name "neoclassical" implies, this perspective of how the macroeconomy works is a "new" view of the "old" classical model

of the economy. The classical view, the predominant economic philosophy until the Great Depression, was that short-term fluctuations in economic activity would rather quickly, with flexible prices, adjust back to full employment. This view of the economy implied a vertical aggregate supply curve at full employment GDP, and prescribed a "hands off" policy approach. For example, if the economy were to slip into recession (a leftward shift of the aggregate demand curve), it would temporarily exhibit a surplus of goods. This surplus would be eliminated with falling prices, and the economy would return to full employment level of GDP; no active fiscal or monetary policy was needed. In fact, the classical view was that expansionary fiscal or monetary policy would only cause inflation, rather than increase GDP. The deep and lasting impact of the Great Depression changed this thinking and Keynesian economics, which prescribed active fiscal policy to alleviate weak aggregate demand, became the more mainstream perspective.

181. Reading: Say's Law and the Macroeconomics of Supply

Say's Law and the Macroeconomics of Supply

Neoclassical economists emphasize Say's law, which holds that supply creates its own demand. Those economists who emphasize the role of supply in the macroeconomy often refer to the work of a famous French economist of the early nineteenth century named *Jean-Baptiste Say* (1767–1832). *Say's law* is: "Supply creates its own demand." As a matter of historical accuracy, Say never actually wrote down this law and it may oversimplify his beliefs, but the law lives on as useful shorthand for summarizing a point of view.

The philosophy behind Say's law is that each time a good or service is produced and sold, it generates income that is earned for someone: a worker, a manager, an owner, or those who are workers, managers, and owners at firms that supply inputs along the chain of production. The forces of supply and demand in individual markets will cause prices to rise and fall. The bottom line remains, however, that every sale represents income to someone, and so, Say's law argues, a given value of supply must create an equivalent value of demand somewhere else in the economy. Because Jean-Baptiste Say, *Adam Smith*, and other economists writing around the turn of the nineteenth century who discussed this view were known as "classical" economists, modern economists who generally subscribe to the Say's law view on the importance of supply for determining the size of the macroeconomy are called *neoclassical economists*.

If *supply* always creates exactly enough demand at the macroeconomic level, then (as Say himself recognized) it is hard

to understand why periods of recession and high unemployment should ever occur. To be sure, even if total supply always creates an equal amount of total demand, the economy could still experience a situation of some firms earning profits while other firms suffer losses. Nevertheless, a *recession* is not a situation where all business failures are exactly counterbalanced by an offsetting number of successes. A recession is a situation in which the economy as a whole is shrinking in size, business failures outnumber the remaining success stories, and many firms end up suffering losses and lying off workers.

Say's law reminds us that supply creates its own *demand* can be a good approximation for the long run. Over periods of some years or decades, as the productive power of an economy to supply goods and services increases, total demand in the economy grows at roughly the same pace. However, over shorter time horizons of a few months or even years, recessions or even depressions occur in which firms, as a group, seem to face a lack of demand for their products.

182. Reading: The Neoclassical Perspective and Flexible Prices

The Role of Flexible Prices

How does the macroeconomy adjust back to its level of potential GDP in the long run? What if aggregate demand increases or decreases? The neoclassical view of how the macroeconomy adjusts is based on the insight that even if wages and prices are "sticky", or slow to change, in the short run, they are flexible over time. To understand this better, let's follow the connections from the short-run to the long-run macroeconomic equilibrium.

The aggregate demand and aggregate supply diagram shown in Figure 12.4 shows two aggregate supply curves. The original upward sloping aggregate supply curve (AS_0) is a short-run or Keynesian AS curve. The vertical aggregate supply curve (ASn) is the long-run or neoclassical AS curve, which is located at potential GDP. The original aggregate demand curve, labeled AD_0, is drawn so that the original equilibrium occurs at point E_0, at which point the economy is producing at its potential GDP.

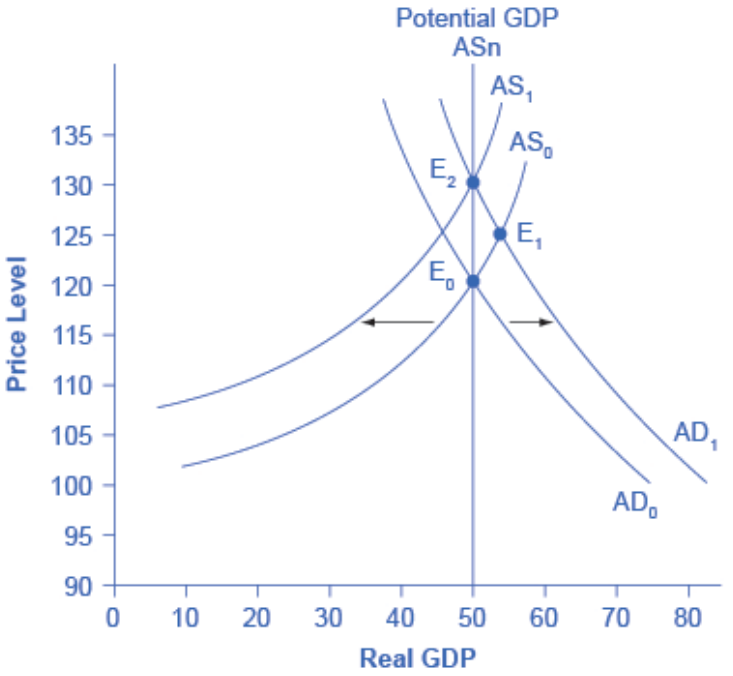


Figure 12.4. *The Rebound to Potential GDP after AD Increases The original equilibrium (E0), at an output level of 50 and a price level of 120, happens at the intersection of the aggregate demand curve (AD0) and the short-run aggregate supply curve (AS0). The output at E0 is equal to potential GDP. Aggregate demand shifts right from AD0 to AD1. The new equilibrium is E1, with a higher output level of 55 and an increase in the price level to 125. With unemployment rates unsustainably low, wages are bid up by eager employers, which shifts short-run aggregate supply to the left, from AS0 to AS1. The new equilibrium (E2) is at the same original level of output, 50, but at a higher price level of 130. Thus, the long-run aggregate supply curve (ASn), which is vertical at the level of potential GDP, determines the level of real GDP in this economy in the long run.*

Now, imagine that some economic event boosts aggregate demand: perhaps a surge of export sales or a rise in business confidence that leads to more investment, perhaps a policy decision like higher government spending, or perhaps a tax cut that leads to additional aggregate demand. The short-run Keynesian analysis is that the rise

in aggregate demand will shift the aggregate demand curve out to the right, from AD_0 to AD_1, leading to a new equilibrium at point E_1 with higher output, lower unemployment, and pressure for an inflationary rise in the price level.

In the long-run neoclassical analysis, however, the chain of economic events is just beginning. As economic output rises above potential GDP, the level of unemployment falls. The economy is now above full employment and there is a shortage of labor. Eager employers are trying to bid workers away from other companies and to encourage their current workers to exert more effort and to put in longer hours. This high demand for labor will drive up wages. Most workers have their salaries reviewed only once or twice a year, and so it will take time before the higher wages filter through the economy. As wages do rise, it will mean a leftward shift in the short-run Keynesian aggregate supply curve back to AS_1, because the price of a major input to production has increased. The economy moves to a new equilibrium (E_2). The new equilibrium has the same level of real GDP as did the original equilibrium (E_0), but there has been an inflationary increase in the price level.

This description of the short-run shift from E_0 to E_1 and the long-run shift from E_1 to E_2 is a step-by-step way of making a simple point: the economy cannot sustain production above its potential GDP in the long run. An economy may produce above its level of potential GDP in the short run, under pressure from a surge in aggregate demand. Over the long run, however, that surge in aggregate demand ends up as an increase in the price level, not as a rise in output.

The rebound of the economy back to potential GDP also works in response to a shift to the left in aggregate demand. Figure 12.5 again starts with two aggregate supply curves, with AS_0 showing the original upward sloping short-run Keynesian AS curve and ASn showing the vertical long-run neoclassical aggregate supply curve. A decrease in aggregate demand—for example, because of a decline in consumer confidence that leads to less consumption and more saving—causes the original aggregate demand curve AD_0 to shift

back to AD_1. The shift from the original equilibrium (E_0) to the new equilibrium (E_1) results in a decline in output. The economy is now below full employment and there is a surplus of labor. As output falls below potential GDP, unemployment rises. While a lower price level (i.e., deflation) is rare in the United States, it does happen from time to time during very weak periods of economic activity. For practical purposes, we might consider a lower price level in the AD–AS model as indicative of disinflation, which is a decline in the rate of inflation. Thus, the long-run aggregate supply curve ASn, which is vertical at the level of potential GDP, ultimately determines the real GDP of this economy.

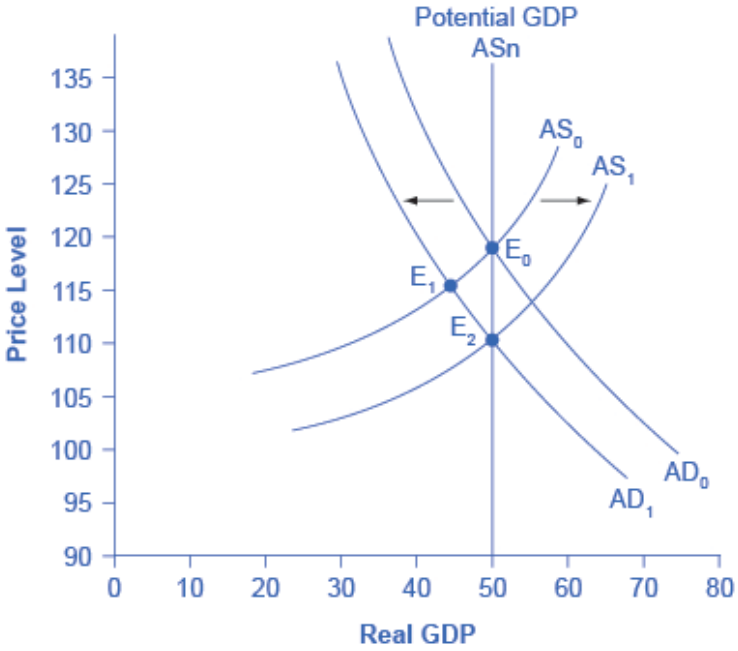


Figure 12.5. *A Rebound Back to Potential GDP from a Shift to the Left in Aggregate Demand The original equilibrium (E0), at an output level of 50 and a price level of 120, happens at the intersection of the aggregate demand curve (AD0) and the short-run aggregate supply curve (AS0). The output at E0 is equal to potential GDP. Aggregate demand shifts left, from AD0 to AD1. The new equilibrium is at E1, with a lower output level of 45 and downward pressure on the price level of 115. With high unemployment rates, wages are held down. Lower wages are an economy-wide decrease in the price of a key input, which shifts short-run aggregate supply to the right, from AS0 to AS1. The new equilibrium (E2) is at the same original level of output, 50, but at a lower price level of 110.*

Again, from the neoclassical perspective, this short-run scenario is only the beginning of the chain of events. The higher level of unemployment means more workers looking for jobs. As a result, employers can hold down on pay increases—or perhaps even replace some of their higher-paid workers with unemployed people willing to accept a lower wage. As wages stagnate or fall, this decline in the price of a key input means that the short-run Keynesian aggregate

supply curve shifts to the right from its original (AS_0 to AS_1). The overall impact in the long run, as the macroeconomic equilibrium shifts from E_0 to E_1 to E_2, is that the level of output returns to potential GDP, where it started. There is, however, downward pressure on the price level. Thus, in the neoclassical view, changes in aggregate demand can have a short-run impact on output and on unemployment—but only a short-run impact. In the long run, when wages and prices are flexible, potential GDP and aggregate supply determine the size of real GDP.

Self Check: The Neoclassical Perspective

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the four Readings in this section.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

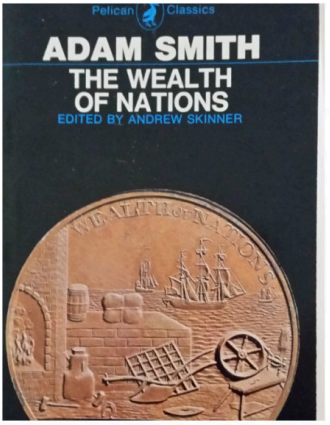
An interactive or media element has been excluded from this version of the text. You can view it online here: https://pressbooks.ccconline.org/accmacro/?p=465

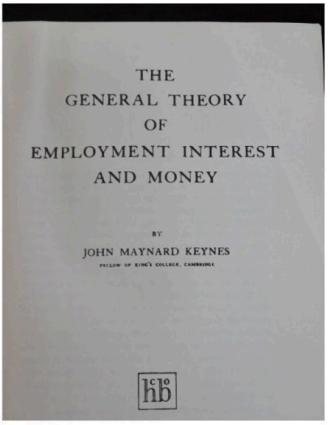
PART X

LESSON 9: KEYNESIAN MODEL

183. Why It Matters: Keynesian Economics

Why identify, compare, and apply key features of Neoclassical and Keynesian economic models?





Smith and Keynes' Collage by Steve. CC-BY.

Macroeconomic theory is both interesting and challenging because there is no single, universally accepted view about either how the economy works or what the appropriate role for government macro policy should be. Throughout history, there have been two competing perspectives about these questions, which we call Keynesian and Neoclassical economics. The views have had different names at different times, such as Classical and New Classical economics or Neo Keynesian and New Keynesian

economics, but while these views have become more nuanced, the basic perspectives have remained the same.

This module will present both perspectives in the context of the Aggregate Demand-Aggregate Supply model.Reality is complicated, which is the reason economists build and use models. In order to do justice to each perspective, the module is longer and more complicated than most modules in this course.

As you work through the module, instead of asking which perspective is correct, you should be guided by the following question: Under what circumstances does each perspective make sense? Also consider:

- What do the Keynesians and the Neoclassicals believe causes economic growth?
- What do the Keynesians and the Neoclassicals believe causes business cycles?
- What do the Keynesians and the Neoclassicals believe causes unemployment?
- What do the Keynesians and the Neoclassicals believe causes inflation?
- To what extent can government stimulate the economy or slow it down?
- To what extent should government attempt to stimulate the economy or slow it down?

There is a lot to learn here, so let's dive right in.

LEARNING OUTCOMES

- Understand the tenets of Keynesian Economics and apply the tenets through the aggregate demand and supply model
- Use the Expenditure Output model to explain periods of recession and expansion

- Compare and contrast the circumstances under which it makes sense to apply the Keynesian and Neoclassical perspectives

184. Outcome: Keynesian Economics and the AD-AS Model

What you'll learn to do: understand the tenets of Keynesian Economics and apply the tenets through the aggregate demand and supply model

In this section, you will learn about the basics behind Keynesian Economics and analyze the AD/AS model through the lens of the Keynesian perspective.

The specific things you'll learn in this section include:

- Identify the Keynesian portion of the AS curve and explain the logic for it
- Use the Income-Expenditure model to explain periods of recession and expansion
- Find the GDP Gap (negative or positive)

LEARNING ACTIVITIES

The learning activities for this section include:

- Reading: Introduction to the Keynesian Perspective
- Reading: Keynes' Law and Demand
- Reading: Aggregate Demand in Keynesian Analysis
- Reading: The Building Blocks of Keynesian Analysis
- Self Check: The Keynesian Perspective

- Reading: The GDP Gap
- Self Check: The GDP Gap
- Reading: The Phillips Curve
- Self Check: The Keynesian Portion of the AS Curve
- Reading: The Keynesian Perspective on Market Forces

Take time to review and reflect on each of these activities in order to improve your performance on the assessment for this section.

185. Reading: Introduction to the Keynesian Perspective

Figure 11.1. *Signs of a Recession Home foreclosures were just one of the many signs and symptoms of the recent Great Recession. During that time, many businesses closed and many people lost their jobs. (Credit: modification of work by Taber Andrew Bain, CC BY).*

THE GREAT RECESSION

The Great Recession of 2008–2009 hit the U.S. economy hard. According to the Bureau of Labor Statistics (BLS), the number of unemployed Americans rose from 6.8 million in May 2007 to 15.4 million in October 2009. During that time, the U.S. Census Bureau estimated that approximately 170,000 small businesses closed. Mass layoffs peaked in February 2009 when 326,392 workers were given notice. U.S. productivity and output fell as well. Job losses, declining home values, declining incomes, and uncertainty about the future caused consumption expenditures to decrease. According to the BLS, household spending dropped by 7.8%.

Home foreclosures and the meltdown in U.S. financial markets called for immediate action by Congress, the President, and the Federal Reserve Bank. For example, programs such as the American Recovery and Reinvestment Act of 2009 were implemented to help millions of people by providing tax credits for homebuyers, paying

"cash for clunkers" (a program for buying back used cars), and extending unemployment benefits. From cutting back on spending, filing for unemployment, and losing homes, millions of people were affected by the recession. And while the United States is now on the path to recovery, the impact will be felt for many years to come.

What caused this recession and what prevented the economy from spiraling further into another depression? Policymakers looked to the lessons learned from the Great Depression of the 1930s and to the models developed by John Maynard Keynes to analyze the causes and find solutions to the country's economic woes.

We have learned that the level of economic activity, for example output, employment, and spending, tends to grow over time. We learned earlier that the economy tends to cycle around the long-run trend. In other words, the economy does not always grow at its average growth rate. Sometimes economic activity grows at the trend rate, sometimes it grows more than the trend, sometimes it grows less than the trend, and sometimes it actually declines. You can see this cyclical behavior in Figure 11.2.

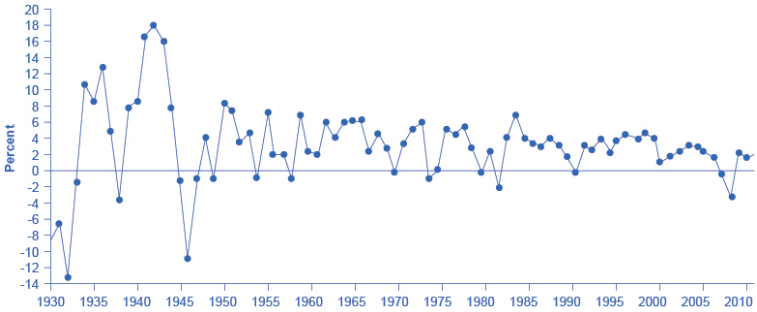


Figure 11.2. *U.S. Gross Domestic Product, Percent Changes 1930–2012 The chart tracks the percent change in GDP since 1930. The magnitude of both recessions and peaks was quite large between 1930 and 1945. (Source: Bureau of Economic Analysis, "National Economic Accounts").*

This empirical reality raises two important questions: How can we

explain the cycles, and to what extent can they be moderated? This module on the Keynesian and Neoclassical Perspectives explores those questions from two different points of view, building on what we learned in the aggregate supply-aggregate demand model.

186. Reading: Keynes' Law and Demand

Keynes' Law and Demand

When Keynes wrote his great work *The General Theory of Employment, Interest, and Money* during The Great Depression of the 1930s, he pointed out that during the Depression, the capacity of the economy to supply goods and services had not changed much. U.S. unemployment rates soared higher than 20% from 1933 to 1935, but the number of possible workers had not increased or decreased much. Factories were closed and shuttered, but machinery and equipment had not disappeared. Technologies that had been invented in the 1920s were not un-invented and forgotten in the 1930s. Thus, Keynes argued that the Great Depression—and many ordinary recessions as well—were not caused by a drop in the ability of the economy to supply goods as measured by labor, physical capital, or technology. He argued the economy often produced less than its full potential, not because it was technically impossible to produce more with the existing workers and machines, but because a lack of demand in the economy as a whole led to inadequate incentives for firms to produce. In such cases, he argued, the level of GDP in the economy was not primarily determined by the potential of what the economy could supply, but rather by the amount of total demand. In short, demand creates its own supply, which we can think of as Keynes Law.

Keynes' law seems to apply fairly well in the short run of a few months to a few years, when many firms experience either a drop in demand for their output during a recession or so much demand that they have trouble producing enough during an economic boom. However, demand cannot tell the whole macroeconomic story,

either. After all, if demand was all that mattered at the macroeconomic level, then the government could make the economy as large as it wanted just by pumping up total demand through a large increase in the government spending component or by legislating large tax cuts to push up the consumption component. Economies do, however, face genuine limits to how much they can produce, limits determined by the quantity of labor, physical capital, technology, and the institutional and market structures that bring these factors of production together. These constraints on what an economy can supply at the macroeconomic level do not disappear just because of an increase in demand.

Key Concepts and Summary

Neoclassical economists emphasize Say's law, which holds that supply creates its own demand. Keynesian economists emphasize Keynes' law, which holds that demand creates its own supply. Many mainstream economists take a Keynesian perspective, emphasizing the importance of aggregate demand, for the short run, and a neoclassical perspective, emphasizing the importance of aggregate supply, for the long run.

187. Reading: Aggregate Demand in Keynesian Analysis

Aggregate Demand in Keynesian Analysis

The Keynesian perspective focuses on aggregate demand. The idea is simple: firms produce output only if they expect it to sell. Thus, while the availability of the factors of production determines a nation's *potential GDP*, the amount of goods and services actually being sold, known as *real GDP*, depends on how much demand exists across the economy. This point is illustrated in Figure 11.3.

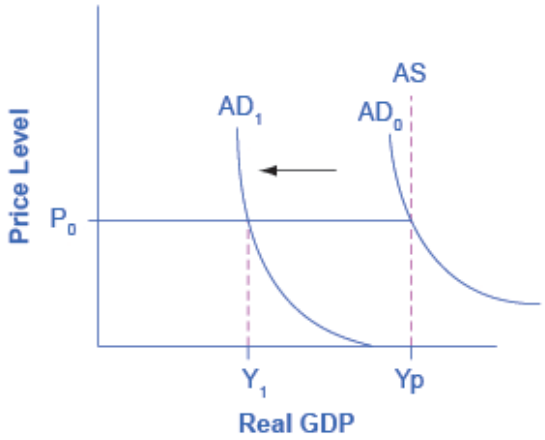


Figure 11.3. *The Keynesian AS–AD Model. The Keynesian View of the AS–AD Model uses an AS curve, which is horizontal at levels of output below potential and vertical at potential output. Thus, when beginning from potential output, any decrease in AD affects only output, but not prices; any increase in AD affects only prices, not output.*

Keynes argued that, for reasons we explain shortly, aggregate demand is not stable—that it can change unexpectedly. Suppose the economy starts where AD intersects AS at P_0 and Yp. Because Yp is potential output, the economy is at full employment. Because AD is volatile, it can easily fall. Thus, even if we start at Yp, if AD falls, then we find ourselves in what Keynes termed a *recessionary gap*. The economy is in equilibrium but with less than full employment, as shown at Y_1 in the Figure 11.3. Keynes believed that the economy would tend to stay in a recessionary gap, with its attendant unemployment, for a significant period of time.

In the same way (though not shown in the figure), if AD increases, the economy could experience an *inflationary gap*, where demand is attempting to push the economy past potential output. As a consequence, the economy experiences inflation. The key policy implication for either situation is that government needs to step

in and fill the gap, increasing spending during recessions and decreasing spending during booms to return aggregate demand to match potential output.

Recall from The Aggregate Supply-Aggregate Demand Model that *aggregate demand* is total spending, economy-wide, on domestic goods and services. (Aggregate demand (AD) is actually what economists call total planned expenditure. You'll read more about this in the next outcome on The Expenditure-Output Model.) You may also remember that aggregate demand is the sum of four components: consumption expenditure, investment expenditure, government spending, and spending on net exports (exports minus imports). In the following sections, we will examine each component through the Keynesian perspective.

What Determines Consumption Expenditure?

Consumption expenditure is spending by households and individuals on durable goods, nondurable goods, and services. Durable goods are things that last and provide value over time, such as automobiles. Nondurable goods are things like groceries—once you consume them, they are gone. Recall from The Macroeconomic Perspective that *services* are intangible things consumers buy, like healthcare or entertainment.

Keynes identified three factors that affect consumption:

- Disposable income: For most people, the single most powerful determinant of how much they consume is how much income they have in their take-home pay, also known as *disposable income*, which is income after taxes.
- Expected future income: Consumer expectations about future income also are important in determining consumption. If consumers feel optimistic about the future, they are more likely to spend and increase overall aggregate demand. News of

recession and troubles in the economy will make them pull back on consumption.
- Wealth or credit: When households experience a rise in wealth, they may be willing to consume a higher share of their income and to save less. When the U.S. stock market rose dramatically in the late 1990s, for example, U.S. rates of saving declined, probably in part because people felt that their wealth had increased and there was less need to save. How do people spend beyond their income, when they perceive their wealth increasing? The answer is borrowing. On the other side, when the U.S. stock market declined about 40% from March 2008 to March 2009, people felt far greater uncertainty about their economic future, so rates of saving increased while consumption declined.

Finally, Keynes noted that a variety of other factors combine to determine how much people save and spend. If household preferences about saving shift in a way that encourages consumption rather than saving, then AD will shift out to the right.

LINK IT UP

Visit this website for more information about how the recession affected various groups of people.

What Determines Investment Expenditure?

Spending on new capital goods is called *investment expenditure*. Investment falls into four categories: producer's durable equipment and software, nonresidential structures (such as factories, offices, and retail locations), changes in inventories, and residential

structures (such as single-family homes, townhouses, and apartment buildings). The first three types of investment are conducted by businesses, while the last is conducted by households.

Keynes's treatment of investment focuses on the key role of expectations about the future in influencing business decisions. When a business decides to make an investment in physical assets, like plants or equipment, or in intangible assets, like skills or a research and development project, that firm considers both the expected benefits of the investment (expectations of future profits) and the costs of the investment (interest rates).

- Expectations of future profits: The clearest driver of the benefits of an investment is expectations for future profits. When an economy is expected to grow, businesses perceive a growing market for their products. Their higher degree of business confidence will encourage new investment. For example, in the second half of the 1990s, U.S. investment levels surged from 18% of GDP in 1994 to 21% in 2000. However, when a recession started in 2001, U.S. investment levels quickly sank back to 18% of GDP by 2002.
- Interest rates also play a significant role in determining how much investment a firm will make. Just as individuals need to borrow money to purchase homes, so businesses need financing when they purchase big ticket items. The cost of investment thus includes the *interest rate*. Even if the firm has the funds, the interest rate measures the opportunity cost of purchasing business capital. Lower interest rates stimulate investment spending and higher interest rates reduce it.

Many factors can affect the expected profitability on investment. For example, if the price of energy declines, then investments that use energy as an input will yield higher profits. If government offers special incentives for investment (for example, through the tax code), then investment will look more attractive; conversely, if government removes special investment incentives from the tax

code, or increases other business taxes, then investment will look less attractive. As Keynes noted, business investment is the most variable of all the components of aggregate demand.

What Determines Government Spending?

The third component of aggregate demand is spending by federal, state, and local governments. Although the United States is usually thought of as a market economy, government still plays a significant role in the economy. Government provides important public services such as national defense, transportation infrastructure, and education.

Keynes recognized that the government budget offered a powerful tool for influencing aggregate demand. Not only could AD be stimulated by more government spending (or reduced by less government spending), but consumption and investment spending could be influenced by lowering or raising tax rates. Indeed, Keynes concluded that during extreme times like deep recessions, only the government had the power and resources to move aggregate demand.

What Determines Net Exports?

Recall that *exports* are products produced domestically and sold abroad while *imports* are products produced abroad but purchased domestically. Since aggregate demand is defined as spending on domestic goods and services, export expenditures add to AD, while import expenditures subtract from AD.

Two sets of factors can cause shifts in export and import demand: changes in relative growth rates between countries and changes in relative prices between countries. The level of demand for a nation's

exports tends to be most heavily affected by what is happening in the economies of the countries that would be purchasing those exports. For example, if major importers of American-made products like Canada, Japan, and Germany have recessions, exports of U.S. products to those countries are likely to decline. Conversely, the quantity of a nation's imports is directly affected by the amount of income in the domestic economy: more income will bring a higher level of imports.

Exports and imports can also be affected by relative prices of goods in domestic and international markets. If U.S. goods are relatively cheaper compared with goods made in other places, perhaps because a group of U.S. producers has mastered certain productivity breakthroughs, then U.S. exports are likely to rise. If U.S. goods become relatively more expensive, perhaps because a change in the exchange rate between the U.S. dollar and other currencies has pushed up the price of inputs to production in the United States, then exports from U.S. producers are likely to decline.

This table summarizes the reasons given here for changes in aggregate demand.

Table 1. Determinants of Aggregate Demand

Reasons for a Decrease in Aggregate Demand	Reasons for an Increase in Aggregate Demand
Consumption	***Consumption***
• Rise in taxes • Fall in income • Rise in interest • Desire to save more • Decrease in wealth • Fall in future expected income	• Decrease in taxes • Increase in income • Fall in interest rates • Desire to save less • Rise in wealth • Rise in future expected income
Investment	***Investment***
• Fall in expected rate of return • Rise in interest rates • Drop in business confidence	• Rise in expected rate of return • Drop in interest rates • Rise in business confidence
Government	***Government***
• Reduction in government spending • Increase in taxes	• Increase in government spending • Decrease in taxes
Net Exports	***Net Exports***
• Decrease in foreign demand • Relative price increase of U.S. goods	• Increase in foreign demand • Relative price drop of U.S. goods

188. Reading: The Building Blocks of Keynesian Analysis

The Building Blocks of Keynesian Analysis

Now that we have a clear understanding of what constitutes aggregate demand, we return to the Keynesian argument using the model of aggregate supply and aggregate demand (AS–AD).

Keynesian economics focuses on explaining why recessions and depressions occur and offering a policy prescription for minimizing their effects. The Keynesian view of *recession* is based on two key building blocks. First, aggregate demand is not always automatically high enough to provide firms with an incentive to hire enough workers to reach full employment. Second, the macroeconomy may adjust only slowly to shifts in aggregate demand because of *sticky wages and prices*, which are wages and prices that do not respond to decreases or increases in demand. We will consider these two claims in turn, and then see how they are represented in the AS–AD model.

The first building block of the Keynesian diagnosis is that recessions occur when the level of household and business sector demand for goods and services is less than what is produced when labor is fully employed. In other words, the intersection of aggregate supply and aggregate demand occurs at a level of output less than the level of GDP consistent with full employment. Suppose the stock market crashes, as occurred in 1929. Or, suppose the housing market collapses, as occurred in 2008. In either case, household wealth will decline, and consumption expenditure will follow. Suppose businesses see that consumer spending is falling. That will reduce expectations of the profitability of investment, so businesses will decrease investment expenditure.This seemed to be the case

during the Great Depression, since the physical capacity of the economy to supply goods did not alter much. No flood or earthquake or other natural disaster ruined factories in 1929 or 1930. No outbreak of disease decimated the ranks of workers. No key input price, like the price of oil, soared on world markets.

The U.S. economy in 1933 had just about the same factories, workers, and state of technology as it had had four years earlier in 1929—and yet the economy had shrunk dramatically. This also seems to be what happened in 2008. As Keynes recognized, the events of the Depression contradicted Say's law that "supply creates its own demand." Although production capacity existed, the markets were not able to sell their products. As a result, real GDP was less than potential GDP.

LINK IT UP

Visit this website for raw data used to calculate GDP.

Wage and Price Stickiness

Keynes also pointed out that although AD fluctuated, prices and wages did not immediately respond as economists often expected. Instead, prices and wages are "sticky," making it difficult to restore the economy to full employment and potential GDP. Keynes emphasized one particular reason why wages were sticky: the *coordination argument*. This argument points out that, even if most people would be willing—at least hypothetically—to see a decline in their own wages in bad economic times as long as everyone else also experienced such a decline, a market-oriented economy has no obvious way to implement a plan of coordinated wage reductions. Unemployment proposed a number of reasons why wages might

be sticky downward, most of which center on the argument that businesses avoid wage cuts because they may in one way or another depress morale and hurt the productivity of the existing workers.

Some modern economists have argued in a Keynesian spirit that, along with wages, other prices may be sticky, too. Many firms do not change their prices every day or even every month. When a firm considers changing prices, it must consider two sets of costs. First, changing prices uses company resources: managers must analyze the competition and market demand and decide what the new prices will be, sales materials must be updated, billing records will change, and product labels and price labels must be redone. Second, frequent price changes may leave customers confused or angry—especially if they find out that a product now costs more than expected. These costs of changing prices are called *menu costs*—like the costs of printing up a new set of menus with different prices in a restaurant. Prices do respond to forces of supply and demand, but from a macroeconomic perspective, the process of changing all prices throughout the economy takes time.

To understand the effect of sticky wages and prices in the economy, consider Figure 11.4 (a) illustrating the overall labor market, while Figure 11.4 (b) illustrates a market for a specific good or service. The original equilibrium (E_0) in each market occurs at the intersection of the demand curve (D_0) and supply curve (S_0). When aggregate demand declines, the demand for labor shifts to the left (to D_1) in Figure 11.4 (a) and the demand for goods shifts to the left (to D_1) in Figure 11.4 (b). However, because of sticky wages and prices, the wage remains at its original level (W_0) for a period of time and the price remains at its original level (P_0).

As a result, a situation of excess supply—where the quantity supplied exceeds the quantity demanded at the existing wage or price—exists in markets for both labor and goods, and Q_1 is less than Q_0 in both Figure 11.4 (a) and Figure 11.4 (b). When many labor markets and many goods markets all across the economy find themselves in this position, the economy is in a recession; that is, firms cannot sell what they wish to produce at the existing market

price and do not wish to hire all who are willing to work at the existing market wage. The Clear It Up feature about the pace of wage adjustments discusses this problem in more detail.

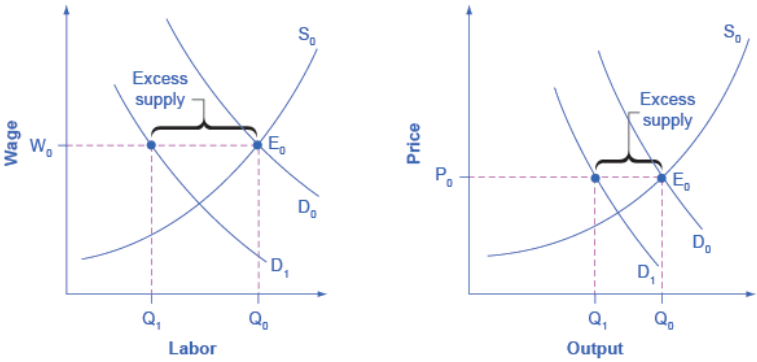


Figure 11. 4. *Sticky Prices and Falling Demand in the Labor and Goods Market. In both (a) and (b), demand shifts left from D_0 to D_1. However, the wage in (a) and the price in (b) do not immediately decline. In (a), the quantity demanded of labor at the original wage (W_0) is Q_0, but with the new demand curve for labor (D_1), it will be Q_1. Similarly, in (b), the quantity demanded of goods at the original price (P_0) is Q_0, but at the new demand curve (D_1) it will be Q_1. An excess supply of labor will exist, which is called unemployment. An excess supply of goods will also exist, where the quantity demanded is substantially less than the quantity supplied. Thus, sticky wages and sticky prices, combined with a drop in demand, bring about unemployment and recession.*

WHY IS THE PACE OF WAGE ADJUSTMENTS SLOW?

The recovery after the Great Recession in the United States has been slow, with wages stagnant, if not declining. In fact, many low-wage workers at McDonalds, Dominos, and Walmart have threatened to strike for higher wages. Their plight is part of a larger trend in job growth and pay in the post–recession recovery.

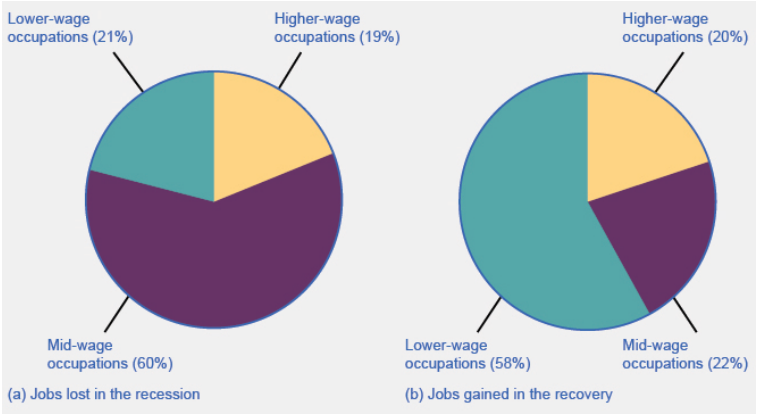


Figure 11.5. *Jobs Lost/Gained in the Recession/Recovery. Data in the aftermath of the Great Recession suggests that jobs lost were in mid-wage occupations, while jobs gained were in low-wage occupations.*

The National Employment Law Project compiled data from the Bureau of Labor Statistics and found that, during the Great Recession, 60% of job losses were in medium-wage occupations. Most of them were replaced during the recovery period with lower-wage jobs in the service, retail, and food industries. This data is illustrated in Figure 11.5.

Wages in the service, retail, and food industries are at or near minimum wage and tend to be both downwardly and upwardly "sticky." Wages are downwardly sticky due to minimum wage laws; they may be upwardly sticky if insufficient competition in low-skilled labor markets enables employers to avoid raising wages that would reduce their profits. At the same time, however, the Consumer Price Index increased 11% between 2007 and 2012, pushing real wages down.

The Two Keynesian Assumptions in the AS–AD Model

These two Keynesian assumptions—the importance of aggregate demand in causing recession and the stickiness of wages and prices—are illustrated by the AS–AD diagram in Figure 11.6. Note that because of the stickiness of wages and prices, the aggregate supply curve is flatter than either supply curve (labor or specific good). In fact, if wages and prices were so sticky that they did not fall at all, the aggregate supply curve would be completely flat below potential GDP, as shown in Figure 11.6. This outcome is an important example of a *macroeconomic externality*, where what happens at the macro level is different from the sum of what happens at the micro level.

The original equilibrium of this economy occurs where the aggregate demand function (AD_0) intersects with AS. Since this intersection occurs at potential GDP (Yp), the economy is operating at full employment. When aggregate demand shifts to the left, all the adjustment occurs through decreased real GDP. There is no decrease in the price level. Since the equilibrium occurs at Y_1, the economy experiences substantial unemployment.

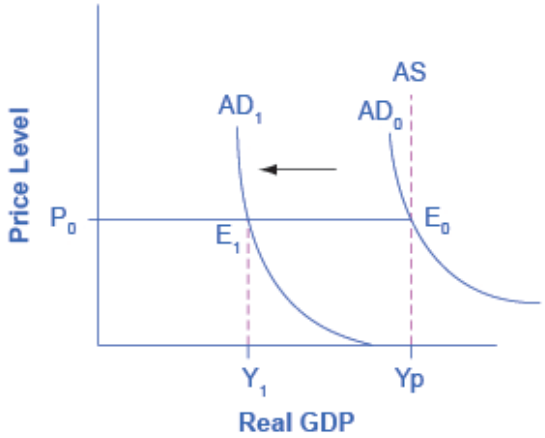


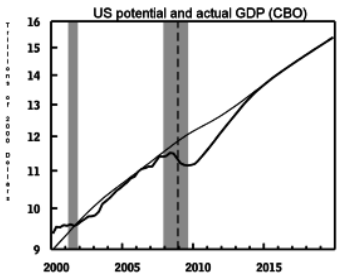
Figure 11.6. *A Keynesian Perspective of Recession. The equilibrium (E_0) illustrates the two key assumptions behind Keynesian economics. The importance of aggregate demand is shown because this equilibrium is a recession which has occurred because aggregate demand is at AD_1 instead of AD_0. The importance of sticky wages and prices is shown because of the assumption of fixed wages and prices, which make the AS curve flat below potential GDP. Thus, when AD falls, the intersection E_1 occurs in the flat portion of the AS curve where the price level does not change.*

189. Reading: The GDP Gap

The GDP Gap

The GDP gap is defined as the difference between potential GDP and real GDP. When the economy falls into recession, the GDP gap is positive, meaning the economy is operating at less than potential (and less than full employment). When the economy experiences an inflationary boom, the GDP gap is negative, meaning the economy is operating at greater than potential (and more than full employment).

Since the neoclassical model assumes the economy operates at (exactly) full employment, the GDP Gap isn't really relevant to Neoclassical analysis but it is integral to the Keynesian view of the world.



Potential (light) and actual (bold) GDP estimates from the Congressional Budget Office. The difference between the two represents the GDP gap.

Keynesian Policy for Fighting Unemployment and Inflation

Keynesian macroeconomics argues that the solution to a recession is *expansionary fiscal policy*, such as tax cuts to stimulate consumption and investment, or direct increases in government spending that would shift the aggregate demand curve to the right. For example, if aggregate demand was originally at ADr in Figure 11.11, so that the economy was in recession, the appropriate policy would be for government to shift aggregate demand to the

right from ADr to ADf, where the economy would be at potential GDP and full employment.

Keynes noted that while it would be nice if the government could spend additional money on housing, roads, and other amenities, he also argued that if the government could not agree on how to spend money in practical ways, then it could spend in impractical ways. For example, Keynes suggested building monuments, like a modern equivalent of the Egyptian pyramids. He proposed that the government could bury money underground, and let mining companies get started to dig the money up again. These suggestions were slightly tongue-in-cheek, but their purpose was to emphasize that a Great Depression is no time to quibble over the specifics of government spending programs and tax cuts when the goal should be to pump up aggregate demand by enough to lift the economy to *potential GDP*.

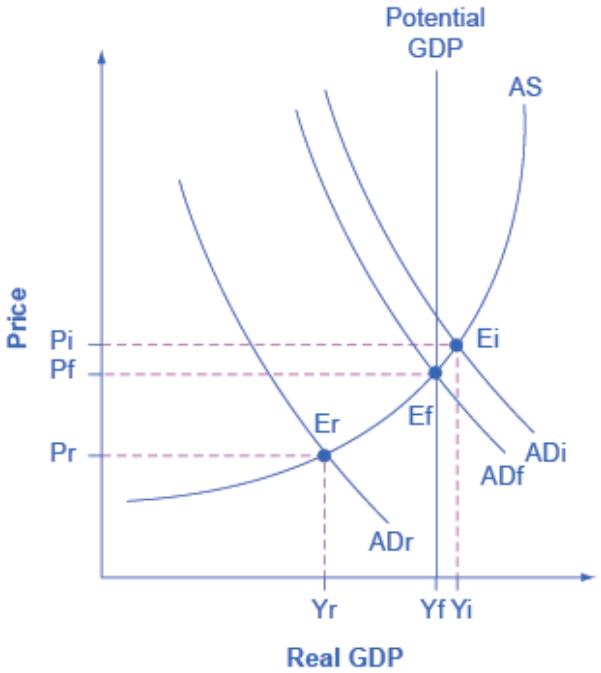


Figure 11.11. *Fighting Recession and Inflation with Keynesian Policy If an economy is in recession, with an equilibrium at Er, then the Keynesian response would be to enact a policy to shift aggregate demand to the right from ADr toward ADf. If an economy is experiencing inflationary pressures with an equilibrium at Ei, then the Keynesian response would be to enact a policy response to shift aggregate demand to the left, from ADi toward ADf.*

The other side of Keynesian policy occurs when the economy is operating above potential GDP. In this situation, unemployment is low, but inflationary rises in the price level are a concern. The Keynesian response would be *contractionary fiscal policy*, using tax increases or government spending cuts to shift AD to the left. The result would be downward pressure on the price level, but very little reduction in output or very little rise in unemployment. If aggregate demand was originally at ADi in Figure 11.11, so that the economy was experiencing inflationary rises in the price level, the appropriate

policy would be for government to shift aggregate demand to the left, from ADi toward ADf, which reduces the pressure for a higher price level while the economy remains at full employment.

In the Keynesian economic model, too little aggregate demand brings unemployment and too much brings inflation. Thus, you can think of Keynesian economics as pursuing a "Goldilocks" level of aggregate demand: not too much, not too little, but looking for what is just right.

Self Check: The GDP Gap

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the six Readings in this section.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

An interactive or media element has been excluded from this version of the text. You can view it online here: https://pressbooks.ccconline.org/accmacro/?p=443

190. Reading: The Keynesian Perspective on Market Forces

The Keynesian Perspective on Market Forces

Ever since the birth of Keynesian economics in the 1930s, controversy has simmered over the extent to which government should play an active role in managing the economy. In the aftermath of the human devastation and misery of the Great Depression, many people—including many economists—became more aware of vulnerabilities within the market-oriented economic system. Some supporters of Keynesian economics advocated a high degree of government planning in all parts of the economy.

However, Keynes himself was careful to separate the issue of aggregate demand from the issue of how well individual markets worked. He argued that individual markets for goods and services were appropriate and useful, but that sometimes that level of aggregate demand was just too low. When 10 million people are willing and able to work, but one million of them are unemployed, he argued, individual markets may be doing a perfectly good job of allocating the efforts of the nine million workers—the problem is that insufficient aggregate demand exists to support jobs for all 10 million. Thus, he believed that, while government should ensure that overall level of aggregate demand is sufficient for an economy to reach full employment, this task did not imply that the government should attempt to set prices and wages throughout the economy, nor to take over and manage large corporations or entire industries directly.

Even if one accepts the Keynesian economic theory, a number of practical questions remain. In the real world, can government economists identify potential GDP accurately? Is a desired increase in aggregate demand better accomplished by a tax cut or by an increase in government spending? Given the inevitable delays and uncertainties as policies are enacted into law, is it reasonable to expect that the government can implement Keynesian economics? Can fixing a recession really be just as simple as pumping up aggregate demand? Government Budgets and Fiscal Policy will probe these issues. The Keynesian approach, with its focus on aggregate demand and sticky prices, has proved useful in understanding how the economy fluctuates in the short run and why recessions and cyclical unemployment occur. In The Neoclassical Perspective, we will consider some of the shortcomings of the Keynesian approach and why it is not especially well-suited for long-run macroeconomic analysis.

THE GREAT RECESSION

The lessons learned during the Great Depression of the 1930s and the aggregate expenditure model proposed by John Maynard Keynes gave the modern economists and policymakers of today the tools to effectively navigate the treacherous economy in the latter half of the 2000s. In "How the Great Recession Was Brought to an End," Alan S. Blinder and Mark Zandi wrote that the actions taken by today's policymakers stand in sharp contrast to those of the early years of the Great Depression. Today's economists and policymakers were not content to let the markets recover from recession without taking proactive measures to support consumption and investment. The Federal Reserve actively lowered short-term interest rates and developed innovative ways to pump money into the economy so that credit and investment would not dry up. Both Presidents Bush and Obama (along with Congress) implemented a variety of programs ranging from tax rebates to "Cash for Clunkers" to the Troubled Asset Relief Program to stimulate and stabilize household consumption and encourage investment. Although these policies came under harsh criticism from the public and many politicians, they lessened the impact of the economic downturn and may have saved the country from a second Great Depression.

Self Check: The Keynesian Portion of the AS Curve

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the Reading in this section.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

An interactive or media element has been excluded from this version of the text. You can view it online here: https://pressbooks.ccconline.org/accmacro/?p=445

191. Outcome: The Expenditure Output Model

What you'll learn to do: use the Expenditure Output model to explain periods of recession and expansion

You've already learned the basic tenets of Keynesian Economics and understand the aggregate demand/aggregate supply model. In this outcome, you'll learn about an alternative approach to calculating national income through the Keynesian perspective, known as the Expenditure-Output Model (or Aggregate Expenditure Model).

LEARNING ACTIVITIES

The learning activities for this section include:

- Reading: The Expenditure-Output Model
- Reading: Using an Algebraic Approach to the Expenditure-Output Model
- Reading: Equilibrium and The Expenditure-Output Model
- Reading: The Multiplier Effect
- Self Check: The Expenditure Output Model

Take time to review and reflect on each of these activities in order to improve your performance on the assessment for this section.

192. Reading: The Expenditure-Output Model

The Axes of the Expenditure-Output Diagram

The fundamental ideas of Keynesian economics were developed before the AD–AS model was popularized. From the 1930s until the 1970s, Keynesian economics was usually explained with a different model, known as the expenditure-output approach. This approach is strongly rooted in the fundamental assumptions of Keynesian economics: it focuses on the total amount of spending in the economy, with no explicit mention of aggregate supply or of the price level (although as you will see, it is possible to draw some inferences about aggregate supply and price levels based on the diagram).

The expenditure-output model, sometimes also called the Keynesian cross diagram, determines the equilibrium level of real GDP by the point where the total or aggregate expenditures in the economy are equal to the amount of output produced. The axes of the Keynesian cross diagram presented in Figure B.1 show real GDP on the horizontal axis as a measure of output and aggregate expenditures on the vertical axis as a measure of spending.

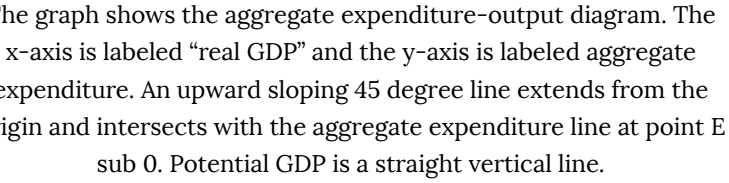


Figure B.1. *The Expenditure-Output Diagram The aggregate expenditure-output model shows aggregate expenditures on the vertical axis and real GDP on the horizontal axis. A vertical line shows potential GDP where full employment occurs. The 45-degree line shows all points where aggregate expenditures and output are equal. The aggregate expenditure schedule shows how total spending or aggregate expenditure increases as output or real GDP rises. The intersection of the aggregate expenditure schedule and the 45-degree line will be the equilibrium. Equilibrium occurs at E0, where aggregate expenditure AE0 is equal to the output level Y0.*

Remember that GDP can be thought of in several equivalent ways: it measures both the value of spending on final goods and also the value of the production of final goods. All sales of the final goods and services that make up GDP will eventually end up as income for workers, for managers, and for investors and owners of firms. The sum of all the income received for contributing resources to GDP is called national income (Y). At some points in the discussion that follows, it will be useful to refer to real GDP as “national income.” Both axes are measured in real (inflation-adjusted) terms.

THE POTENTIAL GDP LINE AND THE 45-DEGREE LINE

The Keynesian cross diagram contains two lines that serve as conceptual guideposts to orient the discussion. The first is a vertical line showing the level of potential GDP. Potential GDP means the same thing here that it means in the AD/AS diagrams: it refers to the quantity of output that the economy can produce with full employment of its labor and physical capital.

The second conceptual line on the Keynesian cross diagram is the 45-degree line, which starts at the origin and reaches up and to the right. A line that stretches up at a 45-degree angle represents the set of points (1, 1), (2, 2), (3, 3) and so on, where the measurement on the vertical axis is equal to the measurement on the horizontal axis. In this diagram, the 45-degree line shows the set of points where the level of aggregate expenditure in the economy, measured on the vertical axis, is equal to the level of output or national income in the economy, measured by GDP on the horizontal axis.

When the macroeconomy is in equilibrium, it must be true that the aggregate expenditures in the economy are equal to the real GDP—because by definition, GDP is the measure of what is spent on final sales of goods and services in the economy. Thus, the equilibrium calculated with a Keynesian cross diagram will always end up where aggregate expenditure and output are equal—which will only occur along the 45-degree line.

THE AGGREGATE EXPENDITURE SCHEDULE

The final ingredient of the Keynesian cross or expenditure-output diagram is the aggregate expenditure schedule, which will show the total expenditures in the economy for each level of real GDP. The

intersection of the aggregate expenditure line with the 45-degree line—at point E_0 in Figure B.1—will show the equilibrium for the economy, because it is the point where aggregate expenditure is equal to output or real GDP. After developing an understanding of what the aggregate expenditures schedule means, we will return to this equilibrium and how to interpret it.

Building the Aggregate Expenditure Schedule

Aggregate expenditure is the key to the expenditure-income model. The aggregate expenditure schedule shows, either in the form of a table or a graph, how aggregate expenditures in the economy rise as real GDP or national income rises. Thus, in thinking about the components of the aggregate expenditure line—consumption, investment, government spending, exports and imports—the key question is how expenditures in each category will adjust as national income rises.

CONSUMPTION AS A FUNCTION OF NATIONAL INCOME

How do consumption expenditures increase as national income rises? People can do two things with their income: consume it or save it (for the moment, let's ignore the need to pay taxes with some of it). Each person who receives an additional dollar faces this choice. The marginal propensity to consume (MPC), is the share of the additional dollar of income a person decides to devote to consumption expenditures. The marginal propensity to save (MPS) is the share of the additional dollar a person decides to save. It must always hold true that:

$$MPC + MPS = 1$$

For example, if the marginal propensity to consume out of the marginal amount of income earned is 0.9, then the marginal propensity to save is 0.1.

With this relationship in mind, consider the relationship among income, consumption, and savings shown in Figure B.2. (Note that we use "Aggregate Expenditure" on the vertical axis in this and the following figures, because all consumption expenditures are parts of aggregate expenditures.)

An assumption commonly made in this model is that even if income were zero, people would have to consume something. In this example, consumption would be $600 even if income were zero. Then, the MPC is 0.8 and the MPS is 0.2. Thus, when income increases by $1,000, consumption rises by $800 and savings rises by $200. At an income of $4,000, total consumption will be the $600 that would be consumed even without any income, plus $4,000 multiplied by the marginal propensity to consume of 0.8, or $ 3,200, for a total of $ 3,800. The total amount of consumption and saving must always add up to the total amount of income. (Exactly how a situation of zero income and negative savings would work in practice is not important, because even low-income societies are not literally at zero income, so the point is hypothetical.) This relationship between income and consumption, illustrated in Figure B.2 and Table B.1, is called the consumption function.

The graph shows an upward-sloping line representative of the consumption function.

Figure B.2. *The Consumption Function. In the expenditure-output model, how does consumption increase with the level of national income? Output on the horizontal axis is conceptually the same as national income, since the value of all final output that is produced and sold must be income to someone, somewhere in the economy. At a national income level of zero, $600 is consumed. Then, each time income rises by $1,000, consumption rises by $800, because in this example, the marginal propensity to consume is 0.8.*

The pattern of consumption shown in Table B.1 is plotted in Figure B.2. To calculate consumption, multiply the income level by 0.8, for

the marginal propensity to consume, and add $600, for the amount that would be consumed even if income was zero. Consumption plus savings must be equal to income.

Table B.1. The Consumption Function

Income	Consumption	Savings
$0	$600	–$600
$1,000	$1,400	–$400
$2,000	$2,200	–$200
$3,000	$3,000	$0
$4,000	$3,800	$200
$5,000	$4,600	$400
$6,000	$5,400	$600
$7,000	$6,200	$800
$8,000	$7,000	$1,000
$9,000	$7,800	$1,200

However, a number of factors other than income can also cause the entire consumption function to shift. These factors were summarized in the earlier discussion of consumption, and listed in Table B.1. When the consumption function moves, it can shift in two ways: either the entire consumption function can move up or down in a parallel manner, or the slope of the consumption function can shift so that it becomes steeper or flatter. For example, if a tax cut leads consumers to spend more, but does not affect their marginal propensity to consume, it would cause an upward shift to a new consumption function that is parallel to the original one. However, a change in household preferences for saving that reduced the marginal propensity to save would cause the slope of the consumption function to become steeper: that is, if the savings rate is lower, then every increase in income leads to a larger rise in consumption.

INVESTMENT AS A FUNCTION OF NATIONAL INCOME

Investment decisions are forward-looking, based on expected rates of return. Precisely because investment decisions depend primarily on perceptions about future economic conditions, they do *not* depend primarily on the level of GDP in the current year. Thus, on a Keynesian cross diagram, the investment function can be drawn as a horizontal line, at a fixed level of expenditure. Figure B.3 shows an investment function where the level of investment is, for the sake of concreteness, set at the specific level of 500. Just as a consumption function shows the relationship between consumption levels and real GDP (or national income), the investment function shows the relationship between investment levels and real GDP.

The graph shows a straight, horizontal line at 500 on the y-axis, representative of the investment function.

Figure B.3. The Investment Function. The investment function is drawn as a flat line because investment is based on interest rates and expectations about the future, and so it does not change with the level of current national income. In this example, investment expenditures are at a level of 500. However, changes in factors like technological opportunities, expectations about near-term economic growth, and interest rates would all cause the investment function to shift up or down.

The appearance of the investment function as a horizontal line does not mean that the level of investment never moves. It means only that in the context of this two-dimensional diagram, the level of investment on the vertical aggregate expenditure axis does not vary according to the current level of real GDP on the horizontal

axis. However, all the other factors that vary investment—new technological opportunities, expectations about near-term economic growth, interest rates, the price of key inputs, and tax incentives for investment—can cause the horizontal investment function to shift up or down.

GOVERNMENT SPENDING AND TAXES AS A FUNCTION OF NATIONAL INCOME

In the Keynesian cross diagram, government spending appears as a horizontal line, as in Figure B.4, where government spending is set at a level of 1,300. As in the case of investment spending, this horizontal line does not mean that government spending is unchanging. It means only that government spending changes when Congress decides on a change in the budget, rather than shifting in a predictable way with the current size of the real GDP shown on the horizontal axis.

The graph shows a straight, horizontal line at 1,300, representative of the government spending function.

Figure B.4. *The Government Spending Function. The level of government spending is determined by political factors, not by the level of real GDP in a given year. Thus, government spending is drawn as a horizontal line. In this example, government spending is at a level of 1,300. Congressional decisions to increase government spending will cause this horizontal line to shift up, while decisions to reduce spending would cause it to shift down.*

The situation of taxes is different because taxes often rise or fall with the volume of economic activity. For example, income taxes are based on the level of income earned and sales taxes are based on the amount of sales made, and both income and sales tend to be higher when the economy is growing and lower when the economy is in

a recession. For the purposes of constructing the basic Keynesian cross diagram, it is helpful to view taxes as a proportionate share of GDP. In the United States, for example, taking federal, state, and local taxes together, government typically collects about 30–35 % of income as taxes.

Table B.2 revises the earlier table on the consumption function so that it takes taxes into account. The first column shows national income. The second column calculates taxes, which in this example are set at a rate of 30%, or 0.3. The third column shows after-tax income; that is, total income minus taxes. The fourth column then calculates consumption in the same manner as before: multiply after-tax income by 0.8, representing the marginal propensity to consume, and then add $600, for the amount that would be consumed even if income was zero. When taxes are included, the marginal propensity to consume is reduced by the amount of the tax rate, so each additional dollar of income results in a smaller increase in consumption than before taxes. For this reason, the consumption function, with taxes included, is flatter than the consumption function without taxes, as Figure B.5 shows.

The graph shows two upward-sloping lines. The steeper of the two lines is the consumption before taxes. The more gradual of the two lines is the consumption after taxes.

Figure B.5. *The Consumptio n Function. Before and After Taxes The upper line repeats the consumption function from Figure B.2. The lower line shows the consumption function if taxes must first be paid on income, and then consumption is based on after-tax income.*

Table B.2. The Consumption Function Before and After Taxes

Income	Taxes	After-Tax Income	Consumption	Savings
$0	$0	$0	$600	–$600
$1,000	$300	$700	$1,160	–$460
$2,000	$600	$1,400	$1,720	–$320
$3,000	$900	$2,100	$2,280	–$180
$4,000	$1,200	$2,800	$2,840	–$40
$5,000	$1,500	$3,500	$3,400	$100
$6,000	$1,800	$4,200	$3,960	$240
$7,000	$2,100	$4,900	$4,520	$380
$8,000	$2,400	$5,600	$5,080	$520
$9,000	$2,700	$6,300	$5,640	$660

EXPORTS AND IMPORTS AS A FUNCTION OF NATIONAL INCOME

The export function, which shows how exports change with the level of a country's own real GDP, is drawn as a horizontal line, as in the example in Figure B.6 (a) where exports are drawn at a level of $840. Again, as in the case of investment spending and government spending, drawing the export function as horizontal does not imply that exports never change. It just means that they do not change because of what is on the horizontal axis—that is, a country's own level of domestic production—and instead are shaped by the level of aggregate demand in other countries. More demand for exports from other countries would cause the export function to shift up; less demand for exports from other countries would cause it to shift down.

The graph on the left show exports as a straight, horizontal line at $840. The graph on the right shows imports as a downward-sloping line beginning at $0.

Figure B.6. *The Export and Import Functions. (a) The export function is drawn as a horizontal line because exports are determined by the buying power of other countries and thus do not change with the size of the domestic economy. In this example, exports are set at 840. However, exports can shift up or down, depending on buying patterns in other countries. (b) The import function is drawn in negative territory because expenditures on imported products are a subtraction from expenditures in the domestic economy. In this example, the marginal*

propensity to import is 0.1, so imports are calculated by multiplying the level of income by –0.1.

Imports are drawn in the Keynesian cross diagram as a downward-sloping line, with the downward slope determined by the marginal propensity to import (MPI), out of national income. In Figure B.6 (b), the marginal propensity to import is 0.1. Thus, if real GDP is $5,000, imports are $500; if national income is $6,000, imports are $600, and so on. The import function is drawn as downward sloping and negative, because it represents a subtraction from the aggregate expenditures in the domestic economy. A change in the marginal propensity to import, perhaps as a result of changes in preferences, would alter the slope of the import function.

193. Reading: Using an Algebraic Approach to the Expenditure-Output Model

USING AN ALGEBRAIC APPROACH TO THE EXPENDITURE-OUTPUT MODEL

In the expenditure-output or Keynesian cross model, the equilibrium occurs where the aggregate expenditure line (AE line) crosses the 45-degree line. Given algebraic equations for two lines, the point where they cross can be readily calculated. Imagine an economy with the following characteristics.

Y = Real GDP or national income
T = Taxes = 0.3Y
C = Consumption = 140 + 0.9 (Y − T)
I = Investment = 400
G = Government spending = 800
X = Exports = 600
M = Imports = 0.15Y

Step 1. Determine the aggregate expenditure function. In this case, it is:

$$AE = C + I + G + X - M$$

$$AE = 140 + 0.9(Y - T) + 400 + 800 + 600 - 0.15Y$$

Step 2. The equation for the 45-degree line is the set of points where GDP or national income on the horizontal axis is equal to aggregate expenditure on the vertical axis. Thus, the equation for the 45-degree line is: AE = Y.

Step 3. The next step is to solve these two equations for Y (or AE, since they will be equal to each other). Substitute Y for AE:

$$Y = 140 + 0.9(Y - T) + 400 + 800 + 600 - 0.15Y$$

Step 4. Insert the term 0.3Y for the tax rate T. This produces an equation with only one variable, Y.

Step 5. Work through the algebra and solve for Y.

Y	=	140 + 0.9(Y − 0.3Y) + 400 + 800 + 600 − 0.15Y
Y	=	140 + 0.9Y −0.27Y + 1800 − 0.15Y
Y	=	1940 + 0.48Y
Y − 0.48Y	=	1940
0.52Y	=	1940
[latex]\displaystyle\frac{0.52\ text{Y}}{0.52}[/latex]	=	[latex]\displaystyle\ frac{1940}{0.52}[/latex]
Y	=	3730

This algebraic framework is flexible and useful in predicting how economic events and policy actions will affect real GDP.

Step 6. Say, for example, that because of changes in the relative prices of domestic and foreign goods, the marginal propensity to import falls to 0.1. Calculate the equilibrium output when the marginal propensity to import is changed to 0.1.

Y	=	140 + 0.9(Y − 0.3Y) + 400 + 800 + 600 − 0.1Y
Y	=	1940 − 0.53Y
0.47Y	=	1940
Y	=	4127

Step 7. Because of a surge of business confidence, investment rises to 500. Calculate the equilibrium output.

$$
\begin{aligned}
Y &= 140 + 0.9(Y - 0.3Y) + 500 + 800 + 600 - 0.15Y \\
Y &= 2040 + 0.48Y \\
Y - 0.48Y &= 2040 \\
0.52Y &= 2040 \\
Y &= 3923
\end{aligned}
$$

For issues of policy, the key questions would be how to adjust government spending levels or tax rates so that the equilibrium level of output is the full employment level. In this case, let the economic parameters be:

Y = National income
T = Taxes = 0.3Y
C = Consumption = 200 + 0.9 (Y − T)
I = Investment = 600
G = Government spending = 1,000
X = Exports = 600
Y = Imports = 0.1 (Y − T)

Step 8. Calculate the equilibrium for this economy (remember Y = AE).

$$
\begin{aligned}
Y &= 200 + 0.9(Y - 0.3Y) + 600 + 1000 + 600 - 0.1(Y - 0.3Y) \\
Y - 0.63Y + 0.07Y &= 2400 \\
0.44Y &= 2400 \\
Y &= 5454
\end{aligned}
$$

Step 9. Assume that the full employment level of output is 6,000. What level of government spending would be necessary to reach that level? To answer this question, plug in 6,000 as equal to Y, but leave G as a variable, and solve for G. Thus:

$$6000 = 200 + 0.9(6000 - 0.3(6000)) + 600 + G + 600 - 0.1(6000 - 0.3(6000))$$

Step 10. Solve this problem arithmetically. The answer is: G = 1,240. In other words, increasing government spending by 240, from its

original level of 1,000, to 1,240, would raise output to the full employment level of GDP.

Indeed, the question of how much to increase government spending so that equilibrium output will rise from 5,454 to 6,000 can be answered without working through the algebra, just by using the multiplier formula. The multiplier equation in this case is:

[latex]\displaystyle\frac{1}{1-0.56}=2.27[/latex]

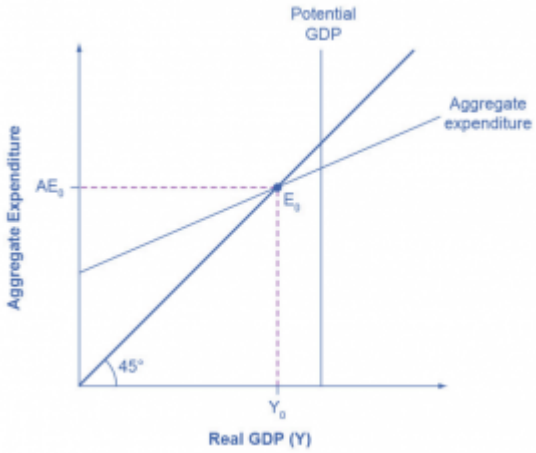
Thus, to raise output by 546 would require an increase in government spending of 546/2.27=240, which is the same as the answer derived from the algebraic calculation.

This algebraic framework is highly flexible. For example, taxes can be treated as a total set by political considerations (like government spending) and not dependent on national income. Imports might be based on before-tax income, not after-tax income. For certain purposes, it may be helpful to analyze the economy without exports and imports. A more complicated approach could divide up consumption, investment, government, exports and imports into smaller categories, or to build in some variability in the rates of taxes, savings, and imports. A wise economist will shape the model to fit the specific question under investigation.

BUILDING THE COMBINED AGGREGATE EXPENDITURE FUNCTION

All the components of aggregate demand—consumption, investment, government spending, and the trade balance—are now in place to build the Keynesian cross diagram. Figure B.7 builds up an aggregate expenditure function, based on the numerical illustrations of C, I, G, X, and M that have been used throughout this text. The first three columns in Table B.3 are lifted from the earlier Table B.2, which showed how to bring taxes into the consumption function. The first column is real GDP or national income, which is what appears on the horizontal axis of the income-expenditure

diagram. The second column calculates after-tax income, based on the assumption, in this case, that 30% of real GDP is collected in taxes. The third column is based on an MPC of 0.8, so that as after-tax income rises by $700 from one row to the next, consumption rises by $560 (700 × 0.8) from one row to the next. Investment, government spending, and exports do not change with the level of current national income. In the previous discussion, investment was $500, government spending was $1,300, and exports were $840, for a total of $2,640. This total is shown in the fourth column. Imports are 0.1 of real GDP in this example, and the level of imports is calculated in the fifth column. The final column, aggregate expenditures, sums up C + I + G + X − M. This aggregate expenditure line is illustrated in Figure B.7.



The aggregate expenditure-output model shows aggregate expenditures on the vertical axis and real GDP on the horizontal axis. A vertical line shows potential GDP where full employment occurs. The 45-degree line shows all points where aggregate expenditures and output are equal. The aggregate expenditure schedule shows how total spending or aggregate expenditure increases as output or real GDP rises. The intersection of the aggregate expenditure schedule and the 45-degree line will be the

equilibrium. Equilibrium occurs at E0, where aggregate expenditure AE0 is equal to the output level Y0.

Table B.3. National Income-Aggregate Expenditure Equilibrium

National Income	After-Tax Income	Consumption	Government Spending + Investment + Exports	Imports	Aggregate Expenditure
$3,000	$2,100	$2,280	$2,640	$300	$4,620
$4,000	$2,800	$2,840	$2,640	$400	$5,080
$5,000	$3,500	$3,400	$2,640	$500	$5,540
$6,000	$4,200	$3,960	$2,640	$600	$6,000
$7,000	$4,900	$4,520	$2,640	$700	$6,460
$8,000	$5,600	$5,080	$2,640	$800	$6,920
$9,000	$6,300	$5,640	$2,640	$900	$7,380

The aggregate expenditure function is formed by stacking on top of each other the consumption function (after taxes), the investment function, the government spending function, the export function, and the import function. The point at which the aggregate expenditure function intersects the vertical axis will be determined by the levels of investment, government, and export expenditures—which do not vary with national income. The upward slope of the aggregate expenditure function will be determined by the marginal propensity to save, the tax rate, and the marginal propensity to import. A higher marginal propensity to save, a higher tax rate, and a higher marginal propensity to import will all make the slope of the aggregate expenditure function flatter—because out of any extra income, more is going to savings or taxes or imports and less to spending on domestic goods and services.

The equilibrium occurs where national income is equal to aggregate expenditure, which is shown on the graph as the point where the aggregate expenditure schedule crosses the 45-degree line. In this example, the equilibrium occurs at 6,000. This equilibrium can also be read off the table under the figure; it is the

level of national income where aggregate expenditure is equal to national income.

194. Reading: Equilibrium and The Expenditure-Output Model

Equilibrium in the Keynesian Cross Model

With the aggregate expenditure line in place, the next step is to relate it to the two other elements of the Keynesian cross diagram. Thus, the first subsection interprets the intersection of the aggregate expenditure function and the 45-degree line, while the next subsection relates this point of intersection to the potential GDP line.

WHERE EQUILIBRIUM OCCURS

The point where the aggregate expenditure line that is constructed from C + I + G + X − M crosses the 45-degree line will be the equilibrium for the economy. It is the only point on the aggregate expenditure line where the total amount being spent on aggregate demand equals the total level of production. In Figure B.8, this point of equilibrium (E_0) happens at 6,000, which can also be read off Table B.3.

The meaning of "equilibrium" remains the same; that is, equilibrium is a point of balance where no incentive exists to shift away from that outcome. To understand why the point of intersection between the aggregate expenditure function and the 45-degree line is a macroeconomic equilibrium, consider what would happen if an economy found itself to the right of the

equilibrium point E, say point H in Figure B.8, where output is higher than the equilibrium. At point H, the level of aggregate expenditure is below the 45-degree line, so that the level of aggregate expenditure in the economy is less than the level of output. As a result, at point H, output is piling up unsold—not a sustainable state of affairs.

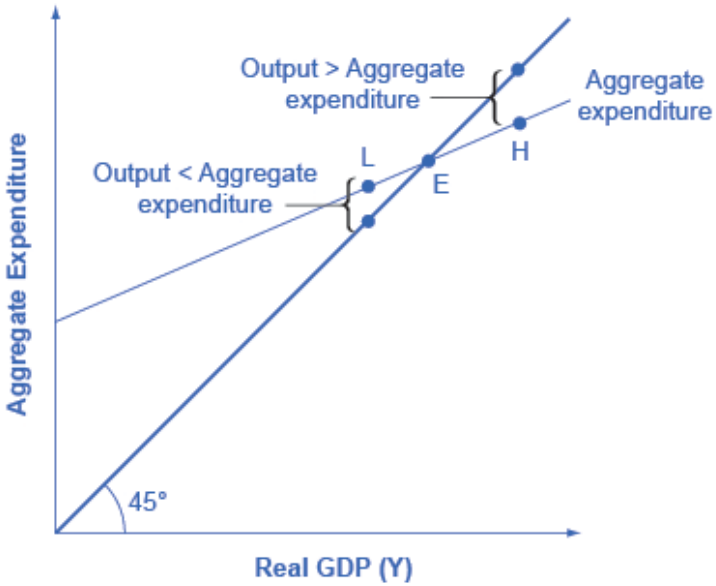


Figure B.8. *Equilibrium in the Keynesian Cross Diagram. If output was above the equilibrium level, at H, then the real output is greater than the aggregate expenditure in the economy. This pattern cannot hold, because it would mean that goods are produced but piling up unsold. If output was below the equilibrium level at L, then aggregate expenditure would be greater than output. This pattern cannot hold either, because it would mean that spending exceeds the number of goods being produced. Only point E can be at equilibrium, where output, or national income and aggregate expenditure, are equal. The equilibrium (E) must lie on the 45-degree line, which is the set of points where national income and aggregate expenditure are equal.*

Conversely, consider the situation where the level of output is at point L—where real output is lower than the equilibrium. In that

case, the level of aggregate demand in the economy is above the 45-degree line, indicating that the level of aggregate expenditure in the economy is greater than the level of output. When the level of aggregate demand has emptied the store shelves, it cannot be sustained, either. Firms will respond by increasing their level of production. Thus, the equilibrium must be the point where the amount produced and the amount spent are in balance, at the intersection of the aggregate expenditure function and the 45-degree line.

FINDING EQUILIBRIUM

The following gives some information on an economy. The Keynesian model assumes that there is some level of consumption even without income. That amount is $236 – $216 = $20. $20 will be consumed when national income equals zero. Assume that taxes are 0.2 of real GDP. Let the marginal propensity to save of after-tax income be 0.1. The level of investment is $70, the level of government spending is $80, and the level of exports is $50. Imports are 0.2 of after-tax income. Given these values, you need to complete the table and then answer these questions: What is the consumption function? What is the equilibrium? Why is a national income of $300 not at equilibrium? How do expenditures and output compare at this point?

National Income	Taxes	After-tax income	Consumption	I + G + X	Imports	Aggregate Expenditures
$300			$236			
$400						
$500						
$600						
$700						

Step 1. Calculate the amount of taxes for each level of national income(reminder: GDP = national income) for each level of national income using the following as an example:

National Income (Y)	$300
Taxes = 0.2 or 20%	× 0.2
Tax amount (T)	$60

Step 2. Calculate after-tax income by subtracting the tax amount from national income for each level of national income using the following as an example:

National income minus taxes	$300
	–$60
After-tax income	$240

Step 3. Calculate consumption. The marginal propensity to save is given as 0.1. This means that the marginal propensity to consume is 0.9, since MPS + MPC = 1. Therefore, multiply 0.9 by the after-tax income amount using the following as an example:

After-tax Income	$240
MPC	× 0.9
Consumption	$216

Step 4. Consider why the table shows consumption of $236 in the

first row. As mentioned earlier, the Keynesian model assumes that there is some level of consumption even without income. That amount is $236 – $216 = $20.

Step 5. There is now enough information to write the consumption function. The consumption function is found by figuring out the level of consumption that will happen when income is zero. Remember that:

C = Consumption when national income is zero + MPC (after-tax income)

Let C represent the consumption function, Y represent national income, and T represent taxes.

$$\begin{aligned} C &= \$20 + 0.9(Y - T) \\ &= \$20 + 0.9(\$300 - \$60) \\ &= \$236 \end{aligned}$$

Step 6. Use the consumption function to find consumption at each level of national income.

Step 7. Add investment (I), government spending (G), and exports (X). Remember that these do not change as national income changes:

Step 8. Find imports, which are 0.2 of after-tax income at each level of national income. For example:

After-tax income	$240
Imports of 0.2 or 20% of Y – T	× 0.2
Imports	$48

Step 9. Find aggregate expenditure by adding C + I + G + X − I for each level of national income. Your completed table should look like this:

National Income (Y)	Tax = 0.2 × Y (T)	After-tax income (Y – T)	Consumption C = $20 + 0.9(Y – T)	I + G + X	Minus Imports (M)	Aggregate Expenditures AE = C + I + G + X – M
$300	$60	$240	$236	$200	$48	$388
$400	$80	$320	$308	$200	$64	$444
$500	$100	$400	$380	$200	$80	$500
$600	$120	$480	$452	$200	$96	$556
$700	$140	$560	$524	$200	$112	$612

Step 10. Answer the question: What is equilibrium? Equilibrium occurs where AE = Y. This table shows that equilibrium occurs where national income equals aggregate expenditure at $500.

Step 11. Find equilibrium mathematically, knowing that national income is equal to aggregate expenditure.Step 10. Answer the question: What is equilibrium? Equilibrium occurs where AE = Y. The table shows that equilibrium occurs where national income equals aggregate expenditure at $500.

$$\begin{aligned} Y &= AE \\ &= C + I + G + X - M \\ &= \$20 + 0.9(Y - T) + \$70 + \$80 + \$50 - 0.2(Y - T) \\ &= \$220 + 0.9(Y - T) - 0.2(Y - T) \end{aligned}$$

Since T is 0.2 of national income, substitute T with 0.2 Y so that:

$$\begin{aligned} Y &= \$220 + 0.9(Y - 0.2Y) - 0.2(Y - 0.2Y) \\ &= \$220 + 0.9Y - 0.18Y - 0.2Y + 0.04Y \\ &= \$220 + 0.56Y \end{aligned}$$

Solve for Y.

$$
\begin{aligned}
Y &= \$220 + 0.56Y \\
Y - 0.56Y &= \$220 \\
0.44Y &= \$220 \\
\frac{0.44Y}{0.44} &= \frac{\$220}{0.44} \\
Y &= \$500
\end{aligned}
$$

Step 12. Answer this question: Why is a national income of $300 not an equilibrium? At national income of $300, aggregate expenditures are $388.

Step 13. Answer this question: How do expenditures and output compare at this point? Aggregate expenditures cannot exceed output (GDP) in the long run, since there would not be enough goods to be bought.

RECESSIONARY AND INFLATIONARY GAPS

In the Keynesian cross diagram, if the aggregate expenditure line intersects the 45-degree line at the level of potential GDP, then the economy is in sound shape. There is no recession, and unemployment is low. But there is no guarantee that the equilibrium will occur at the potential GDP level of output. The equilibrium might be higher or lower.

For example, Figure B.9 (a) illustrates a situation where the aggregate expenditure line intersects the 45-degree line at point E_0, which is a real GDP of $6,000, and which is below the potential GDP of $7,000. In this situation, the level of aggregate expenditure is too low for GDP to reach its full employment level, and unemployment will occur. The distance between an output level like E_0 that is below potential GDP and the level of potential GDP is called a recessionary

gap. Because the equilibrium level of real GDP is so low, firms will not wish to hire the full employment number of workers, and unemployment will be high.

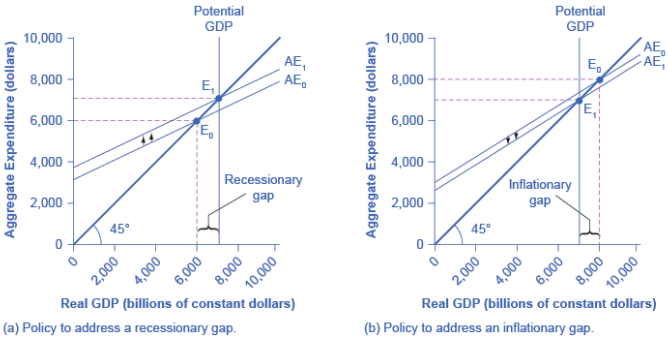


Figure B.9. *Addressing Recessionary and Inflationary Gaps. (a) If the equilibrium occurs at an output below potential GDP, then a recessionary gap exists. The policy solution to a recessionary gap is to shift the aggregate expenditure schedule up from AE0 to AE1, using policies like tax cuts or government spending increases. Then the new equilibrium E1occurs at potential GDP. (b) If the equilibrium occurs at an output above potential GDP, then an inflationary gap exists. The policy solution to an inflationary gap is to shift the aggregate expenditure schedule down from AE0 to AE1, using policies like tax increases or spending cuts. Then, the new equilibrium E1 occurs at potential GDP.*

What might cause a recessionary gap? Anything that shifts the aggregate expenditure line down is a potential cause of recession, including a decline in consumption, a rise in savings, a fall in investment, a drop in government spending or a rise in taxes, or a fall in exports or a rise in imports. Moreover, an economy that is at equilibrium with a recessionary gap may just stay there and suffer high unemployment for a long time; remember, the meaning of equilibrium is that there is no particular adjustment of prices or quantities in the economy to chase the recession away.

The appropriate response to a recessionary gap is for the government to reduce taxes or increase spending so that the

aggregate expenditure function shifts up from AE_0 to AE_1. When this shift occurs, the new equilibrium E_1 now occurs at potential GDP as shown in Figure B.9 (a).

Conversely, Figure B.9 (b) shows a situation where the aggregate expenditure schedule (AE_0) intersects the 45-degree line above potential GDP. The gap between the level of real GDP at the equilibrium E_0 and potential GDP is called an inflationary gap. The inflationary gap also requires a bit of interpreting. After all, a naïve reading of the Keynesian cross diagram might suggest that if the aggregate expenditure function is just pushed up high enough, real GDP can be as large as desired—even doubling or tripling the potential GDP level of the economy. This implication is clearly wrong. An economy faces some supply-side limits on how much it can produce at a given time with its existing quantities of workers, physical and human capital, technology, and market institutions.

The inflationary gap should be interpreted, not as a literal prediction of how large real GDP will be, but as a statement of how much extra aggregate expenditure is in the economy beyond what is needed to reach potential GDP. An inflationary gap suggests that because the economy cannot produce enough goods and services to absorb this level of aggregate expenditures, the spending will instead cause an inflationary increase in the price level. In this way, even though changes in the price level do not appear explicitly in the Keynesian cross equation, the notion of inflation is implicit in the concept of the inflationary gap.

The appropriate Keynesian response to an inflationary gap is shown in Figure B.9 (b). The original intersection of aggregate expenditure line AE_0 and the 45-degree line occurs at $8,000, which is above the level of potential GDP at $7,000. If AE_0 shifts down to AE_1, so that the new equilibrium is at E_1, then the economy will be at potential GDP without pressures for inflationary price increases. The government can achieve a downward shift in aggregate expenditure by increasing taxes on consumers or firms, or by reducing government expenditures.

195. Reading: The Multiplier Effect

The Multiplier Effect

The Keynesian policy prescription has one final twist. Assume that for a certain economy, the intersection of the aggregate expenditure function and the 45-degree line is at a GDP of 700, while the level of potential GDP for this economy is $800. By how much does government spending need to be increased so that the economy reaches the full employment GDP? The obvious answer might seem to be $800 – $700 = $100; so raise government spending by $100. But that answer is incorrect. A change of, for example, $100 in government expenditures will have an effect of more than $100 on the equilibrium level of real GDP. The reason is that a change in aggregate expenditures circles through the economy: households buy from firms, firms pay workers and suppliers, workers and suppliers buy goods from other firms, those firms pay their workers and suppliers, and so on. In this way, the original change in aggregate expenditures is actually spent more than once. This is called the multiplier effect: An initial increase in spending, cycles repeatedly through the economy and has a larger impact than the initial dollar amount spent.

HOW DOES THE MULTIPLIER WORK?

To understand how the multiplier effect works, return to the example in which the current equilibrium in the Keynesian cross diagram is a real GDP of $700, or $100 short of the $800 needed

to be at full employment, potential GDP. If the government spends $100 to close this gap, someone in the economy receives that spending and can treat it as income. Assume that those who receive this income pay 30% in taxes, save 10% of after-tax income, spend 10% of total income on imports, and then spend the rest on domestically produced goods and services.

As shown in the calculations in Figure B.10 and Table B.4, out of the original $100 in government spending, $53 is left to spend on domestically produced goods and services. That $53 which was spent, becomes income to someone, somewhere in the economy. Those who receive that income also pay 30% in taxes, save 10% of after-tax income, and spend 10% of total income on imports, as shown in Figure B.10, so that an additional $28.09 (that is, 0.53 × $53) is spent in the third round. The people who receive that income then pay taxes, save, and buy imports, and the amount spent in the fourth round is $14.89 (that is, 0.53 × $28.09).

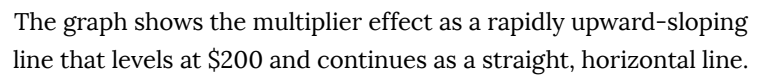


Figure B.10. *The Multiplier Effect. An original increase of government spending of $100 causes a rise in aggregate expenditure of $100. But that $100 is income to others in the economy, and after they save, pay taxes, and buy imports, they spend $53 of that $100 in a second round. In turn, that $53 is income to others. Thus, the original government spending of $100 is multiplied by these cycles of spending, but the impact of each successive cycle gets smaller and smaller. Given the numbers in this example, the original government spending increase of $100 raises aggregate expenditure by $213; therefore, the multiplier in this example is $213/$100 = 2.13.*

Table B.4. Calculating the Multiplier Effect	
Original increase in aggregate expenditure from government spending	100
Which is income to people throughout the economy: Pay 30% in taxes. Save 10% of after-tax income. Spend 10% of income on imports. Second-round increase of…	70 – 7 – 10 = 53
Which is $53 of income to people through the economy: Pay 30% in taxes. Save 10% of after-tax income. Spend 10% of income on imports. Third-round increase of…	37.1 – 3.71 – 5.3 = 28.09
Which is $28.09 of income to people through the economy: Pay 30% in taxes. Save 10% of after-tax income. Spend 10% of income on imports. Fourth-round increase of…	19.663 – 1.96633 – 2.809 = 14.89

Thus, over the first four rounds of aggregate expenditures, the impact of the original increase in government spending of $100 creates a rise in aggregate expenditures of $100 + $53 + $28.09 + $14.89 = $195.98. Figure B.10 shows these total aggregate expenditures after these first four rounds, and then the figure shows the total aggregate expenditures after 30 rounds. The additional boost to aggregate expenditures is shrinking in each round of consumption. After about 10 rounds, the additional increments are very small indeed—nearly invisible to the naked eye. After 30 rounds, the additional increments in each round are so small that they have no practical consequence. After 30 rounds, the cumulative value of the initial boost in aggregate expenditure is approximately $213. Thus, the government spending increase of $100 eventually, after many cycles, produced an increase of $213 in aggregate expenditure and real GDP. In this example, the multiplier is $213/$100 = 2.13.

CALCULATING THE MULTIPLIER

Fortunately for everyone who is not carrying around a computer

with a spreadsheet program to project the impact of an original increase in expenditures over 20, 50, or 100 rounds of spending, there is a formula for calculating the multiplier.

[latex]\displaystyle\text{Spending Multiplier}=\frac{1}{(1-\text{MPC} \times (1-\text{tax rate})+\text{MPI})}[/latex]

The data from Figure B.10 and Table B.4 is: Marginal Propensity to Save (MPS) = 30% Tax rate = 10% Marginal Propensity to Import (MPI) = 10%

The MPC is equal to 1 – MPS, or 0.7. Therefore, the spending multiplier is:

[latex]\displaystyle\text{Spending Multiplier}=\frac{1}{1-(0.7-(0.10)(0.7)-0.10}[/latex]

[latex]\displaystyle\text{Spending Multiplier}=\frac{1}{0.47}[/latex]

[latex]\displaystyle\text{Spending Multiplier}=2.13[/latex]

A change in spending of $100 multiplied by the spending multiplier of 2.13 is equal to a change in GDP of $213. Not coincidentally, this result is exactly what was calculated in Figure after many rounds of expenditures cycling through the economy.

The size of the multiplier is determined by what proportion of the marginal dollar of income goes into taxes, saving, and imports. These three factors are known as "leakages," because they determine how much demand "leaks out" in each round of the multiplier effect. If the leakages are relatively small, then each successive round of the multiplier effect will have larger amounts of demand, and the multiplier will be high. Conversely, if the leakages are relatively large, then any initial change in demand will diminish more quickly in the second, third, and later rounds, and the multiplier will be small. Changes in the size of the leakages—a change in the marginal propensity to save, the tax rate, or the marginal propensity to import—will change the size of the multiplier.

CALCULATING KEYNESIAN POLICY

INTERVENTIONS

Returning to the original question: How much should government spending be increased to produce a total increase in real GDP of $100? If the goal is to increase aggregate demand by $100, and the multiplier is 2.13, then the increase in government spending to achieve that goal would be $100/2.13 = $47. Government spending of approximately $47, when combined with a multiplier of 2.13 (which is, remember, based on the specific assumptions about tax, saving, and import rates), produces an overall increase in real GDP of $100, restoring the economy to potential GDP of $800, as Figure B.11 shows.

The graph shows the multiplier effect in the expenditure-output model: an increase in expenditure has a larger increase on the equilibrium output.

Figure B.11. *The Multiplier Effect. in an Expenditure-Output Model The power of the multiplier effect is that an increase in expenditure has a larger increase on the equilibrium output. The increase in expenditure is the vertical increase from AE0 to AE1. However, the increase in equilibrium output, shown on the horizontal axis, is clearly larger.*

The multiplier effect is also visible on the Keynesian cross diagram. Figure B.11 shows the example we have been discussing: a recessionary gap with an equilibrium of $700, potential GDP of $800, the slope of the aggregate expenditure function (AE_0) determined by the assumptions that taxes are 30% of income, savings are 0.1 of after-tax income, and imports are 0.1 of before-tax income. At AE_1, the aggregate expenditure function is moved up to reach potential GDP.

Now, compare the vertical shift upward in the aggregate expenditure function, which is $47, with the horizontal shift outward in real GDP, which is $100 (as these numbers were calculated earlier). The rise in real GDP is more than double the

rise in the aggregate expenditure function. (Similarly, if you look back at Figure B.9, you will see that the vertical movements in the aggregate expenditure functions are smaller than the change in equilibrium output that is produced on the horizontal axis. Again, this is the multiplier effect at work.) In this way, the power of the multiplier is apparent in the income–expenditure graph, as well as in the arithmetic calculation.

The multiplier does not just affect government spending, but applies to any change in the economy. Say that business confidence declines and investment falls off, or that the economy of a leading trading partner slows down so that export sales decline. These changes will reduce aggregate expenditures, and then will have an even larger effect on real GDP because of the multiplier effect. Read the following Clear It Up feature to learn how the multiplier effect can be applied to analyze the economic impact of professional sports.

HOW CAN THE MULTIPLIER BE USED TO ANALYZE THE ECONOMIC IMPACT OF PROFESSIONAL SPORTS?

Attracting professional sports teams and building sports stadiums to create jobs and stimulate business growth is an economic development strategy adopted by many communities throughout the United States. In his recent article, "Public Financing of Private Sports Stadiums," James Joyner of *Outside the Beltway* looked at public financing for NFL teams. Joyner's findings confirm the earlier work of John Siegfried of Vanderbilt University and Andrew Zimbalist of Smith College.

Siegfried and Zimbalist used the multiplier to analyze this issue. They considered the amount of taxes paid and dollars spent locally to see if there was a positive multiplier effect. Since most professional athletes and owners of sports teams are rich enough to

owe a lot of taxes, let's say that 40% of any marginal income they earn is paid in taxes. Because athletes are often high earners with short careers, let's assume that they save one-third of their after-tax income.

However, many professional athletes do not live year-round in the city in which they play, so let's say that one-half of the money that they do spend is spent outside the local area. One can think of spending outside a local economy, in this example, as the equivalent of imported goods for the national economy.

Now, consider the impact of money spent at local entertainment venues other than professional sports. While the owners of these other businesses may be comfortably middle-income, few of them are in the economic stratosphere of professional athletes. Because their incomes are lower, so are their taxes; say that they pay only 35% of their marginal income in taxes. They do not have the same ability, or need, to save as much as professional athletes, so let's assume their MPC is just 0.8. Finally, because more of them live locally, they will spend a higher proportion of their income on local goods—say, 65%.

If these general assumptions hold true, then money spent on professional sports will have less local economic impact than money spent on other forms of entertainment. For professional athletes, out of a dollar earned, 40 cents goes to taxes, leaving 60 cents. Of that 60 cents, one-third is saved, leaving 40 cents, and half is spent outside the area, leaving 20 cents. Only 20 cents of each dollar is cycled into the local economy in the first round. For locally-owned entertainment, out of a dollar earned, 35 cents goes to taxes, leaving 65 cents. Of the rest, 20% is saved, leaving 52 cents, and of that amount, 65% is spent in the local area, so that 33.8 cents of each dollar of income is recycled into the local economy.

Siegfried and Zimbalist make the plausible argument that, within their household budgets, people have a fixed amount to spend on entertainment. If this assumption holds true, then money spent attending professional sports events is money that was not spent on other entertainment options in a given metropolitan area. Since

the multiplier is lower for professional sports than for other local entertainment options, the arrival of professional sports to a city would reallocate entertainment spending in a way that causes the local economy to shrink, rather than to grow. Thus, their findings seem to confirm what Joyner reports and what newspapers across the country are reporting. A quick Internet search for "economic impact of sports" will yield numerous reports questioning this economic development strategy.

MULTIPLIER TRADEOFFS: STABILITY VERSUS THE POWER OF MACROECONOMIC POLICY

Is an economy healthier with a high multiplier or a low one? With a high multiplier, any change in aggregate demand will tend to be substantially magnified, and so the economy will be more unstable. With a low multiplier, by contrast, changes in aggregate demand will not be multiplied much, so the economy will tend to be more stable.

However, with a low multiplier, government policy changes in taxes or spending will tend to have less impact on the equilibrium level of real output. With a higher multiplier, government policies to raise or reduce aggregate expenditures will have a larger effect. Thus, a low multiplier means a more stable economy, but also weaker government macroeconomic policy, while a high multiplier means a more volatile economy, but also an economy in which government macroeconomic policy is more powerful.

Self Check: The Expenditure Output Model

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not**

count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the four Readings in this section.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

An interactive or media element has been excluded from this version of the text. You can view it online here: https://pressbooks.ccconline.org/accmacro/?p=455

196. Outcome: Applying the Keynesian and Neoclassical Perspectives

What you'll learn to do: compare and contrast the circumstances under which it makes sense to apply the Keynesian and Neoclassical perspectives

LEARNING ACTIVITIES

The learning activities for this section include:

- Reading: Keynes' Law and Say's Law in the AD/AS Model
- Video: Macroeconomic Perspectives
- Reading: Speed of Macroeconomic Adjustment
- Reading: Balancing Keynesian and Neoclassical Models
- Self Check: The Keynesian and Neoclassical Portions of the AS Curve

Take time to review and reflect on each of these activities in order to improve your performance on the assessment for this section.

197. Reading: Keynes' Law and Say's Law in the AD/AS Model

Keynes' Law and Say's Law in the AD/AS Model

The AD/AS model can be used to illustrate both Say's law that supply creates its own demand and Keynes' law that demand creates its own supply. Consider the three zones of the SRAS curve as identified in Figure 11.1: the Keynesian zone, the neoclassical zone, and the intermediate zone.

The graph shows three aggregate demand curves to represent different zones: the Keynesian zone, intermediate zone, and neoclassical zone. The Keynesian is furthest to the left as well as the lowest; the intermediate zone is the center of the three curves; the neoclassical zone is the furthest to the right as well as the highest.

Figure 11.1. *Keynes, Neoclassical, and Intermediate Zones in the Aggregate Supply Curve. Near the equilibrium Ek, in the Keynesian zone at the far left of the SRAS curve, small shifts in AD, either to the right or the left, will affect the output level Yk, but will not much affect the price level. In the Keynesian zone, AD largely determines the quantity of output. Near the equilibrium En, in the neoclassical zone at the far right of the SRAS curve, small shifts in AD, either to the right or the left, will have relatively little effect on the output level Yn, but instead will have a greater effect on the price level. In the neoclassical zone, the near-vertical SRAS curve close to the level of potential GDP largely determines the quantity of output. In the intermediate zone around equilibrium Ei, movement in AD to the right will increase both the output level and the price level, while a movement in AD to the left would decrease both the output level and the price level.*

Focus first on the Keynesian zone, that portion of the SRAS curve

on the far left which is relatively flat. If the AD curve crosses this portion of the SRAS curve at an equilibrium point like Ek, then certain statements about the economic situation will follow. In the Keynesian zone, the equilibrium level of real GDP is far below potential GDP, the economy is in recession, and cyclical unemployment is high. If aggregate demand shifted to the right or left in the Keynesian zone, it will determine the resulting level of output (and thus unemployment). However, inflationary price pressure is not much of a worry in the Keynesian zone, since the price level does not vary much in this zone.

Now, focus your attention on the neoclassical zone of the SRAS curve, which is the near-vertical portion on the right-hand side. If the AD curve crosses this portion of the SRAS curve at an equilibrium point like En where output is at or near potential GDP, then the size of potential GDP pretty much determines the level of output in the economy. Since the equilibrium is near potential GDP, cyclical unemployment is low in this economy, although structural unemployment may remain an issue. In the neoclassical zone, shifts of aggregate demand to the right or the left have little effect on the level of output or employment. The only way to increase the size of the real GDP in the neoclassical zone is for AS to shift to the right. However, shifts in AD in the neoclassical zone will create pressures to change the price level.

Finally, consider the intermediate zone of the SRAS curve in Figure 11.1. If the AD curve crosses this portion of the SRAS curve at an equilibrium point like Ei, then we might expect unemployment and inflation to move in opposing directions. For instance, a shift of AD to the right will move output closer to potential GDP and thus reduce unemployment, but will also lead to a higher price level and upward pressure on inflation. Conversely, a shift of AD to the left will move output further from potential GDP and raise unemployment, but will also lead to a lower price level and downward pressure on inflation.

This approach of dividing the SRAS curve into different zones works as a diagnostic test that can be applied to an economy, like

a doctor checking a patient for symptoms. First, figure out what zone the economy is in and then the economic issues, tradeoffs, and policy choices will be clarified. Some economists believe that the economy is strongly predisposed to be in one zone or another. Thus, hard-line Keynesian economists believe that the economies are in the Keynesian zone most of the time, and so they view the neoclassical zone as a theoretical abstraction. Conversely, hard-line neoclassical economists argue that economies are in the neoclassical zone most of the time and that the Keynesian zone is a distraction.

FROM HOUSING BUBBLE TO HOUSING BUST

Economic fluctuations, whether those experienced during the Great Depression of the 1930s, the stagflation of the 1970s, or the Great Recession of 2008–2009, can be explained using the AD/AS diagram. Short-run fluctuations in output occur due to shifts of the SRAS curve, the AD curve, or both. In the case of the housing bubble, rising home values caused the AD curve to shift to the right as more people felt that rising home values increased their overall wealth. Many homeowners took on mortgages that exceeded their ability to pay because, as home values continued to go up, the increased value would pay off any debt outstanding. Increased wealth due to rising home values lead to increased home equity loans and increased spending. All these activities pushed AD to the right, contributing to low unemployment rates and economic growth in the United States. When the housing bubble burst, overall wealth dropped dramatically, wiping out the recent gains. This drop in the value of homes was a demand shock to the U.S. economy because of its impact directly on the wealth of the household sector, and its contagion into the financial that essentially locked up new

credit. The AD curve shifted to the left as evidenced by the rising unemployment of the Great Recession.

Understanding the source of these macroeconomic fluctuations provided monetary and fiscal policy makers with insight about what policy actions to take to mitigate the impact of the housing crisis. From a monetary policy perspective, the Federal Reserve lowered short-term interest rates to between 0% and 0.25 %, to loosen up credit throughout the financial system. Discretionary fiscal policy measures included the passage of the Emergency Economic Stabilization Act of 2008 that allowed for the purchase of troubled assets, such as mortgages, from financial institutions and the American Recovery and Reinvestment Act of 2009 that increased government spending on infrastructure, provided for tax cuts, and increased transfer payments. In combination, both monetary and fiscal policy measures were designed to help stimulate aggregate demand in the U.S. economy, pushing the AD curve to the right.

While most economists agree on the usefulness of the AD/AS diagram in analyzing the sources of these fluctuations, there is still some disagreement about the effectiveness of policy decisions that are useful in stabilizing these fluctuations.

Key Concepts and Summary

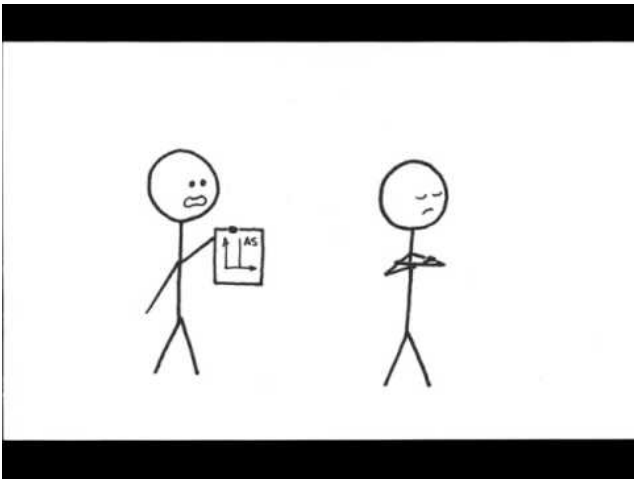
The SRAS curve can be divided into three zones. Keynes' law says demand creates its own supply, so that changes in aggregate demand cause changes in real GDP and employment. Keynes' law can be shown on the horizontal Keynesian zone of the aggregate supply curve. The Keynesian zone occurs at the left of the SRAS curve where it is fairly flat, so movements in AD will affect output, but have little effect on the price level. Say's law says supply creates its own demand. Changes in aggregate demand have no effect on real GDP and employment, only on the price level. Say's law can be shown on the vertical neoclassical zone of the aggregate supply

curve. The neoclassical zone occurs at the right of the SRAS curve where it is fairly vertical, and so movements in AD will affect the price level, but have little impact on output. The intermediate zone in the middle of the SRAS curve is upward-sloping, so a rise in AD will cause higher output and price level, while a fall in AD will lead to a lower output and price level.

198. Video: Macroeconomic Perspectives

Macroeconomic Perspectives

So which model for AD/AS should you use? Which model is the right model? Here you'll see that each model is helpful in understanding and making predictions about economic behavior, and that each perspective more accurately explains economic behavior during different time periods.



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199. Reading: Speed of Macroeconomic Adjustment

Speed of Macroeconomic Adjustment

How long does it take for wages and prices to adjust, and for the economy to rebound back to its potential GDP? This subject is highly contentious. Keynesian economists argue that if the adjustment from recession to potential GDP takes a very long time, then neoclassical theory may be more hypothetical than practical. In response to those immortal words of *John Maynard Keynes*, "In the long run we are all dead," neoclassical economists would say that even if the adjustment takes as long as ten years, the neoclassical perspective remains of central importance in understanding the economy.

One subset of neoclassical economists holds that the adjustment of wages and prices in the macroeconomy might be quite rapid indeed. The theory of *rational expectations* holds that people form the most accurate possible expectations about the future that they can, using all information available to them. In an economy where most people have rational expectations, economic adjustments may happen very quickly.

To understand how rational expectations may affect the speed of price adjustments, let's consider a situation in the real estate market. Imagine that several events seem likely to push up the value of homes in the neighborhood. Perhaps a local employer announces that it is going to hire many more people or the city announces that it is going to build a local park or a library in that neighborhood. The theory of rational expectations points out that even though none of the changes will happen immediately, home prices in the neighborhood will rise immediately, because the expectation that

homes will be worth more in the future will lead buyers to be willing to pay more in the present. The amount of the immediate increase in home prices will depend on how likely it seems that the announcements about the future will actually happen and on how distant the local jobs and neighborhood improvements are in the future. The key point is that, because of rational expectations, prices do not wait on events, but adjust immediately.

At a macroeconomic level, the theory of rational expectations points out that if the aggregate supply curve is vertical over time, then people should rationally expect this pattern. When a shift in aggregate demand occurs, people and businesses with rational expectations will know that its impact on output and employment will be temporary, while its impact on the price level will be permanent. If firms and workers perceive the outcome of the process in advance, and if all firms and workers know that everyone else is perceiving the process in the same way, then they have no incentive to go through an extended series of short-run scenarios, like a firm first hiring more people when aggregate demand shifts out and then firing those same people when aggregate supply shifts back. Instead, everyone will recognize where this process is heading—toward a change in the price level—and then will act on that expectation. In this scenario, the expected long-run change in the price level may happen very quickly, without a drawn-out zigzag of output and employment first moving one way and then the other.

The theory that people and firms have rational expectations can be a useful simplification, but as a statement about how people and businesses actually behave, the assumption seems too strong. After all, many people and firms are not especially well informed, either about what is happening in the economy or about how the economy works. It is probably more realistic to believe that people and firms act with *adaptive expectations*: they look at past experience and gradually adapt their beliefs and behavior as circumstances change, but are not perfect synthesizers of information and accurate predictors of the future in the sense of rational expectations theory. If most people and businesses have some form of adaptive

expectations, then the adjustment from the short run and long run will be traced out in incremental steps that occur over time.

The empirical evidence on the speed of macroeconomic adjustment of prices and wages is not clear-cut. Indeed, the speed of macroeconomic adjustment probably varies among different countries and time periods. A reasonable guess is that the initial short-run effect of a shift in aggregate demand might last two to five years, before the adjustments in wages and prices cause the economy to adjust back to potential GDP. Thus, one might think of the short run for applying Keynesian analysis as time periods less than two to five years, and the long run for applying neoclassical analysis as longer than five years. For practical purposes, this guideline is frustratingly imprecise, but when analyzing a complex social mechanism like an economy as it evolves over time, some imprecision seems unavoidable.

200. Reading: Balancing Keynesian and Neoclassical Models

Balancing Keynesian and Neoclassical Models

Finding the balance between Keynesian and Neoclassical models can be compared to the challenge of riding two horses simultaneously. When a circus performer stands on two horses, with a foot on each one, much of the excitement for the viewer lies in contemplating the gap between the two. As modern macroeconomists ride into the future on two horses—with one foot on the short-term Keynesian perspective and one foot on the long-term neoclassical perspective—the balancing act may look uncomfortable, but there does not seem to be any way to avoid it. Each approach, Keynesian and neoclassical, has its strengths and weaknesses.

The short-term Keynesian model, built on the importance of aggregate demand as a cause of business cycles and a degree of wage and price rigidity, does a sound job of explaining many recessions and why cyclical unemployment rises and falls. By focusing on the short-run adjustments of aggregate demand, *Keynesian economics* risks overlooking the long-term causes of economic growth or the natural rate of unemployment that exists even when the economy is producing at potential GDP.

The neoclassical model, with its emphasis on aggregate supply, focuses on the underlying determinants of output and employment in markets, and thus tends to put more emphasis on economic growth and how labor markets work. However, the neoclassical view is not especially helpful in explaining why unemployment moves

up and down over short time horizons of a few years. Nor is the neoclassical model especially helpful when the economy is mired in an especially deep and long-lasting recession, like the *Great Depression* of the 1930s. Keynesian economics tends to view inflation as a price that might sometimes be paid for lower unemployment; neoclassical economics tends to view inflation as a cost that offers no offsetting gains in terms of lower unemployment.

Macroeconomics cannot, however, be summed up as an argument between one group of economists who are pure Keynesians and another group who are pure neoclassicists. Instead, many mainstream economists believe both the Keynesian and neoclassical perspectives. *Robert Solow*, the Nobel laureate in economics in 1987, described the dual approach in this way:

> At short time scales, I think, something sort of 'Keynesian' is a good approximation, and surely better than anything straight 'neoclassical.' At very long time scales, the interesting questions are best studied in a neoclassical framework, and attention to the Keynesian side of things would be a minor distraction. At the five-to-ten-year time scale, we have to piece things together as best we can, and look for a hybrid model that will do the job.

Many modern macroeconomists spend considerable time and energy trying to construct models that blend the most attractive aspects of the Keynesian and neoclassical approaches. It is possible to construct a somewhat complex mathematical model where aggregate demand and sticky wages and prices matter in the short run, but wages, prices, and aggregate supply adjust in the long run. However, creating an overall model that encompasses both short-term Keynesian and long-term neoclassical models is not easy.

NAVIGATING UNCHARTERED WATERS

Were the policies implemented to stabilize the economy and financial markets during the Great Recession effective? Many economists from both the Keynesian and neoclassical schools have found that they were, although to varying degrees. Alan Blinder of Princeton University and Mark Zandi for Moody's Analytics found that, without fiscal policy, GDP decline would have been significantly more than its 3.3% in 2008 followed by its 0.1% decline in 2009. They also estimated that there would have been 8.5 million more job losses had the government not intervened in the market with the TARP to support the financial industry and key automakers General Motors and Chrysler. Federal Reserve Bank economists Carlos Carvalho, Stefano Eusip, and Christian Grisse found in their study, *Policy Initiatives in the Global Recession: What Did Forecasters Expect?* that once policies were implemented, forecasters adapted their expectations to these policies. They were more likely to anticipate increases in investment due to lower interest rates brought on by monetary policy and increased economic growth resulting from fiscal policy.

The difficulty with evaluating the effectiveness of the stabilization policies that were taken in response to the Great Recession is that we will never know what would have happened had those policies not have been implemented. Surely some of the programs were more effective at creating and saving jobs, while other programs were less so. The final conclusion on the effectiveness of macroeconomic policies is still up for debate, and further study will no doubt consider the impact of these policies on the U.S. budget and deficit, as well as the value of the U.S. dollar in the financial market.

Self Check: The Keynesian and Neoclassical Portions of the AS Curve

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the three Readings in this section.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

An interactive or media element has been excluded from this version of the text. You can view it online here: https://pressbooks.ccconline.org/accmacro/?p=475

201. Putting It Together: Keynesian and Neoclassical Economics

Summary

The goal of this module was to teach you to understand the Neoclassical and Keynesian perspectives on macro theory, to identify their strengths and weaknesses, and to be able to apply each one to appropriate contexts. You learned how to:

- Understand the tenets of Neoclassical Economics
- Understand the tenets of Keynesian Economics
- Apply the tenets through the aggregate supply and demand model
- Compare and contrast the circumstances under which it makes sense to apply the Keynesian and Neoclassical perspectives

Examples

Let's return to the questions posed in the Why it Matters feature. We have seen that both schools of thought believe economic growth to be the result of increases in the supply of labor, increases the supply of capital and improvements in technology. This can be shown by a rightward shift in the long run aggregate supply curve.

Keynesians believe that business cycles are caused primarily by shifts in the aggregate demand curve, but also by shifts in the short

run aggregate supply curve. Neoclassicals believe that business cycles are caused by shifts in the long run aggregate supply curve.

Keynesians believe that unemployment occurs when aggregate demand decreases, and inflation occurs when aggregate demand increases. Neoclassicals believe that aggregate demand only affects inflation, in a positive relationship—higher aggregate demand yields higher inflation while lower aggregate demand yields lower inflation.

While there are economists who consider themselves exclusively Keynesian or exclusively Neoclassical, the majority believe that both perspectives have something to offer. Keynesian thinking makes sense over periods of time too short for wages and prices to adjust fully to demand or supply shocks. Neoclassical thinking makes sense over longer periods of time. Thus, Keynesian thinking is usually applied to understanding business cycles and Neoclassical thinking to economic growth.

202. Glossary: Keynesian and Neoclassical Economics

The Keynesian Perspective

contractionary fiscal policy
tax increases or cuts in government spending designed to decrease aggregate demand and reduce inflationary pressures

coordination argument
downward wage and price flexibility requires perfect information about the level of lower compensation acceptable to other laborers and market participants

disposable income
income after taxes

expansionary fiscal policy
tax cuts or increases in government spending designed to stimulate aggregate demand and move the economy out of recession

expenditure multiplier
Keynesian concept that asserts that a change in autonomous spending causes a more than proportionate change in real GDP

inflationary gap
equilibrium at a level of output above potential GDP

macroeconomic externality
what occurs at the macro level is different from the sum of what happens at the micro level; an example would be where

upward-sloping market supply curves become a flat aggregate supply curve

menu costs
costs firms face in changing prices

Phillips curve
the tradeoff between unemployment and inflation

real GDP
the amount of goods and services actually being sold in a nation

recessionary gap
equilibrium at a level of output below potential GDP

sticky wages and prices
a situation where wages and prices do not fall in response to a decrease in demand, or do not rise in response to an increase in demand

The Neoclassical Perspective

adaptive expectations
the theory that people look at past experience and gradually adapt their beliefs and behavior as circumstances change

expected inflation
a future rate of inflation that consumers and firms build into current decision making

neoclassical perspective
the philosophy that, in the long run, the business cycle will fluctuate around the potential, or full-employment, level of output

physical capital per person
: the amount and kind of machinery and equipment available to help a person produce a good or service

rational expectations
: the theory that people form the most accurate possible expectations about the future that they can, using all information available to them

203. Discussion Topic: Keynesian vs. Neoclassical Economics

Thinking back to the business cycle discussion, how would Keynesian economists explain the performance of the economy during the last few years? Show graphically using the AD/AS model, and explain your reasoning.

Next, how would neoclassical economists explain the performance of the economy during the last few years? Show graphically using the AD/AS model, and explain your reasoning.

Which interpretation makes the most sense to you? Why?

PART XI

LESSON 10: MONEY AND FINANCIAL MARKETS

204. Outcome: Defining Money

What you'll learn to do: define money, explain the functions of money, and define liquidity

You use money nearly every day, but in this section, you will take a deeper look at what money really is—what it represents, why it has value, and what purpose it serves.

LEARNING ACTIVITIES

The learning activities for this section include:

- Reading: Introduction to Money and Banking
- Reading: Defining Money by Its Functions
- Reading: Measuring Money: Currency, M1, And M2
- Video: What is Money?
- Self Check: Defining Money

Take time to review and reflect on each of these activities in order to improve your performance on the assessment for this section.

205. Reading: Introduction to Money and Banking

Figure 13.1. *Cowrie Shell or Money? Is this an image of a cowrie shell or money? The answer is: Both. For centuries, the extremely durable cowrie shell was used as a medium of exchange in various parts of the world. (Credit: modification of work by "prilfish"/Flickr Creative Commons).*

THE MANY DISGUISES OF MONEY: FROM COWRIES TO BITCOINS

Here is a trivia question: In the history of the world, what item was used for money over the broadest geographic area and for the longest period of time? The answer is not gold, silver, or any precious metal. It is the cowrie, a mollusk shell found mainly off the Maldives Islands in the Indian Ocean. Cowries served as money as early as 700 B.C. in China. By the 1500s, they were in widespread use across India and Africa. For several centuries after that, cowries

were used in markets including southern Europe, western Africa, India, and China for a wide range of purchases: everything from buying lunch or a ferry ride to paying for a shipload of silk or rice. Cowries were still acceptable as a way of paying taxes in certain African nations in the early twentieth century.

What made cowries work so well as money? First, they are extremely durable—lasting a century or more. As the late economic historian Karl Polyani put it, they can be "poured, sacked, shoveled, hoarded in heaps" while remaining "clean, dainty, stainless, polished, and milk-white." Second, parties could use cowries either by counting shells of a certain size, or—for large purchases—by measuring the weight or volume of the total shells to be exchanged. Third, it was impossible to counterfeit a cowrie shell, but gold or silver coins could be counterfeited by making copies with cheaper metals. Finally, in the heyday of cowrie money, from the 1500s into the 1800s, the collection of cowries was tightly controlled, first by the Portuguese and later by the Dutch and the English. As a result, the supply of cowries was allowed to grow quickly enough to serve the needs of commerce, but not so quickly that they were no longer scarce. Money throughout the ages has taken many different forms and continues to evolve even today. What do you think money is?

Money and Banking

The discussion of money and banking is a central component in the study of macroeconomics. At this point, you should have firmly in mind the main goals of macroeconomics from Welcome to Economics!: *economic growth*, low *unemployment*, and low *inflation*. We have yet to discuss money and its role in helping to achieve our macroeconomic goals.

You should also understand Keynesian and neoclassical frameworks for macroeconomic analysis and how these frameworks can be embodied in the *aggregate supply–aggregate demand* (AS–AD)

model. With the goals and frameworks for macroeconomic analysis in mind, the final step is to discuss the two main categories of macroeconomic policy: monetary policy, which focuses on money, banking and interest rates; and fiscal policy, which focuses on government spending, taxes, and borrowing. This chapter discusses what economists mean by money, and how money is closely interrelated with the banking system. Monetary Policy and Bank Regulation furthers this discussion.

206. Reading: Defining Money by Its Functions

Barter and the Double Coincidence of Wants

Money for the sake of money is not an end in itself. You cannot eat dollar bills or wear your bank account. Ultimately, the usefulness of money rests in exchanging it for goods or services. As the American writer and humorist Ambrose Bierce (1842–1914) wrote in 1911, money is a "blessing that is of no advantage to us excepting when we part with it." Money is what people regularly use when purchasing or selling goods and services, and thus money must be widely accepted by both buyers and sellers. This concept of money is intentionally flexible, because money has taken a wide variety of forms in different cultures.

To understand the usefulness of money, we must consider what the world would be like without money. How would people exchange goods and services? Economies without money typically engage in the barter system. *Barter*—literally trading one good or service for another—is highly inefficient for trying to coordinate the trades in a modern advanced economy. In an economy without money, an exchange between two people would involve a *double coincidence of wants*, a situation in which two people each want some good or service that the other person can provide. For example, if an accountant wants a pair of shoes, this accountant must find someone who has a pair of shoes in the correct size and who is willing to exchange the shoes for some hours of accounting services. Such a trade is likely to be difficult to arrange. Think about the complexity of such trades in a modern economy, with its

extensive division of labor that involves thousands upon thousands of different jobs and goods.

Another problem with the barter system is that it does not allow us to easily enter into future contracts for the purchase of many goods and services. For example, if the goods are perishable it may be difficult to exchange them for other goods in the future. Imagine a farmer wanting to buy a tractor in six months using a fresh crop of strawberries. Additionally, while the barter system might work adequately in small economies, it will keep these economies from growing. The time that individuals would otherwise spend producing goods and services and enjoying leisure time is spent bartering.

Functions for Money

Money solves the problems created by the barter system. (We will get to its definition soon.) First, money serves as a *medium of exchange*, which means that money acts as an intermediary between the buyer and the seller. Instead of exchanging accounting services for shoes, the accountant now exchanges accounting services for money. This money is then used to buy shoes. To serve as a medium of exchange, money must be very widely accepted as a method of payment in the markets for goods, labor, and financial capital.

Second, money must serve as a *store of value*. In a barter system, we saw the example of the shoemaker trading shoes for accounting services. But she risks having her shoes go out of style, especially if she keeps them in a warehouse for future use—their value will decrease with each season. Shoes are not a good store of value. Holding money is a much easier way of storing value. You know that you do not need to spend it immediately because it will still hold its value the next day, or the next year. This function of money does not require that money is a *perfect* store of value. In an economy with

inflation, money loses some buying power each year, but it remains money.

Third, money serves as a *unit of account*, which means that it is the ruler by which other values are measured. For example, an accountant may charge $100 to file your tax return. That $100 can purchase two pair of shoes at $50 a pair. Money acts as a common denominator, an accounting method that simplifies thinking about trade-offs.

Finally, another function of money is that money must serve as a *standard of deferred payment*. This means that if money is usable today to make purchases, it must also be acceptable to make purchases today that will be paid in the *future*. Loans and future agreements are stated in monetary terms and the standard of deferred payment is what allows us to buy goods and services today and pay in the future. So *money* serves all of these functions– it is a medium of exchange, store of value, unit of account, and standard of deferred payment.

Commodity versus Fiat Money

Money has taken a wide variety of forms in different cultures. Gold, silver, cowrie shells, cigarettes, and even cocoa beans have been used as money. Although these items are used as *commodity money*, they also have a value from use as something other than money. Gold, for example, has been used throughout the ages as money although today it is not used as money but rather is valued for its other attributes. Gold is a good conductor of electricity and is used in the electronics and aerospace industry. Gold is also used in the manufacturing of energy efficient reflective glass for skyscrapers and is used in the medical industry as well. Of course, gold also has value because of its beauty and malleability in the creation of jewelry.

As commodity money, gold has historically served its purpose as a medium of exchange, a store of value, and as a unit of account. *Commodity-backed currencies* are dollar bills or other currencies with values backed up by gold or other commodity held at a bank. During much of its history, the money supply in the United States was backed by gold and silver. Interestingly, antique dollars dated as late as 1957, have "Silver Certificate" printed over the portrait of George Washington, as shown in Figure 13.2. This meant that the holder could take the bill to the appropriate bank and exchange it for a dollar's worth of silver. As economies grew and became more global in nature, the use of commodity monies became more cumbersome. Countries moved towards the use of *fiat money*. Fiat money has no intrinsic value, but is declared by a government to be the legal tender of a country. The United States' paper money, for example, carries the statement: "THIS NOTE IS LEGAL TENDER FOR ALL DEBTS, PUBLIC AND PRIVATE." In other words, by government decree, if you owe a debt, then legally speaking, you can pay that debt with the U.S. currency, even though it is not backed by a commodity. The only backing of our money is universal faith and trust that the currency has value, and nothing more.

Figure 13.2. *A Silver Certificate and a Modern U.S. Bill Until 1958, silver certificates were commodity-backed money—backed by silver, as indicated by the words "Silver Certificate" printed on the bill. Today, U.S. bills are backed by the Federal Reserve, but as fiat money. (Credit: "The.Comedian"/Flickr Creative Commons).*

https://youtu.be/3FMHh6T86GE?t=1s

207. Reading: Measuring Money: Currency, M1, and M2

Measuring Money: Currency, M1, and M2

Cash in your pocket certainly serves as money. But what about checks or credit cards? Are they money, too? Rather than trying to state a single way of measuring money, economists offer broader definitions of money based on liquidity. *Liquidity* refers to how quickly a financial asset can be used to buy a good or service. For example, cash is very liquid. Your $10 bill can be easily used to buy a hamburger at lunchtime. However, $10 that you have in your savings account is not so easy to use. You must go to the bank or ATM machine and withdraw that cash to buy your lunch. Thus, $10 in your savings account is *less* liquid.

The *Federal Reserve Bank*, which is the central bank of the United States, is a bank regulator and is responsible for monetary policy and defines money according to its liquidity. We will discuss this further later in the module, but for now, there are two definitions of money: M1 and M2 money supply. *M1 money supply* includes those monies that are very liquid such as cash, checkable (demand) deposits, and traveler's checks. *M2 money supply* is less liquid in nature and includes M1 plus savings and time deposits, certificates of deposits, and money market funds.

M1

M1 money supply includes *coins and currency in circulation*—the coins and bills that circulate in an economy that are not held by the U.S. Treasury, at the Federal Reserve Bank, or in bank vaults. Closely related to currency are checkable deposits, also known as *demand deposits*. These are the amounts held in checking accounts. They are called demand deposits or checkable deposits because the banking institution must give the deposit holder his money "on demand" when a check is written or a debit card is used. These items together—currency, and checking accounts in banks—make up the definition of money known as M1, which is measured daily by the

Federal Reserve System. Traveler's checks are also included in M1, but have decreased in use over the recent past.

M2

A broader definition of money, M2 includes everything in M1 but also adds other types of deposits. For example, M2 includes *savings deposits* in banks, which are bank accounts on which you cannot write a check directly, but from which you can easily withdraw the money at an automatic teller machine or bank. Many banks and other financial institutions also offer a chance to invest in *money market funds*, where the deposits of many individual investors are pooled together and invested in a safe way, such as short-term government bonds. Another ingredient of M2 is the relatively small (that is, less than about $100,000) *certificates of deposit (CDs)* or *time deposits*, which are accounts that the depositor has committed to leaving in the bank for a certain period of time, ranging from a few months to a few years, in exchange for a higher interest rate. In short, all these types of M2 are money that you can withdraw and spend, but which require a greater effort to do so than the items in M1. Figure 13.3 should help in visualizing the relationship between M1 and M2. Note that M1 is included in the M2 calculation.

Figure 13.3. *The Relationship between M1 and M2 Money. M1 and M2 money have several definitions, ranging from narrow to broad. M1 = coins and currency in circulation + checkable (demand) deposit + traveler's checks. M2 = M1 + savings deposits + money market funds + certificates of deposit + other time deposits.*

The Federal Reserve System is responsible for tracking the amounts of M1 and M2 and prepares a weekly release of information about the money supply. To provide an idea of what these amounts sound like, according to the Federal Reserve Bank's measure of the U.S. money stock, at year-end 2012, M1 in the United States was $2.4 trillion, while M2 was $10.4 trillion. For comparison, the size of the U.S. GDP in 2012 was $16.3 trillion. A breakdown of the portion of each type of money that comprised M1 and M2 in 2012, as provided by the Federal Reserve Bank, is provided in Table 13.1.

Table 13.1. M1 and M2 Federal Reserve Statistical Release, Money Stock Measures

Components of M1 in the United States in 2012	**$ billions**
Currency	$1,090.0
Traveler's checks	$3.8
Demand deposits and other checking accounts	$1,351.1
Total M1	***$2,444.9 (or $2.4 trillion)***
Components of M2 in the United States in 2012	**$ billions**
M1 money supply	$2,444.9
Savings accounts	$6,692.0
Time deposits	$631.0
Individual money market mutual fund balances	$640.1
Total M2	***$10,408.7 billion (or $10.4 trillion)***

(Source: Federal Reserve Statistical Release, http://www.federalreserve.gov/RELEASES/h6/current/default.htm#t2tg1link)

The lines separating M1 and M2 can become a little blurry. Sometimes elements of M1 are not treated alike; for example, some businesses will not accept personal checks for large amounts, but will accept traveler's checks or cash. Changes in banking practices and technology have made the savings accounts in M2 more similar to the checking accounts in M1. For example, some savings accounts will allow depositors to write checks, use automatic teller machines, and pay bills over the Internet, which has made it easier to access savings accounts. As with many other economic terms and statistics, the important point is to know the strengths and limitations of the various definitions of money, not to believe that

such definitions are as clear-cut to economists as, say, the definition of nitrogen is to chemists.

Other Money

Where does "plastic money" like debit cards, credit cards, and smart money fit into this picture? A *debit card*, like a check, is an instruction to the user's bank to transfer money directly and immediately from your bank account to the seller. It is important to note that in our definition of money, it is *checkable deposits* that are money, not the paper check or the debit card. Although you can make a purchase with a *credit card*, it is not considered money but rather a short term loan from the credit card company to you. When you make a purchase with a credit card, the credit card company immediately transfers money from its checking account to the seller, and at the end of the month, the credit card company sends you a bill for what you have charged that month. Until you pay the credit card bill, you have effectively borrowed money from the credit card company. With a *smart card*, you can store a certain value of money on the card and then use the card to make purchases. Some "smart cards" used for specific purposes, like long-distance phone calls or making purchases at a campus bookstore and cafeteria, are not really all that smart, because they can only be used for certain purchases or in certain places.

In short, credit cards, debit cards, and smart cards are different ways to move money when a purchase is made. But having more credit cards or debit cards does not change the quantity of money in the economy, any more than having more checks printed increases the amount of money in your checking account.

One key message underlying this discussion of M1 and M2 is that money in a modern economy is not just paper bills and coins; instead, money is closely linked to bank accounts. Indeed, the

macroeconomic policies concerning money are largely conducted through the *banking system*.

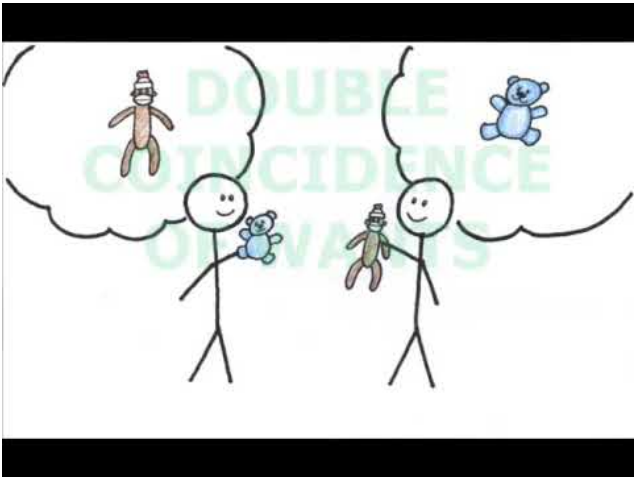
LINK IT UP

Read a brief article on the current monetary challenges in Sweden.

208.

What is Money?

Watch this lecture to review what money is and how it works.



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Unlike traditional money that is based not on a tangible asset (like gold), or on the faith of a government (like dollars), Bitcoin is a currency based on cryptography and algorithms. To transfer bitcoins, one uses keys and an algorithm. The currency is independent of banks and governments.

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209. Self Check: Defining Money

Check Your Understanding

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the three Readings in this section.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

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210. Outcome: Defining Credit

What you'll learn to do: define credit (or debt)

In this section, you will examine the credit, or debt, and how it is incurred.

LEARNING ACTIVITIES

The learning activities for this section include:

- Reading: Credit
- Self Check: Defining Credit

Take time to review and reflect on each of these activities in order to improve your performance on the assessment for this section.

211. Reading: Credit

Credit

When you spend money that you don't have, you are using credit. Credit is money that is lent to you. Typically you use credit to buy something like a car, a house, or tuition and other college expenses. Sometimes people obtain credit so that in the future when opportunities or needs arise they will be able to buy something. This is particularly common for businesses. When you use credit, you are borrowing money.

Credit comes in many forms, including loans, bonds, notes, or lines of credit (like home equity loans). All are essentially IOUs: that is, promises to repay with interest. Debt is accumulated credit, less what has been repaid. If you look at a credit card statement, each purchase you make using a credit card is a loan from the credit card company to you. Your balance on the credit card statement is your debt to the credit card company. Of course, your total debt is the sum of money you have borrowed from **all** your creditors, less what you have repaid. This would include credit card debt, car loans, educational loans, mortgages…everything you have borrowed and not paid back.

Debit cards enable you to make purchases like credit cards do, but with one major difference. Debit cards are not credit! Rather, they draw on a bank account, so they are a form of money. When you buy something with a debit card, it is just as if (but more convenient than) going to the bank to make a withdrawal, and then spending the cash. Credit/debt is not a bad thing. It is a tool for buying things you can't afford to pay for all at once, and repaying the loan over a period of time. Most economic agents, that is, individuals or families, businesses and governments, borrow money/obtain credit

at some point. The trick is to know what you're getting into and to use credit responsibly.

Self Check: Defining Credit

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the Reading in this section.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

An interactive or media element has been excluded from this version of the text. You can view it online here: https://pressbooks.ccconline.org/accmacro/?p=547

212. Outcome: Banks

What you'll learn to do: explain what a bank does

In this section, you will examine the role of banks and understand the purpose they serve in the economy.

LEARNING ACTIVITIES

The learning activities for this section include:

- Reading: The Role of Banks
- Self Check: Banks

Take time to review and reflect on each of these activities in order to improve your performance on the assessment for this section.

213. Reading: The Role of Banks

The Role of Banks

The late bank robber named Willie Sutton was once asked why he robbed banks. He answered: "That's where the money is." While this may have been true at one time, from the perspective of modern economists, Sutton is both right and wrong. He is wrong because the overwhelming majority of money in the economy is not in the form of currency sitting in vaults or drawers at banks, waiting for a robber to appear. Most money is in the form of bank accounts, which exist only as electronic records on computers. From a broader perspective, however, the bank robber was more right than he may have known. Banking is intimately interconnected with money and consequently, with the broader economy.

Banks make it far easier for a complex economy to carry out the extraordinary range of transactions that occur in goods, labor, and financial capital markets. Imagine for a moment what the economy would be like if all payments had to be made in cash. When shopping for a large purchase or going on vacation you might need to carry hundreds of dollars in a pocket or purse. Even small businesses would need stockpiles of cash to pay workers and to purchase supplies. A bank allows people and businesses to store this money in either a checking account or savings account, for example, and then withdraw this money as needed through the use of a direct withdrawal, writing a check, or using a debit card.

Banks are a critical intermediary in what is called the *payment system*, which helps an economy exchange goods and services for money or other financial assets. Also, those with extra money that they would like to save can store their money in a bank rather

than look for an individual that is willing to borrow it from them and then repay them at a later date. Those who want to borrow money can go directly to a bank rather than trying to find someone to lend them cash. T*ransaction costs* are the costs associated with finding a lender or a borrower for this money. Thus, banks lower transactions costs and act as financial intermediaries—they bring savers and borrowers together. Along with making transactions much safer and easier, banks also play a key role in the creation of money.

Banks as Financial Intermediaries

An "intermediary" is one who stands between two other parties. Banks are a *financial intermediary*—that is, an institution that operates between a saver who deposits money in a bank and a borrower who receives a loan from that bank. Financial intermediaries include other institutions in the financial market such as insurance companies and pension funds, but they will not be included in this discussion because they are not considered to be *depository institutions*, which are institutions that accept money *deposits* and then use these to make loans. All the funds deposited are mingled in one big pool, which is then loaned out. Figure 13.4 illustrates the position of banks as financial intermediaries, with deposits flowing into a bank and loans flowing out. Of course, when banks make loans to firms, the banks will try to funnel financial capital to healthy businesses that have good prospects for repaying the loans, not to firms that are suffering losses and may be unable to repay.

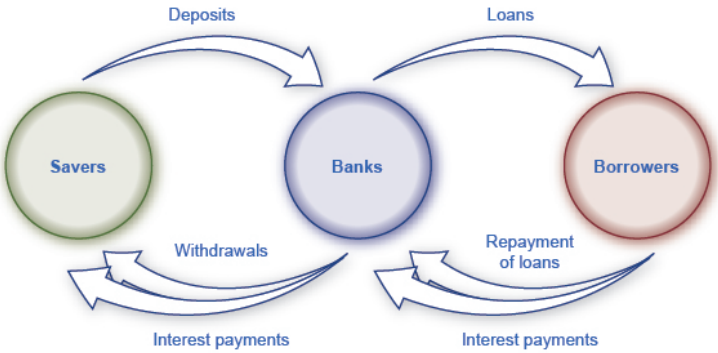

Figure 13.4. *Banks as Financial Intermediaries Banks act as financial intermediaries because they stand between savers and borrowers. Savers place deposits with banks, and then receive interest payments and withdraw money. Borrowers receive loans from banks and repay the loans with interest. In turn, banks return money to savers in the form of withdrawals, which also include interest payments from banks to savers.*

HOW ARE BANKS, SAVINGS AND LOANS, AND CREDIT UNIONS RELATED?

Banks have a couple of close cousins: savings institutions and credit unions. Banks, as explained, receive deposits from individuals and businesses and make loans with the money. Savings institutions are also sometimes called "savings and loans" or "thrifts." They also take loans and make deposits. However, from the 1930s until the 1980s, federal law limited how much interest savings institutions were allowed to pay to depositors. They were also required to make most of their loans in the form of housing-related loans, either to homebuyers or to real-estate developers and builders.

A *credit union* is a nonprofit financial institution that its members own and run. Members of each credit union decide who is eligible to be a member. Usually, potential members would be everyone in a certain community, or groups of employees, or members of

a certain organization. The credit union accepts deposits from members and focuses on making loans back to its members. While there are more credit unions than banks and more banks than savings and loans, the total assets of credit unions are growing.

In 2008, there were 7,085 banks. Due to the bank failures of 2007–2009 and bank mergers, there were 5,844 banks in the United States at the end of the third quarter in 2013. According to Bankrate, there were 7,351 credit unions in the United States in 2012 with average assets of $20 million. A day of "Transfer Your Money" took place in 2009 out of general public disgust with big bank bailouts. People were encouraged to transfer their deposits to credit unions. This has grown into the ongoing Move Your Money Project. Consequently, some now hold deposits as large as $50 million. However, as of 2013, the 12 largest banks (0.2%) controlled 69 percent of all banking assets, according to the Dallas Federal Reserve.

A Bank's Balance Sheet

A *balance sheet* is an accounting tool that lists assets and liabilities. An *asset* is something of value that is owned and can be used to produce something. For example, the cash you own can be used to pay your tuition. If you own a home, this is also considered an asset. A *liability* is a debt or something you owe. Many people borrow money to buy homes. In this case, a home is the asset, but the mortgage is the liability. The *net worth* is the asset value minus how much is owed (the liability). A bank's balance sheet operates in much the same way. A bank's net worth is also referred to as *bank capital*. A bank has assets such as cash held in its vaults, monies that the bank holds at the Federal Reserve bank (called "reserves"), loans that are made to customers, and bonds.

Figure 13.5 illustrates a hypothetical and simplified balance sheet for the Safe and Secure Bank. Because of the two-column format

of the balance sheet, with the T-shape formed by the vertical line down the middle and the horizontal line under "Assets" and "Liabilities," it is sometimes called a *T-account*.

Assets		Liabilities + Net Worth	
Loans	$5 million	Deposits	$10 million
U.S. Government Securities (USGS)	$4 million		
Reserves	$2 million	Net Worth	$1 million

Figure 13.5. A *Balance Sheet for the Safe and Secure Bank*

The "T" in a T-account separates the assets of a firm, on the left, from its liabilities, on the right. All firms use T-accounts, though most are much more complex. For a bank, the assets are the financial instruments that either the bank is holding (its reserves) or those instruments where other parties owe money to the bank—like loans made by the bank and U.S. Government Securities, such as U.S. treasury bonds purchased by the bank. Liabilities are what the bank owes to others. Specifically, the bank owes any deposits made in the bank to those who have made them. The net worth of the bank is the total assets minus total liabilities. Net worth is included on the liabilities side to have the T account balance to zero. For a healthy business, net worth will be positive. For a bankrupt firm, net worth will be negative. In either case, on a bank's T-account, assets will always equal liabilities plus net worth.

When bank customers deposit money into a checking account, savings account, or a certificate of deposit, the bank views these deposits as liabilities. After all, the bank owes these deposits to its customers, when the customers wish to withdraw their money. In the example shown in Figure 13.5, the Safe and Secure Bank holds $10 million in deposits.

Loans are the first category of bank assets shown in Figure 13.5. Say that a family takes out a 30-year mortgage loan to purchase a house, which means that the borrower will repay the loan over the next 30 years. This loan is clearly an asset from the bank's perspective, because the borrower has a legal obligation to make

payments to the bank over time. But in practical terms, how can the value of the mortgage loan that is being paid over 30 years be measured in the present? One way of measuring the value of something—whether a loan or anything else—is by estimating what another party in the market is willing to pay for it. Many banks issue home loans, and charge various handling and processing fees for doing so, but then sell the loans to other banks or financial institutions who collect the loan payments. The market where loans are made to borrowers is called the primary *loan market*, while the market in which these loans are bought and sold by financial institutions is the secondary loan market.

One key factor that affects what financial institutions are willing to pay for a loan, when they buy it in the secondary loan market, is the perceived riskiness of the loan: that is, given the characteristics of the borrower, such as income level and whether the local economy is performing strongly, what proportion of loans of this type will be repaid? The greater the risk that a loan will not be repaid, the less that any financial institution will pay to acquire the loan. Another key factor is to compare the interest rate charged on the original loan with the current interest rate in the economy. If the original loan made at some point in the past requires the borrower to pay a low interest rate, but current interest rates are relatively high, then a financial institution will pay less to acquire the loan. In contrast, if the original loan requires the borrower to pay a high interest rate, while current interest rates are relatively low, then a financial institution will pay more to acquire the loan. For the Safe and Secure Bank in this example, the total value of its loans if they were sold to other financial institutions in the secondary market is $5 million.

The second category of bank asset is *bonds*, which are a common mechanism for borrowing, used by the federal and local government, and also private companies, and nonprofit organizations. A bank takes some of the money it has received in deposits and uses the money to buy bonds—typically bonds issued by the U.S. government. Government bonds are low-risk because

the government is virtually certain to pay off the bond, albeit at a low rate of interest. These bonds are an asset for banks in the same way that loans are an asset: The bank will receive a stream of payments in the future. In our example, the Safe and Secure Bank holds bonds worth a total value of $4 million.

The final entry under assets is *reserves*, which is money that the bank keeps on hand, and that is not loaned out or invested in bonds—and thus does not lead to interest payments. The Federal Reserve requires that banks keep a certain percentage of depositors' money on "reserve," which means either in their vaults or kept at the Federal Reserve Bank. This is called a reserve requirement. (Monetary Policy and Bank Regulation will explain how the level of these required reserves are one policy tool that governments have to influence bank behavior.) Additionally, banks may also want to keep a certain amount of reserves on hand in excess of what is required. The Safe and Secure Bank is holding $2 million in reserves.

The net worth of a bank is defined as its total assets minus its total liabilities. For the Safe and Secure Bank shown in Figure 13.5, net worth is equal to $1 million; that is, $11 million in assets minus $10 million in liabilities. For a financially healthy bank, the net worth will be positive. If a bank has negative net worth and depositors tried to withdraw their money, the bank would not be able to give all depositors their money.

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How Banks Go Bankrupt

A bank that is bankrupt will have a negative net worth, meaning its assets will be worth less than its liabilities. How can this happen? Again, looking at the balance sheet helps to explain.

A well-run bank will assume that a small percentage of borrowers will not repay their loans on time, or at all, and factor these missing payments into its planning. Remember, the calculations of the expenses of banks every year includes a factor for loans that are not repaid, and the value of a bank's loans on its balance sheet assumes a certain level of riskiness because some loans will not be repaid. Even

if a bank expects a certain number of loan defaults, it will suffer if the number of loan defaults is much greater than expected, as can happen during a recession. For example, if the Safe and Secure Bank in Figure 13.5 experienced a wave of unexpected defaults, so that its loans declined in value from $5 million to $3 million, then the assets of the Safe and Secure Bank would decline so that the bank had a negative net worth.

WHAT LED TO THE FINANCIAL CRISIS OF 2008–2009?

Many banks make mortgage loans so that people can buy a home, but then do not keep the loans on their books as an asset. Instead, the bank sells the loan. These loans are "securitized," which means that they are bundled together into a financial security that is sold to investors. Investors in these mortgage-backed securities receive a rate of return based on the level of payments that people make on all the mortgages that stand behind the security.

Securitization offers certain advantages. If a bank makes most of its loans in a local area, then the bank may be financially vulnerable if the local economy declines, so that many people are unable to make their payments. But if a bank sells its local loans, and then buys a mortgage-backed security based on home loans in many parts of the country, it can avoid being exposed to local financial risks. (In the simple example in the text, banks just own "bonds." In reality, banks can own a number of financial instruments, as long as these financial investments are safe enough to satisfy the government bank regulators.) From the standpoint of a local homebuyer, securitization offers the benefit that a local bank does not need to have lots of extra funds to make a loan, because the bank is only planning to hold that loan for a short time, before selling the loan so that it can be pooled into a financial security.

But securitization also offers one potentially large disadvantage.

If a bank is going to hold a mortgage loan as an asset, the bank has an incentive to scrutinize the borrower carefully to ensure that the loan is likely to be repaid. However, a bank that is going to sell the loan may be less careful in making the loan in the first place. The bank will be more willing to make what are called "subprime loans," which are loans that have characteristics like low or zero down-payment, little scrutiny of whether the borrower has a reliable income, and sometimes low payments for the first year or two that will be followed by much higher payments after that. Some *subprime loans* made in the mid-2000s were later dubbed NINJA loans: loans made even though the borrower had demonstrated No Income, No Job, nor Assets.

These subprime loans were typically sold and turned into financial securities—but with a twist. The idea was that if losses occurred on these mortgage-backed securities, certain investors would agree to take the first, say, 5% of such losses. Other investors would agree to take, say, the next 5% of losses. By this approach, still other investors would not need to take any losses unless these mortgage-backed financial securities lost 25% or 30% or more of their total value. These complex securities, along with other economic factors, encouraged a large expansion of subprime loans in the mid-2000s.

The economic stage was now set for a banking crisis. Banks thought they were buying only ultra-safe securities, because even though the securities were ultimately backed by risky subprime mortgages, the banks only invested in the part of those securities where they were protected from small or moderate levels of losses. But as housing prices fell after 2007, and the deepening recession made it harder for many people to make their mortgage payments, many banks found that their mortgage-backed financial assets could end up being worth much less than they had expected—and so the banks were staring bankruptcy in the face. In the 2008–2011 period, 318 banks failed in the United States.

Loan Defaults

The risk of an unexpectedly high level of loan defaults can be especially difficult for banks because a bank's liabilities, namely the deposits of its customers, can be withdrawn quickly, but many of the bank's assets like loans and bonds will only be repaid over years or even decades. This *asset-liability time mismatch*—a bank's liabilities can be withdrawn in the short term while its assets are repaid in the long term—can cause severe problems for a bank. For example, imagine a bank that has loaned a substantial amount of money at a certain interest rate, but then sees interest rates rise substantially. The bank can find itself in a precarious situation. If it does not raise the interest rate it pays to depositors, then deposits will flow to other institutions that offer the higher interest rates that are now prevailing. However, if the bank raises the interest rates that it pays to depositors, it may end up in a situation where it is paying a higher interest rate to depositors than it is collecting from those past loans that were made at lower interest rates. Clearly, the bank cannot survive in the long term if it is paying out more in interest to depositors than it is receiving from borrowers.

How can banks protect themselves against an unexpectedly high rate of loan defaults and against the risk of an asset-liability time mismatch? One strategy is for a bank to *diversify* its loans, which means lending to a variety of customers. For example, suppose a bank specialized in lending to a niche market—say, making a high proportion of its loans to construction companies that build offices in one downtown area. If that one area suffers an unexpected economic downturn, the bank will suffer large losses. However, if a bank loans both to consumers who are buying homes and cars and also to a wide range of firms in many industries and geographic areas, the bank is less exposed to risk. When a bank diversifies its loans, those categories of borrowers who have an unexpectedly large number of defaults will tend to be balanced out, according to random chance, by other borrowers who have an unexpectedly

low number of defaults. Thus, diversification of loans can help banks to keep a positive net worth. However, if a widespread recession occurs that touches many industries and geographic areas, diversification will not help.

Along with diversifying their loans, banks have several other strategies to reduce the risk of an unexpectedly large number of loan defaults. For example, banks can sell some of the loans they make in the secondary loan market, as described earlier, and instead hold a greater share of assets in the form of government bonds or reserves. Nevertheless, in a lengthy recession, most banks will see their net worth decline because a higher share of loans will not be repaid in tough economic times.

Self Check: Banks

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the Reading in this section.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

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214. Outcome: Lending and Money Creation

What you'll learn to do: understand how money is created by lending

In this section, you will see how banks can actually create money through loans.

The specific things you'll learn in this section include:

- Calculate the lending capacity of a bank given its deposits and a required reserve ratio

LEARNING ACTIVITIES

The learning activities for this section include:

- Reading: How Banks Create Money
- Reading: Money Creation
- Video: Creating Money
- Self Check: Lending, Money, and Banks

Take time to review and reflect on each of these activities in order to improve your performance on the assessment for this section.

215. Reading: How Banks Create Money

Money Creation by a Single Bank

Banks and money are intertwined. It is not just that most money is in the form of bank accounts. The banking system can literally create money through the process of making loans. Let's see how.

Start with a hypothetical bank called Singleton Bank. The bank has $10 million in deposits. The T-account balance sheet for Singleton Bank, when it holds all of the deposits in its vaults, is shown in Figure 13.6. At this stage, Singleton Bank is simply storing money for depositors and is using these deposits to make loans. In this simplified example, Singleton Bank cannot earn any interest income from these loans and cannot pay its depositors an interest rate either.

Assets		Liabilities + Net Worth	
Reserves	$10 million	Deposits	$10 million

Figure 13.6. Singleton Bank's Balance Sheet: Receives $10 million in Deposits

Singleton Bank is required by the Federal Reserve to keep $1 million on reserve (10% of total deposits). It will loan out the remaining $9 million. By loaning out the $9 million and charging interest, it will be able to make interest payments to depositors and earn interest income for Singleton Bank (for now, we will keep it simple and not put interest income on the balance sheet). Instead of becoming just a storage place for deposits, Singleton Bank can become a financial intermediary between savers and borrowers.

This change in business plan alters Singleton Bank's balance

sheet, as shown in Figure 13.7. Singleton's assets have changed; it now has $1 million in reserves and a loan to Hank's Auto Supply of $9 million. The bank still has $10 million in deposits.

Assets		Liabilities + Net Worth	
Reserves	$1 million	Deposits	$10 million
Loan to Hank's Auto Supply	$9 million		

Figure 13.7. Singleton Bank's Balance Sheet: 10% Reserves, One Round of Loans

Singleton Bank lends $9 million to Hank's Auto Supply. The bank records this loan by making an entry on the balance sheet to indicate that a loan has been made. This loan is an asset, because it will generate interest income for the bank. Of course, the loan officer is not going to let Hank walk out of the bank with $9 million in cash. The bank issues Hank's Auto Supply a cashier's check for the $9 million. Hank deposits the loan in his regular checking account with First National. The deposits at First National rise by $9 million and its reserves also rise by $9 million, as Figure 13.8 shows. First National must hold 10% of additional deposits as required reserves but is free to loan out the rest.

Assets		Liabilities + Net Worth	
Reserves	+ $9 million	Deposits	+ $9 million

Figure 13.8. Singleton Bank's Balance Sheet: Required 10% Reserves

Making loans that are deposited into a demand deposit account increases the M1 money supply. Remember the definition of M1 includes checkable (demand) deposits, which can be easily used as a medium of exchange to buy goods and services. Notice that the money supply is now $19 million: $10 million in deposits in Singleton bank and $9 million in deposits at First National. Obviously these deposits will be drawn down as Hank's Auto Supply writes checks to pay its bills. But the bigger picture is that a bank must hold enough

money in reserves to meet its liabilities; the rest the bank loans out. In this example so far, bank lending has expanded the money supply by $9 million.

Now, First National must hold only 10% as required reserves ($90,000) but can lend out the other 90% ($8.1 million) in a loan to Jack's Chevy Dealership as shown in Figure 13.9.

Assets		Liabilities + Net Worth	
Reserves	$90,000	Deposits	+ $9 million
Loans	$8.1 million		

Figure 13.9. First National Balance Sheet

If Jack's deposits the loan in its checking account at Second National, the money supply just increased by an additional $8.1 million, as Figure 13.10 shows.

Assets		Liabilities + Net Worth	
Reserves	+ $8.1 million	Deposits	+ $8.1 million

Figure 13.10. Second National Bank's Balance Sheet

How is this money creation possible? It is possible because there are multiple banks in the financial system, they are required to hold only a fraction of their deposits, and loans end up deposited in other banks, which increases deposits and, in essence, the money supply.

LINK IT UP

Watch this video to learn more about how banks create money.

Money and banks are marvelous social inventions that help a modern economy to function. Compared with the alternative of barter, money makes market exchanges vastly easier in goods, labor,

and financial markets. Banking makes money still more effective in facilitating exchanges in goods and labor markets. Moreover, the process of banks making loans in financial capital markets is intimately tied to the creation of money.

But the extraordinary economic gains that are possible through money and banking also suggest some possible corresponding dangers. If banks are not working well, it sets off a decline in convenience and safety of transactions throughout the economy. If the banks are under financial stress, because of a widespread decline in the value of their assets, loans may become far less available, which can deal a crushing blow to sectors of the economy that depend on borrowed money like business investment, home construction, and car manufacturing. The Great Recession of 2008–2009 illustrated this pattern.

THE MANY DISGUISES OF MONEY: FROM COWRIES TO BITCOINS

The global economy has come a long way since it started using cowrie shells as currency. We have moved away from commodity and commodity-backed paper money to fiat currency. As technology and global integration increases, the need for paper currency is diminishing, too. Every day, we witness the increased use of debit and credit cards.

The latest creation and perhaps one of the purest forms of fiat money is the Bitcoin. Bitcoins are a digital currency that allows users to buy goods and services online. Products and services such as videos and books may be purchased using Bitcoins. It is not backed by any commodity nor has it been decreed by any government as legal tender, yet it used as a medium of exchange and its value (online at least) can be stored. It is also unregulated by any central bank, but is created online through people solving very complicated mathematics problems and getting paid afterward.

Bitcoin.org is an information source if you are curious. Bitcoins are a relatively new type of money. At present, because it is not sanctioned as a legal currency by any country nor regulated by any central bank, it lends itself for use in illegal trading activities as well as legal ones. As technology increases and the need to reduce transactions costs associated with using traditional forms of money increases, Bitcoins or some sort of digital currency may replace our dollar bill, just as the cowrie shell was replaced.

216. Reading: Money Creation

Money Creation

To understand the process of money creation today, let us create a hypothetical system of banks. We will focus on three banks in this system: Acme Bank, Bellville Bank, and Clarkston Bank. Assume that all banks are required to hold reserves equal to 10% of their checkable deposits. The quantity of reserves banks are required to hold is called required reserves. The reserve requirement is expressed as a required reserve ratio; it specifies the ratio of reserves to checkable deposits a bank must maintain. Banks may hold reserves in excess of the required level; such reserves are called excess reserves. Excess reserves plus required reserves equal total reserves.

Because banks earn relatively little interest on their reserves held on deposit with the Federal Reserve, we shall assume that they seek to hold no excess reserves. When a bank's excess reserves equal zero, it is loaned up. Finally, we shall ignore assets other than reserves and loans and deposits other than checkable deposits. To simplify the analysis further, we shall suppose that banks have no net worth; their assets are equal to their liabilities.

Let us suppose that every bank in our imaginary system begins with $1,000 in reserves, $9,000 in loans outstanding, and $10,000 in checkable deposit balances held by customers. The balance sheet for one of these banks, Acme Bank, is shown in Table 9.2 "A Balance Sheet for Acme Bank." The required reserve ratio is 0.1: Each bank must have reserves equal to 10% of its checkable deposits. Because reserves equal required reserves, excess reserves equal zero. Each bank is loaned up.

Table 9.2 A Balance Sheet for Acme Bank

Acme Bank			
Assets		**Liabilities**	
Reserves	$1,000	Deposits	$10,000
Loans	$9,000		

We assume that all banks in a hypothetical system of banks have $1,000 in reserves, $10,000 in checkable deposits, and $9,000 in loans. With a 10% reserve requirement, each bank is loaned up; it has zero excess reserves.

Acme Bank, like every other bank in our hypothetical system, initially holds reserves equal to the level of required reserves. Now suppose one of Acme Bank's customers deposits $1,000 in cash in a checking account. The money goes into the bank's vault and thus adds to reserves. The customer now has an additional $1,000 in his or her account. Two versions of Acme's balance sheet are given here. The first shows the changes brought by the customer's deposit: reserves and checkable deposits rise by $1,000. The second shows how these changes affect Acme's balances. Reserves now equal $2,000 and checkable deposits equal $11,000. With checkable deposits of $11,000 and a 10% reserve requirement, Acme is required to hold reserves of $1,100. With reserves equaling $2,000, Acme has $900 in excess reserves.

At this stage, there has been no change in the money supply. When the customer brought in the $1,000 and Acme put the money in the vault, currency in circulation fell by $1,000. At the same time, the $1,000 was added to the customer's checking account balance, so the money supply did not change.

Figure 9.3

Acme Bank, Changes in Balance Sheet		Acme Bank, Balance Sheet	
Assets	Liabilities	Assets	Liabilities
Reserves +$1,000	Deposits +$1,000	Reserves $2,000 Loans $9,000	Deposits $11,000
		(Excess reserves = $900)	

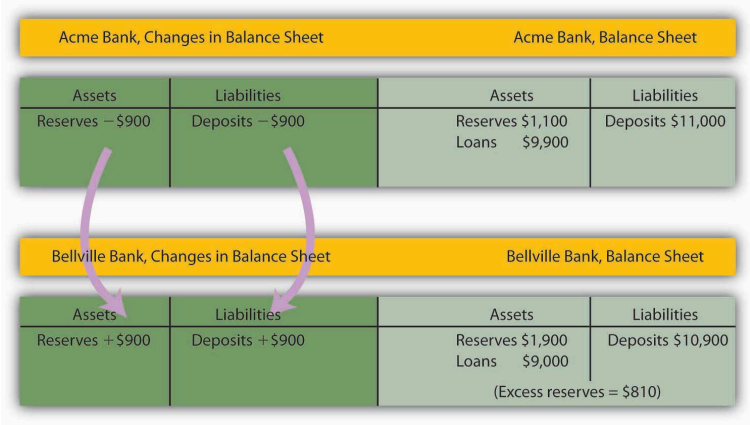
Because Acme earns only a low interest rate on its excess reserves, we assume it will try to loan them out. Suppose Acme lends the $900 to one of its customers. It will make the loan by crediting the customer's checking account with $900. Acme's outstanding loans and checkable deposits rise by $900. The $900 in checkable deposits is new money; Acme created it when it issued the $900 loan. Now you know where money comes from—it is created when a bank issues a loan.

Figure 9.4

Acme Bank, Changes in Balance Sheet		Acme Bank, Balance Sheet	
Assets	Liabilities	Assets	Liabilities
Loans +$900	Deposits +$900	Reserves $2,000 Loans $9,900	Deposits $11,900

Presumably, the customer who borrowed the $900 did so in order to spend it. That customer will write a check to someone else, who is likely to bank at some other bank. Suppose that Acme's borrower writes a check to a firm with an account at Bellville Bank. In this set of transactions, Acme's checkable deposits fall by $900. The firm that receives the check deposits it in its account at Bellville Bank, increasing that bank's checkable deposits by $900. Bellville Bank now has a check written on an Acme account. Bellville will submit the check to the Fed, which will reduce Acme's deposits with the Fed—its reserves—by $900 and increase Bellville's reserves by $900.

Figure 9.5



Notice that Acme Bank emerges from this round of transactions with $11,000 in checkable deposits and $1,100 in reserves. It has eliminated its excess reserves by issuing the loan for $900; Acme is now loaned up. Notice also that from Acme's point of view, it has not created any money! It merely took in a $1,000 deposit and emerged from the process with $1,000 in additional checkable deposits.

Notice that when the banks received new deposits, they could make new loans only up to the amount of their excess reserves, not up to the amount of their deposits and total reserve increases. For example, with the new deposit of $1,000, Acme Bank was able to make additional loans of $900. If instead it made new loans equal to its increase in total reserves, then after the customers who received new loans wrote checks to others, its reserves would be less than the required amount. In the case of Acme, had it lent out an additional $1,000, after checks were written against the new loans, it would have been left with only $1,000 in reserves against $11,000 in deposits, for a reserve ratio of only 0.09, which is less than the required reserve ratio of 0.1 in the example.

Creating Money

Watch this video to review the process of how banks create money:

A YouTube element has been excluded from this version of the text. You can view it online here:
https://pressbooks.ccconline.org/accmacro/?p=557

Self Check: Lending, Money, and Banks

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the two Readings in this section.

Use this quiz to check your understanding and decide whether

to (1) study the previous section further or (2) move on to the next section.

An interactive or media element has been excluded from this version of the text. You can view it online here: https://pressbooks.ccconline.org/accmacro/?p=557

PART XII

LESSON 11: FEDERAL RESERVE AND MONETARY POLICY

217. Why It Matters: Monetary Policy

Why explain the role of money, banking and monetary policy in an economy?

This is another practical module. Have you ever made a purchase, saved some of your paycheck, or taken out a loan? If so, this module is for you, and you probably know at least some of what the module has to say. If not, it's time you learned this real life knowledge.

Bank Collage. TDBank, Bank of America, and Wells Fargo by Mike Mozart, CC-BY.

It's a bit ironic that after all you have studied in this course about buying, selling, producing and consuming, it's only now that we introduce money and the financial side of the economy. In an important sense, this module is similar to the previous one on budgets and fiscal policy. In this module, like the last one, we start with practical stuff:

- What is money?
- What are banks?

- How does credit work?
- What is the difference between a credit card and a debit card?

Federal Reserve by Josh, CC-BY-ND.

Then we move to explaining how the government regulates the financial system and uses monetary policy to influence the direction and speed of the economy.

As this is written, interest rates have been unusually low for several years. Some are barely above zero. This is not so good for savers, but it is very good for borrowers.

- If you are interested in getting a loan to buy a car or getting a mortgage to buy a house, you probably wonder when interest rates will start rising back to "normal," higher levels.
- If you are saving for retirement, low interest rates mean you may have to work more years to save up that nest egg, so you also want to know when interest rates will increase again.

After completing this module, you should have a good understanding of how to answer these questions.

LEARNING OUTCOMES

- Define money; Explain the functions of money; Define liquidity
- Define credit (or debt)
- Explain what a bank does
- Understand how money is created by lending
- Explain the structure, functions and responsibilities of the Federal Reserve System

- Differentiate between M1 and M2 (measures of the supply of money)
- Define monetary policy and differentiate it from fiscal policy
- Define interest rates
- Explain how the equilibrium interest rate is determined in the market for money.
- Explain how monetary policy affects GDP and the price level.
- List and explain the goals of monetary policy.

218. Outcome: The Federal Reserve

What you'll learn to do: explain the structure, functions, and responsibilities of the Federal Reserve System

The Federal Reserve (or Fed) has a significant impact on the economy by controlling the creation of money. Central Banks such as the Fed have an important role in conducting monetary policy, promoting stability in the financial system, and providing banking services to other banks as well as the government.

The specific things you'll learn in this section include:

- Define the money multiplier, explain how to calculate it, and demonstrate its relevance

LEARNING ACTIVITIES

The learning activities for this section include:

- Reading: The Federal Reserve Banking Statement and Central Banks
- Self Check: The Federal Reserve
- Reading: The Money Multiplier and a Multi-Bank Statement
- Self Check: The Money Multiplier

Take time to review and reflect on each of these activities in order to improve your performance on the assessment for this section.

219. Reading: The Federal Reserve Banking System and Central Banks

Structure/Organization of the Federal Reserve

In making decisions about the money supply, a central bank decides whether to raise or lower *interest rates* and, in this way, to influence macroeconomic policy, whose goal is low *unemployment* and low *inflation*. The central bank is also responsible for regulating all or part of the nation's banking system to protect bank depositors and insure the health of the bank's balance sheet.

The organization responsible for conducting *monetary policy* and ensuring that a nation's financial system operates smoothly is called the *central bank*. Most nations have central banks or currency boards. Some prominent central banks around the world include the European Central Bank, the Bank of Japan, and the Bank of England. In the United States, the central bank is called the Federal Reserve—often abbreviated as just "the Fed." This section explains the organization of the U.S. *Federal Reserve* and identifies the major responsibilities of a central bank.

Unlike most central banks, the Federal Reserve is semi-decentralized, mixing government appointees with representation from private-sector banks. At the national level, it is run by a Board of Governors, consisting of seven members appointed by the President of the United States and confirmed by the Senate. Appointments are for 14-year terms and they are arranged so that one term expires January 31 of every even-numbered year. The purpose of the long and staggered terms is to insulate the Board of Governors as much as possible from political pressure so that

policy decisions can be made based only on their economic merits. Additionally, except when filling an unfinished term, each member only serves one term, further insulating decision-making from politics. Policy decisions of the Fed do not require congressional approval, and the President cannot ask for the resignation of a Federal Reserve Governor as the President can with cabinet positions.

One member of the Board of Governors is designated as the Chair. For example, from 1987 until early 2006, the Chair was Alan Greenspan. From 2006 until 2014, Ben Bernanke held the post. The current Chair, Janet Yellen, has made many headlines already. Why? Read on to find out.

WHO HAS THE MOST IMMEDIATE ECONOMIC POWER IN THE WORLD?

Figure 14.2. *Chair of the Federal Reserve Board. Janet L. Yellen is the first woman to hold the position of Chair of the Federal Reserve Board of Governors. (Credit: Board of Governors of the Federal Reserve System)*

What individual can make financial market crash or soar just by making a public statement? It is not Bill Gates or Warren Buffett. It is not even the President of the United States. The answer is the Chair of the Federal Reserve Board of Governors. In early 2014, *Janet L. Yellen*, shown in Figure 14.2 became the first woman to hold this post. Yellen has been described in the media as "perhaps the most qualified Fed chair in history." With a Ph.D. in economics from Yale University, Yellen has taught macroeconomics at Harvard, the London School of Economics, and most recently at the University of California at Berkeley. From 2004–2010, Yellen was President of the Federal Reserve Bank of San Francisco. Not an ivory tower economist, Yellen became one the few economists who warned about a possible bubble in the housing market, more than two years before the financial crisis occurred. Yellen served on the Board of Governors of the Federal Reserve twice, most recently as Vice Chair. She also spent two years as Chair of the President's Council of Economic Advisors. If experience and credentials mean anything, Yellen is likely to be an effective Fed chair.

The Fed Chair is first among equals on the Board of Governors. While he or she has only one vote, the Chair controls the agenda,

and is the public voice of the Fed, so he or she has more power and influence than one might expect.

LINK IT UP

Visit this website to see who the current members of the Federal Reserve Board of Governors are. You can follow the links provided for each board member to learn more about their backgrounds, experiences, and when their terms on the board will end.

The Federal Reserve is more than the Board of Governors. The Fed also includes 12 regional Federal Reserve banks, each of which is responsible for supporting the commercial banks and economy generally in its district. The Federal Reserve districts and the cities where their regional headquarters are located are shown in Figure 14.3. The commercial banks in each district elect a Board of Directors for each regional Federal Reserve bank, and that board chooses a president for each regional Federal Reserve district. Thus, the Federal Reserve System includes both federally and private-sector appointed leaders.

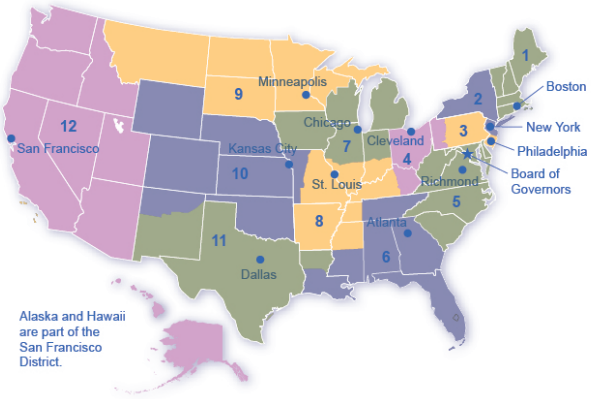


Figure 14.3. *The Twelve Federal Reserve Districts. There are twelve regional Federal Reserve banks, each with its district.*

Watch the following video for an overview of the organization of the Federal Reserve.

A YouTube element has been excluded from this version of the text. You can view it online here: *https://pressbooks.ccconline.org/accmacro/?p=561*

What Does a Central Bank Do?

The Federal Reserve, like most central banks, is designed to perform three important functions:

1. To conduct monetary policy
2. To promote stability of the financial system
3. To provide banking services to commercial banks and other

depository institutions, and to provide banking services to the federal government.

The first two functions are sufficiently important that we will discuss them in their own modules; the third function we will discuss here.

The Federal Reserve provides many of the same services to banks as banks provide to their customers. For example, all commercial banks have an account at the Fed where they deposit reserves. Similarly, banks can obtain loans from the Fed through the "discount window" facility, which will be discussed in more detail later. The Fed is also responsible for check processing. When you write a check, for example, to buy groceries, the grocery store deposits the check in its bank account. Then, the physical check (or an image of that actual check) is returned to your bank, after which funds are transferred from your bank account to the account of the grocery store. The Fed is responsible for each of these actions.

On a more mundane level, the Federal Reserve ensures that enough currency and coins are circulating through the financial system to meet public demands. For example, each year the Fed increases the amount of currency available in banks around the Christmas shopping season and reduces it again in January.

Finally, the Fed is responsible for assuring that banks are in compliance with a wide variety of consumer protection laws. For example, banks are forbidden from discriminating on the basis of age, race, sex, or marital status. Banks are also required to disclose publicly information about the loans they make for buying houses and how those loans are distributed geographically, as well as by sex and race of the loan applicants.

Self Check: The Federal Reserve

Answer the question(s) below to see how well you understand the

topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the two Readings in this section.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

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220. Reading: The Money Multiplier and a Multi-Bank System

USING THE MONEY MULTIPLIER FORMULA

In a system with multiple banks, the initial excess reserve amount that Singleton Bank decided to lend to Hank's Auto Supply was deposited into First National Bank, which is free to loan out $8.1 million. If all banks loan out their excess reserves, the money supply will expand. In a multi-bank system, the amount of money that the system can create is found by using the money multiplier. The money multiplier tells us by how many times a loan will be "multiplied" as it is spent in the economy and then re-deposited in other banks.

Fortunately, a formula exists for calculating the total of these many rounds of lending in a banking system. The *money multiplier formula* is:

[latex]\displaystyle\frac{1}{\text{Reserve Requirement}}[/latex]

The money multiplier is then multiplied by the change in excess reserves to determine the total amount of M1 money supply created in the banking system.

Using the money multiplier for the example in this text:

Step 1. In the case of Singleton Bank, for whom the reserve requirement is 10% (or 0.10), the money multiplier is 1 divided by .10, which is equal to 10.

Step 2. We have identified that the excess reserves are $9 million, so, using the formula we can determine the total change in the M1 money supply:

[latex]\displaystyle\text{Total change in the M1 Money Supply}=\frac{1}{\text{Reserve Requirement}}\times\text{Excess Requirement}[/latex]

[latex]\displaystyle\text{Total change in the M1 Money Supply}=\frac{1}{0.10}\times{9}\text{ million}[/latex]

[latex]\displaystyle\text{Total change in the M1 Money Supply}=10\times{9}\text{ million}[/latex]

[latex]\displaystyle\text{Total change in the M1 Money Supply}=90\text{ million}[/latex]

Step 3. Thus, we can say that, in this example, the total quantity of money generated in this economy after all rounds of lending are completed will be $90 million.

Cautions about the Money Multiplier

The money multiplier will depend on the proportion of reserves that banks are required to hold by the Federal Reserve Bank. Additionally, a bank can also choose to hold extra reserves. Banks may decide to vary how much they hold in reserves for two reasons: macroeconomic conditions and government rules. When an economy is in recession, banks are likely to hold a higher proportion of reserves because they fear that loans are less likely to be repaid when the economy is slow. The Federal Reserve may also raise or lower the required reserves held by banks as a policy move to affect the quantity of money in an economy, as Monetary Policy and Bank Regulation will discuss.

The process of how banks create money shows how the quantity of money in an economy is closely linked to the quantity of lending or credit in the economy. Indeed, all of the money in the economy, except for the original reserves, is a result of bank loans that are re-deposited and loaned out, again, and again.

Finally, the money multiplier depends on people re-depositing the money that they receive in the banking system. If people instead

store their cash in safe-deposit boxes or in shoeboxes hidden in their closets, then banks cannot recirculate the money in the form of loans. Indeed, central banks have an incentive to assure that bank deposits are safe because if people worry that they may lose their bank deposits, they may start holding more money in cash, instead of depositing it in banks, and the quantity of loans in an economy will decline. Low-income countries have what economists sometimes refer to as "mattress savings," or money that people are hiding in their homes because they do not trust banks. When mattress savings in an economy are substantial, banks cannot lend out those funds and the money multiplier cannot operate as effectively. The overall quantity of money and loans in such an economy will decline.

LINK IT UP

Watch a video of Jem Bendell discussing "The Money Myth."

Self Check: The Money Multiplier

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the Reading in this section.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

An interactive or media element has been excluded from this version of the text. You can view it online here: https://pressbooks.ccconline.org/accmacro/?p=563

221. Outcome: Defining Monetary Policy

What you'll learn to do: define monetary policy and differentiate it from fiscal policy

The specific things you'll learn in this section include:

- Identify the tools of monetary policy

LEARNING ACTIVITIES

The learning activities for this section include:

- Reading: Monetary Policy
- Reading: Goals of Monetary Policy
- Self Check: Defining Monetary Policy
- Reading: Tools of Monetary Policy
- Self Check: Tools of Monetary Policy
- Video: Monetary Policy Options

Take time to review and reflect on each of these activities in order to improve your performance on the assessment for this section.

222. Reading: Monetary Policy

Monetary Policy

Monetary policy involves managing interest rates and credit conditions to influence the levels of economic activity and prices. Monetary policy is similar to fiscal policy in that both are tools for influencing the nation's economy, but fiscal policy involves manipulating the federal budget, that is, changing government spending and tax rates.

223. Reading: Goals of Monetary Policy

Goals of Monetary Policy

In many respects, the Fed is the most powerful maker of economic policy in the United States. Congress can pass laws, but the president must execute them; the president can propose laws, but only Congress can pass them. The Fed, however, both sets and carries out monetary policy. Deliberations about fiscal policy can drag on for months, even years, but the Federal Open Market Committee (FOMC) can, behind closed doors, set monetary policy in a day—and see that policy implemented within hours. The Board of Governors can change the discount rate or reserve requirements at any time. The impact of the Fed's policies on the economy can be quite dramatic. The Fed can push interest rates up or down. It can promote a recession or an expansion. It can cause the inflation rate to rise or fall. The Fed wields enormous power.

But to what ends should all this power be directed? With what tools are the Fed's policies carried out? And what problems exist in trying to achieve the Fed's goals? This section reviews the goals of monetary policy, the tools available to the Fed in pursuing those goals, and the way in which monetary policy affects macroeconomic variables.

When we think of the goals of monetary policy, we naturally think of standards of macroeconomic performance that seem desirable—a low unemployment rate, a stable price level, and economic growth. It thus seems reasonable to conclude that the goals of monetary policy should include the maintenance of full employment, the

avoidance of inflation or deflation, and the promotion of economic growth.

But these goals, each of which is desirable in itself, may conflict with one another. A monetary policy that helps to close a recessionary gap and thus promotes full employment may accelerate inflation. A monetary policy that seeks to reduce inflation may increase unemployment and weaken economic growth. You might expect that in such cases, monetary authorities would receive guidance from legislation spelling out goals for the Fed to pursue and specifying what to do when achieving one goal means not achieving another. But as we shall see, that kind of guidance does not exist.

The Federal Reserve Act

When Congress established the Federal Reserve System in 1913, it said little about the policy goals the Fed should seek. The closest it came to spelling out the goals of monetary policy was in the first paragraph of the Federal Reserve Act, the legislation that created the Fed:

"An Act to provide for the establishment of Federal reserve banks, to furnish an elastic currency, [to make loans to banks], to establish a more effective supervision of banking in the United States, and for other purposes."

In short, nothing in the legislation creating the Fed anticipates that the institution will act to close recessionary or inflationary gaps, that it will seek to spur economic growth, or that it will strive to keep the price level steady. There is no guidance as to what the Fed should do when these goals conflict with one another.

The Employment Act of 1946

The first U.S. effort to specify macroeconomic goals came after World War II. The Great Depression of the 1930s had instilled in people a deep desire to prevent similar calamities in the future. That desire, coupled with the 1936 publication of John Maynard Keynes's prescription for avoiding such problems through government policy (*The General Theory of Employment, Interest and Money*), led to the passage of the Employment Act of 1946, which declared that the federal government should "use all practical means . . . to promote maximum employment, production and purchasing power." The act also created the Council of Economic Advisers (CEA) to advise the president on economic matters.

The Fed might be expected to be influenced by this specification of federal goals, but because it is an independent agency, it is not required to follow any particular path. Furthermore, the legislation does not suggest what should be done if the goals of achieving full employment and maximum purchasing power conflict.

The Full Employment and Balanced Growth Act of 1978

The clearest, and most specific, statement of federal economic goals came in the Full Employment and Balanced Growth Act of 1978. This act, generally known as the Humphrey–Hawkins Act, specified that by 1983 the federal government should achieve an unemployment rate among adults of 3% or less, a civilian unemployment rate of 4% or less, and an inflation rate of 3% or less. Although these goals have the virtue of specificity, they offer little in terms of practical policy guidance. The last time the civilian unemployment rate in the United States fell below 4% was 1969, and the inflation rate that year was 6.2%. In 2000, the unemployment rate touched 4%, and the

inflation rate that year was 3.4%, so the goals were close to being met. Except for 2007 when inflation hit 4.1%, inflation has hovered between 1.6% and 3.4% in all the other years between 1991 and 2008, so the inflation goal was met or nearly met, but unemployment fluctuated between 4.0% and 7.5% during those years.

The Humphrey-Hawkins Act requires that the chairman of the Fed's Board of Governors report twice each year to Congress about the Fed's monetary policy. These sessions provide an opportunity for members of the House and Senate to express their views on monetary policy.

Federal Reserve Policy and Goals

Perhaps the clearest way to see the Fed's goals is to observe the policy choices it makes. Since 1979, following a bout of double-digit inflation, its actions have suggested that the Fed's primary goal is to keep inflation under control. Provided that the inflation rate falls within acceptable limits, however, the Fed will also use stimulative measures to close recessionary gaps.

In 1979, the Fed, then led by Paul Volcker, launched a deliberate program of reducing the inflation rate. It stuck to that effort through the early 1980s, even in the face of a major recession. That effort achieved its goal: the annual inflation rate fell from 13.3% in 1979 to 3.8% in 1982. The cost, however, was great. Unemployment soared past 9% during the recession. With the inflation rate below 4%, the Fed shifted to a stimulative policy early in 1983.

In 1990, when the economy slipped into a recession, the Fed, with Alan Greenspan at the helm, engaged in aggressive open-market operations to stimulate the economy, despite the fact that the inflation rate had jumped to 6.1%. Much of that increase in the inflation rate, however, resulted from an oil-price boost that came in the wake of Iraq's invasion of Kuwait that year. A jump in prices that occurs at the same time as real GDP is slumping suggests a

leftward shift in short-run aggregate supply, a shift that creates a recessionary gap. Fed officials concluded that the upturn in inflation in 1990 was a temporary phenomenon and that an expansionary policy was an appropriate response to a weak economy. Once the recovery was clearly under way, the Fed shifted to a neutral policy, seeking neither to boost nor to reduce aggregate demand. Early in 1994, the Fed shifted to a contractionary policy, selling bonds to reduce the money supply and raise interest rates. Then Fed Chairman Greenspan indicated that the move was intended to head off any possible increase in inflation from its 1993 rate of 2.7%. Although the economy was still in a recessionary gap when the Fed acted, Greenspan indicated that any acceleration of the inflation rate would be unacceptable.

By March 1997 the inflation rate had fallen to 2.4%. The Fed became concerned that inflationary pressures were increasing and tightened monetary policy, raising the goal for the federal funds interest rate to 5.5%. Inflation remained well below 2.0% throughout the rest of 1997 and 1998. In the fall of 1998, with inflation low, the Fed was concerned that the economic recession in much of Asia and slow growth in Europe would reduce growth in the United States. In quarter-point steps it reduced the goal for the federal funds rate to 4.75%. With real GDP growing briskly in the first half of 1999, the Fed became concerned that inflation would increase, even though the inflation rate at the time was about 2%, and in June 1999, it raised its goal for the federal funds rate to 5% and continued raising the rate until it reached 6.5% in May 2000.

With inflation under control, it then began lowering the federal funds rate to stimulate the economy. It continued lowering through the brief recession of 2001 and beyond. There were 11 rate cuts in 2001, with the rate at the end of that year at 1.75%; in late 2002 the rate was cut to 1.25%, and in mid-2003 it was cut to 1.0%.

Then, with growth picking up and inflation again a concern, the Fed began again in the middle of 2004 to increase rates. By the end of 2006, the rate stood at 5.25% as a result of 17 quarter-point rate increases.

Starting in September 2007, the Fed, since 2006 led by Ben Bernanke, shifted gears and began lowering the federal funds rate, mostly in larger steps or 0.5 to 0.75 percentage points. Though initially somewhat concerned with inflation, it sensed that the economy was beginning to slow down. It moved aggressively to lower rates over the course of the next 15 months, and by the end of 2008, the rate was targeted at between 0% and 0.25%. In late 2008, with inflation running quite low and deflation threatening, the Fed seemed quite willing to use all of its options to try to keep financial markets running smoothly and to moderate the recession.

What can we infer from these episodes in the 1980s, 1990s, and the first years of this century? It seems clear that the Fed is determined not to allow the high inflation rates of the 1970s to occur again. When the inflation rate is within acceptable limits, the Fed will undertake stimulative measures in response to a recessionary gap or even in response to the possibility of a growth slowdown. Those limits seem to have tightened over time. In the late 1990s and early 2000s, it appeared that an inflation rate above 3%—or any indication that inflation might rise above 3%—would lead the Fed to adopt a contractionary policy. While on the Federal Reserve Board in the early 2000s, Ben Bernanke had been an advocate of inflation targeting. Under that system, the central bank announces its inflation target and then adjusts the federal funds rate if the inflation rate moves above or below the central bank's target. Mr. Bernanke indicated his preferred target to be an expected increase in the price level, as measured by the price index for consumer goods and services excluding food and energy, of between 1% and 2%. Thus, the inflation goal appears to have tightened even more—to a rate of 2% or less. If inflation were expected to remain below 2%, however, the Fed would undertake stimulative measures to close a recessionary gap. Whether the Fed will hold to that goal will not really be tested until further macroeconomic experiences unfold.

Self Check: Defining Monetary Policy

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the two Readings in this section.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

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224.

How a Central Bank Executes Monetary Policy

The most important function of the Federal Reserve is to conduct the nation's *monetary policy*. Article I, Section 8 of the U.S. Constitution gives Congress the power "to coin money" and "to regulate the value thereof." As part of the 1913 legislation that created the Federal Reserve, Congress delegated these powers to the Fed. Monetary policy involves managing interest rates and credit conditions, which influences the level of economic activity, as described in more detail below.

A central bank has three traditional tools to implement monetary policy in the economy:

- Open market operations
- Changing reserve requirements
- Changing the discount rate

In discussing how these three tools work, it is useful to think of the central bank as a "bank for banks"—that is, each private-sector bank has its own account at the central bank. We will discuss each of these monetary policy tools in the sections below.

Open Market Operations

The most commonly used tool of monetary policy in the U.S. is *open market operations*. Open market operations take place when the central bank sells or buys U.S. Treasury bonds in order to influence the quantity of bank reserves and the level of interest rates. The

specific interest rate targeted in open market operations is the federal funds rate. The name is a bit of a misnomer since the federal funds rate is the interest rate charged by commercial banks making overnight loans to other banks. As such, it is a very short term interest rate, but one that reflects credit conditions in financial markets very well.

The *Federal Open Market Committee* (FOMC) makes the decisions regarding these open market operations. The FOMC is made up of the seven members of the Federal Reserve's Board of Governors. It also includes five voting members who are drawn, on a rotating basis, from the regional Federal Reserve Banks. The New York district president is a permanent voting member of the FOMC and the other four spots are filled on a rotating, annual basis, from the other 11 districts. The FOMC typically meets every six weeks, but it can meet more frequently if necessary. The FOMC tries to act by consensus; however, the chairman of the Federal Reserve has traditionally played a very powerful role in defining and shaping that consensus. For the Federal Reserve, and for most central banks, open market operations have, over the last few decades, been the most commonly used tool of monetary policy.

LINK IT UP

Visit this website for the Federal Reserve to learn more about current monetary policy.

To understand how open market operations affect the money supply, consider the balance sheet of Happy Bank, displayed in Figure 14.5. Figure 14.5 (a) shows that Happy Bank starts with $460 million in assets, divided among reserves, bonds and loans, and $400 million in liabilities in the form of deposits, with a net worth of $60 million. When the central bank purchases $20 million in bonds from Happy Bank, the bond holdings of Happy Bank fall by $20 million

and the bank's reserves rise by $20 million, as shown in Figure 14.5 (b). However, Happy Bank only wants to hold $40 million in reserves (the quantity of reserves that it started with in Figure 14.5) (a), so the bank decides to loan out the extra $20 million in reserves and its loans rise by $20 million, as shown in Figure 14.5 (c). The open market operation by the central bank causes Happy Bank to make loans instead of holding its assets in the form of government bonds, which expands the money supply. As the new loans are deposited in banks throughout the economy, these banks will, in turn, loan out some of the deposits they receive, triggering the money multiplier discussed in Money and Banking.

Assets		Liabilities + Net Worth	
Reserves	40	Deposits	400
Bonds	120		
Loans	300	Net Worth	60

(a) The original balance sheet

Assets		Liabilities + Net Worth	
Reserves	40 + 20 = 60	Deposits	400
Bonds	120 – 20 = 100		
Loans	300	Net Worth	60

(b) The central bank buys bonds

Assets		Liabilities + Net Worth	
Reserves	60 – 20 = 40	Deposits	400
Bonds	100		
Loans	300 + 20 = 320	Net Worth	60

(c) The bank makes additional loans

Figure 14.5

Where did the Federal Reserve get the $20 million that it used to purchase the *bonds*? A central bank has the power to create money. In practical terms, the Federal Reserve would write a check to Happy Bank, so that Happy Bank can have that money credited to its bank account at the Federal Reserve. In truth, the Federal Reserve created the money to purchase the bonds out of thin air—or with a few clicks on some computer keys.

Open market operations can also reduce the quantity of money and loans in an economy. Figure 14.6 (a) shows the balance sheet

of Happy Bank before the central bank sells bonds in the open market. When Happy Bank purchases $30 million in bonds, Happy Bank sends $30 million of its reserves to the central bank, but now holds an additional $30 million in bonds, as shown in Figure 14.6 (b). However, Happy Bank wants to hold $40 million in reserves, as in Figure 14.6 (a), so it will adjust down the quantity of its loans by $30 million, to bring its reserves back to the desired level, as shown in Figure 14.6 (c). In practical terms, a bank can easily reduce its quantity of loans. At any given time, a bank is receiving payments on loans that it made previously and also making new loans. If the bank just slows down or briefly halts making new loans, and instead adds those funds to its reserves, then its overall quantity of loans will decrease. A decrease in the quantity of loans also means fewer deposits in other banks, and other banks reducing their lending as well, as the money multiplier discussed in Money and Banking takes effect. And what about all those bonds? How do they affect the money supply? Read the following Clear It Up feature for the answer.

Assets		Liabilities + Net Worth	
Reserves	40	Deposits	400
Bonds	120		
Loans	300	Net Worth	60

(a) The original balance sheet

Assets		Liabilities + Net Worth	
Reserves	40 - 30 = 10	Deposits	400
Bonds	120 + 30 = 100		
Loans	300	Net Worth	60

(b) The central bank sells bonds to the bank

Assets		Liabilities + Net Worth	
Reserves	10 + 30 = 40	Deposits	400
Bonds	150		
Loans	300 – 30 = 320	Net Worth	60

(c) The bank makes fewer loans

Figure 14.6

DOES SELLING OR BUYING BONDS INCREASE THE MONEY SUPPLY?

Is it a sale of bonds by the central bank which increases bank reserves and lowers interest rates or is it a purchase of bonds by the central bank? The easy way to keep track of this is to treat the central bank as being *outside* the banking system. When a central bank buys bonds, money is flowing from the central bank to individual banks in the economy, increasing the supply of money in circulation. When a central bank sells bonds, then money from individual banks in the economy is flowing into the central bank—reducing the quantity of money in the economy.

Changing Reserve Requirements

A second method of conducting monetary policy is for the central bank to raise or lower the *reserve requirement*, which, as we noted earlier, is the percentage of each bank's deposits that it is legally required to hold either as cash in their vault or on deposit with the central bank. If banks are required to hold a greater amount in *reserves*, they have less money available to lend out. If banks are allowed to hold a smaller amount in reserves, they will have a greater amount of money available to lend out.

At the end of 2013, the Federal Reserve required banks to hold reserves equal to 0% of the first $13.3 million in deposits, then to hold reserves equal to 3% of the deposits up to $89.0 million in checking and savings accounts, and 10% of any amount above $89.0 million. Small changes in the reserve requirements are made almost every year. For example, the $89.0 million dividing line is sometimes bumped up or down by a few million dollars. In practice, large changes in reserve requirements are rarely used to execute monetary policy. A sudden demand that all banks increase their

reserves would be extremely disruptive and difficult to comply with, while loosening requirements too much would create a danger of banks being unable to meet the demand for withdrawals.

Changing the Discount Rate

The Federal Reserve was founded in the aftermath of the Financial Panic of 1907 when many banks failed as a result of bank runs. As mentioned earlier, since banks make profits by lending out their deposits, no bank, even those that are not bankrupt, can withstand a bank run. As a result of the Panic, the Federal Reserve was founded to be the "lender of last resort." In the event of a bank run, sound banks, (banks that were not bankrupt) could borrow as much cash as they needed from the Fed's discount "window" to quell the bank run. The interest rate banks pay for such loans is called the *discount rate*. (They are so named because loans are made against the bank's outstanding loans "at a discount" of their face value.) Once depositors became convinced that the bank would be able to honor their withdrawals, they no longer had a reason to make a run on the bank. In short, the Federal Reserve was originally intended to provide credit passively, but in the years since its founding, the Fed has taken on a more active role with monetary policy.

So, the third traditional method for conducting monetary policy is to raise or lower the discount rate. If the central bank raises the discount rate, then commercial banks will reduce their borrowing of reserves from the Fed, and instead call in loans to replace those reserves. Since fewer loans are available, the money supply falls and market interest rates rise. If the central bank lowers the discount rate it charges to banks, the process works in reverse.

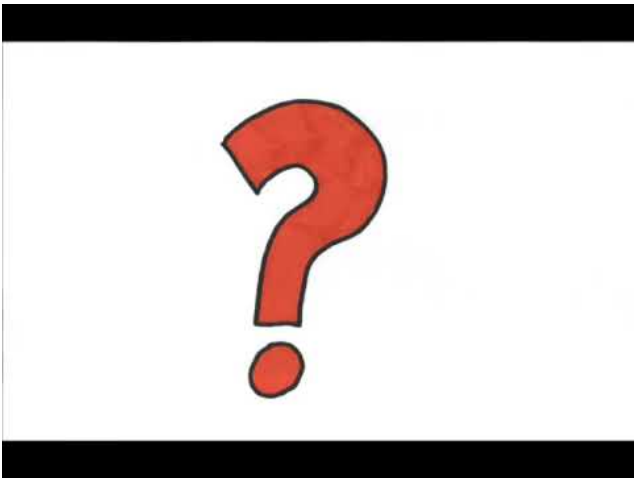
In recent decades, the Federal Reserve has made relatively few discount loans. Before a bank borrows from the Federal Reserve to fill out its required reserves, the bank is expected to first borrow from other available sources, like other banks. This is encouraged by

Fed's charging a higher discount rate, than the federal funds rate. Given that most banks borrow little at the discount rate, changing the discount rate up or down has little impact on their behavior. More importantly, the Fed has found from experience that open market operations are a more precise and powerful means of executing any desired monetary policy.

In the Federal Reserve Act, the phrase "...to afford means of rediscounting commercial paper" is contained in its long title. This tool was seen as the main tool for monetary policy when the Fed was initially created. This illustrates how monetary policy has evolved and how it continues to do so.

Monetary Policy Options

This video gives a brief overview of the Fed's three monetary policy tools: Open Market Operations, the Required Reserve Ratio, and the Discount Rate.



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Self Check: Tools of Monetary Policy

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the Reading in this section.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

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225. Outcome: Interest Rates

What you'll learn to do: define interest rates

The specific things you'll learn in this section include:

- Differentiate between the Federal Funds rate, the Prime rate and the Discount rate

LEARNING ACTIVITIES

The learning activities for this section include:

- Reading: Defining Interest Rates
- Self Check: Interest Rates
- Reading: Federal Funds, Prime, and Discount Interest Rates
- Self Check:Federal Funds, Prime, and Discount Interest Rates

Take time to review and reflect on each of these activities in order to improve your performance on the assessment for this section.

226. Reading: Defining Interest Rates

Defining Interest Rates

An interest rate is the price of borrowing money or the reward for lending money. There is an interest rate, either explicit or implicit, for every type of credit (or debt instrument), including bank accounts, certificates of deposit, U.S. Treasury securities, corporate bonds and mortgages, just to name a few examples. The website of any bank will list the interest rates it pays for every type of account it offers, as well as the interest rates it charges on every type of loan it makes. Similarly, the Wall Street Journal lists current interest rates for Treasury securities, corporate bonds and other debt instruments.

Self Check: Interests Rates

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the Reading in this section.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

An interactive or media element has been excluded from this version of the text. You can view it online here: https://pressbooks.ccconline.org/accmacro/?p=575

227. Reading: Federal Funds, Prime, and Discount Interest Rates

Federal Funds, Prime, and Discount Interest Rates

Three well-known interest rates are the **federal funds rate**, the **prime rate**, and the **discount rate**. These are often confused so let's define them clearly.

The **federal funds rate** is the interest rate on overnight, interbank loans. In other words, banks with excess reserves lend to other banks (i.e. interbank) who need reserves to meet their reserve requirement. These loans are typically for 24 hours (i.e. overnight). The federal funds rate is possibly the best indicator of credit conditions on short term loans, and changes in credit conditions are quickly reflected by changes in the federal funds rate.

The **prime rate** is the interest rate banks charge their very best corporate customers, borrowers with the strongest credit ratings. If Google were to borrow money from Bank of America for a short period of time, Google would be charged Bank of America's Prime Rate. Customers with less strong credit ratings would be charged more than the prime rate (typically thought of as Prime rate plus a premium). The prime rate is thus the floor on which a bank's short term rates of different types are based. Additionally, variable interest rates like car loans or credit cards are often based on the prime rate. When the prime rate changes, variable interest rates will change also. Since each bank can charge its own prime rate, the published prime rate is the consensus or average rate banks charge. Both the federal funds rate and the prime rate are market

determined interest rates. In other words, they are determined through the interaction between supply and demand in their respective credit markets.

The **discount rate**, by contrast, is the interest rate charged by the Federal Reserve for discount loans. As such, it is not market determined, but rather set by the Federal Reserve. We will discuss these interest rates in more detail in future modules.

Self Check: Federal Funds, Prime and Discount Interest Rates

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the Reading in this section.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

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228. Outcome: The Equilibrium Rate

What you'll learn to do: explain how the equilibrium interest rate is determined in the market for money

The specific things you'll learn in this section include:

- Describe what economists mean by the demand for money

LEARNING ACTIVITIES

The learning activities for this section include:

- Reading: Demand and Supply in Financial Markets
- Self Check: The Equilibrium Rate
- Reading: The Demand for Money
- Self Check: Demand for Money

Take time to review and reflect on each of these activities in order to improve your performance on the assessment for this section.

229. Reading: Demand and Supply in Financial Markets

Who Demands and Who Supplies in Financial Markets?

There are two approaches to explaining how interest rates are determined. The first looks at financial markets and loanable funds. The second approach focuses on money supply and demand and is explained in the following module.

United States' households and businesses saved almost $2.9 trillion in 2012. Where did that savings go and what was it used for? Some of the savings ended up in banks, which in turn loaned the money to individuals or businesses that wanted to borrow money. Some was invested in private companies or loaned to government agencies that wanted to borrow money to raise funds for purposes like building roads or mass transit. Some firms reinvested their savings in their own businesses.

In this section, we will determine how the demand and supply model links those who wish to supply *financial capital* (i.e., savings) with those who demand financial capital (i.e., borrowing). Those who save money (or make financial investments, which is the same thing), whether individuals or businesses, are on the supply side of the financial market. Those who borrow money are on the demand side of the financial market.

In any market, the price is what suppliers receive and what demanders pay. In financial markets, those who supply financial capital through saving expect to receive a rate of return, while those who demand financial capital by receiving funds expect to pay a rate of return. This rate of return can come in a variety of forms, depending on the type of investment.

The simplest example of a rate of return is the *interest rate*. For example, when you supply money into a savings account at a bank, you receive interest on your deposit. The interest paid to you as a percent of your deposits is the interest rate. Similarly, if you demand a loan to buy a car or a computer, you will need to pay interest on the money you borrow.

Let's consider the market for borrowing money with credit cards. In 2012, more than 180 million Americans were cardholders. Credit cards allow you to borrow money from the card's issuer, and pay back the borrowed amount plus interest, though most allow you a period of time in which you can repay the loan without paying interest. A typical credit card interest rate ranges from 12% to 18% per year. In 2010, Americans had about $900 billion outstanding

in credit card debts. About half of U.S. families with credit cards report that they almost always pay the full balance on time, but one-quarter of U.S. families with credit cards say that they "hardly ever" pay off the card in full. In fact, as of March 2013, CreditCards.com reported that nearly two out of every five Americans (39%) carry credit card debt from one month to the next. Let's say that, on average, the annual interest rate for credit card borrowing is 15% per year. So, Americans pay tens of billions of dollars every year in interest on their credit cards—plus basic fees for the credit card or fees for late payments.

Figure 4.5 illustrates demand and supply in the financial market for credit cards. The horizontal axis of the financial market shows the quantity of money that is loaned or borrowed in this market. The vertical or price axis shows the rate of return, which in the case of credit card borrowing can be measured with an interest rate.Table 4.5 shows the quantity of financial capital that consumers demand at various interest rates and the quantity that credit card firms (often banks) are willing to supply.

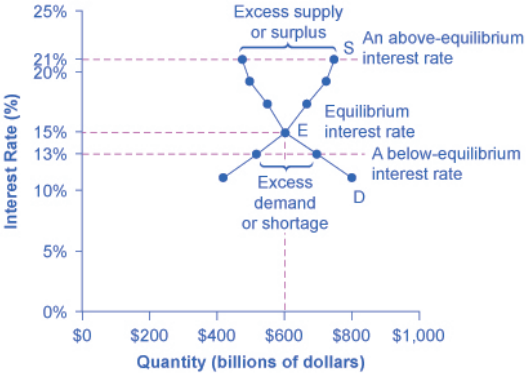

Figure 4.5. *Demand and Supply for Borrowing Money with Credit Cards In this market for credit card borrowing, the demand curve (D) for borrowing financial capital intersects the supply curve (S) for lending financial capital at equilibrium €. At the equilibrium, the interest rate (the "price" in this market) is 15% and the quantity of financial capital being loaned and borrowed is $600 billion. The equilibrium price is where the quantity demanded and the quantity supplied are equal. At an above-equilibrium interest rate like 21%, the quantity of financial capital supplied would increase to $750 billion, but the quantity demanded would decrease to $480 billion. At a below-equilibrium interest rate like 13%, the quantity of financial capital demanded would increase to $700 billion, but the quantity of financial capital supplied would decrease to $510 billion.*

Table 4.5. Demand and Supply for Borrowing Money with Credit Cards

Interest Rate (%)	Quantity of Financial Capital Demanded (Borrowing) ($ billions)	Quantity of Financial Capital Supplied (Lending) ($ billions)
11	$800	$420
13	$700	$510
15	$600	$600
17	$550	$660
19	$500	$720
21	$480	$750

The laws of demand and supply continue to apply in the financial markets. According to the *law of demand*, a higher rate of return

(that is, a higher price) will decrease the quantity demanded. As the interest rate rises, consumers will reduce the quantity that they borrow. According to the law of supply, a higher price increases the quantity supplied. Consequently, as the interest rate paid on credit card borrowing rises, more firms will be eager to issue credit cards and to encourage customers to use them. Conversely, if the interest rate on credit cards falls, the quantity of financial capital supplied in the credit card market will decrease and the quantity demanded will fall.

Equilibrium in Financial Markets

In the financial market for credit cards shown in Figure 4.5, the supply curve (S) and the demand curve (D) cross at the equilibrium point (E). The equilibrium occurs at an interest rate of 15%, where the quantity of funds demanded and the quantity supplied are equal at an equilibrium quantity of $600 billion.

If the interest rate (remember, this measures the "price" in the financial market) is above the equilibrium level, then an excess supply, or a surplus, of financial capital will arise in this market. For example, at an interest rate of 21%, the quantity of funds supplied increases to $750 billion, while the quantity demanded decreases to $480 billion. At this above-equilibrium interest rate, firms are eager to supply loans to credit card borrowers, but relatively few people or businesses wish to borrow. As a result, some credit card firms will lower the interest rates (or other fees) they charge to attract more business. This strategy will push the interest rate down toward the equilibrium level.

If the interest rate is below the equilibrium, then excess demand or a shortage of funds occurs in this market. At an interest rate of 13%, the quantity of funds credit card borrowers demand increases to $700 billion; but the quantity credit card firms are willing to supply is only $510 billion. In this situation, credit card firms will

perceive that they are overloaded with eager borrowers and conclude that they have an opportunity to raise interest rates or fees. The interest rate will face economic pressures to creep up toward the equilibrium level.

Shifts in Demand and Supply in Financial Markets

Those who supply financial capital face two broad decisions: how much to save, and how to divide up their savings among different forms of financial investments. We will discuss each of these in turn.

Participants in financial markets must decide when they prefer to consume goods: now or in the future. Economists call this *intertemporal decision making* because it involves decisions across time. Unlike a decision about what to buy from the grocery store, decisions about investment or saving are made across a period of time, sometimes a long period.

Most workers save for retirement because their income in the present is greater than their needs, while the opposite will be true once they retire. So they save today and supply financial markets. If their income increases, they save more. If their perceived situation in the future changes, they change the amount of their saving. For example, there is some evidence that Social Security, the program that workers pay into in order to qualify for government checks after retirement, has tended to reduce the quantity of financial capital that workers save. If this is true, Social Security has shifted the supply of financial capital at any interest rate to the left.

By contrast, many college students need money today when their income is low (or nonexistent) to pay their college expenses. As a result, they borrow today and demand from financial markets. Once they graduate and become employed, they will pay back the loans. Individuals borrow money to purchase homes or cars. A business seeks financial investment so that it has the funds to build a factory

or invest in a research and development project that will not pay off for five years, ten years, or even more. So when consumers and businesses have greater confidence that they will be able to repay in the future, the quantity demanded of financial capital at any given interest rate will shift to the right.

For example, in the technology boom of the late 1990s, many businesses became extremely confident that investments in new technology would have a high rate of return, and their demand for financial capital shifted to the right. Conversely, during the Great Recession of 2008 and 2009, their demand for financial capital at any given interest rate shifted to the left.

To this point, we have been looking at saving in total. Now let us consider what affects saving in different types of financial investments. In deciding between different forms of financial investments, suppliers of financial capital will have to consider the rates of return and the risks involved. Rate of return is a positive attribute of investments, but risk is a negative. If Investment A becomes more risky, or the return diminishes, then savers will shift their funds to Investment B—and the supply curve of financial capital for Investment A will shift back to the left while the supply curve of capital for Investment B shifts to the right.

The United States as a Global Borrower

In the global economy, trillions of dollars of financial investment cross national borders every year. In the early 2000s, financial investors from foreign countries were investing several hundred billion dollars per year more in the U.S. economy than U.S. financial investors were investing abroad. The following feature deals with one of the macroeconomic concerns for the U.S. economy in recent years.

THE EFFECT OF GROWING U.S. DEBT

Imagine that the U.S. economy became viewed as a less desirable place for foreign investors to put their money because of fears about the growth of the U.S. public debt. Using the four-step process for analyzing how changes in supply and demand affect equilibrium outcomes, how would increased U.S. public debt affect the equilibrium price and quantity for capital in U.S. financial markets?

Step 1. Draw a diagram showing demand and supply for financial capital that represents the original scenario in which foreign investors are pouring money into the U.S. economy. Figure 4.6 shows a demand curve, D, and a supply curve, S, where the supply of capital includes the funds arriving from foreign investors. The original equilibrium E_0 occurs at interest rate R_0 and quantity of financial investment Q_0.

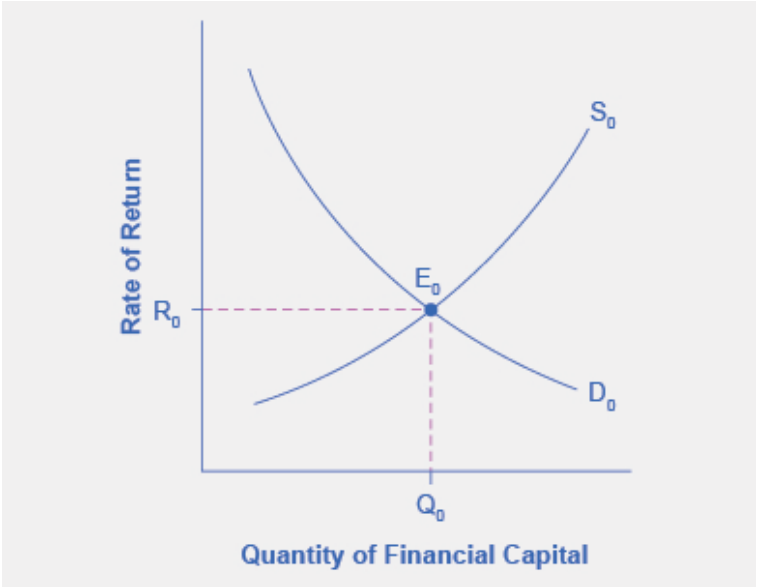

Figure 4.6. *The United States as a Global Borrower Before U.S. Debt Uncertainty The graph shows the demand for financial capital from and supply of financial capital into the U.S. financial markets by the foreign sector before the increase in uncertainty regarding U.S. public debt. The original equilibrium (E0) occurs at an equilibrium rate of return (R0) and the equilibrium quantity is at Q0.*

Step 2. Will the diminished confidence in the U.S. economy as a place to invest affect demand or supply of financial capital? Yes, it will affect supply. Many foreign investors look to the U.S. financial markets to store their money in safe financial vehicles with low risk and stable returns. As the U.S. debt increases, debt servicing will increase—that is, more current income will be used to pay the interest rate on past debt. Increasing U.S. debt also means that businesses may have to pay higher interest rates to borrow money, because business is now competing with the government for financial resources.

Step 3. Will supply increase or decrease? When the enthusiasm

of foreign investors' for investing their money in the U.S. economy diminishes, the supply of financial capital shifts to the left. Figure 4.7 shows the supply curve shift from S_0 to S_1.

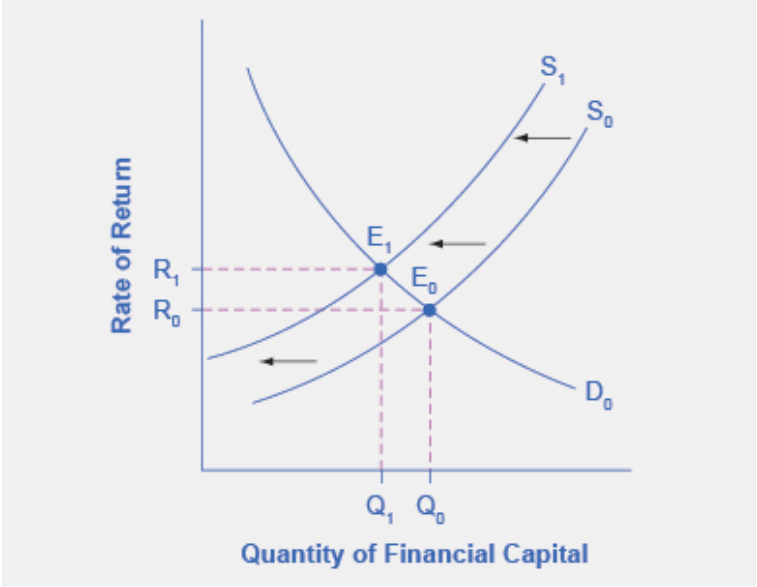

Figure 4.7. *The United States as a Global Borrower Before and After U.S. Debt Uncertainty The graph shows the demand for financial capital and supply of financial capital into the U.S. financial markets by the foreign sector before and after the increase in uncertainty regarding U.S. public debt. The original equilibrium (E0) occurs at an equilibrium rate of return (R0) and the equilibrium quantity is at Q0.*

Step 4. Thus, foreign investors' diminished enthusiasm leads to a new equilibrium, E_1, which occurs at the higher interest rate, R_1, and the lower quantity of financial investment, Q_1.

The economy has experienced an enormous inflow of foreign capital. According to U.S. Bureau of Economic Analysis, by 2012, U.S. investors had accumulated $20.1 trillion of foreign assets, but foreign investors owned a total $25.2 trillion of U.S. assets. If foreign investors were to pull their money out of the U.S. economy and

invest elsewhere in the world, the result could be a significantly lower quantity of financial investment in the United States, available only at a higher interest rate. This reduced inflow of foreign financial investment could impose hardship on U.S. consumers and firms interested in borrowing.

In a modern, developed economy, financial capital often moves invisibly through electronic transfers between one bank account and another. Yet these flows of funds can be analyzed with the same tools of demand and supply as markets for goods or labor.

Price Ceilings in Financial Markets: Usury Laws

As we noted earlier, more than 180 million Americans own credit cards, and their interest payments and fees total tens of billions of dollars each year. It is little wonder that political pressures sometimes arise for setting limits on the interest rates or fees that credit card companies charge. The firms that issue credit cards, including banks, oil companies, phone companies, and retail stores, respond that the higher interest rates are necessary to cover the losses created by those who borrow on their credit cards and who do not repay on time or at all. These companies also point out that cardholders can avoid paying interest if they pay their bills on time.

Consider the credit card market as illustrated in Figure 4.8. In this financial market, the vertical axis shows the interest rate (which is the price in the financial market). Demanders in the credit card market are households and businesses; suppliers are the companies that issue credit cards. This figure does not use specific numbers, which would be hypothetical in any case, but instead focuses on the underlying economic relationships. Imagine a law imposes a price ceiling that holds the interest rate charged on credit cards at the rate Rc, which lies below the interest rate R_0 that would otherwise have prevailed in the market. The price ceiling is shown by the horizontal dashed line in Figure 4.8. The demand and supply model

predicts that at the lower price ceiling interest rate, the quantity demanded of credit card debt will increase from its original level of Q_0 to Qd; however, the quantity supplied of credit card debt will decrease from the original Q_0 to Qs. At the price ceiling (Rc), quantity demanded will exceed quantity supplied. Consequently, a number of people who want to have credit cards and are willing to pay the prevailing interest rate will find that companies are unwilling to issue cards to them. The result will be a credit shortage.

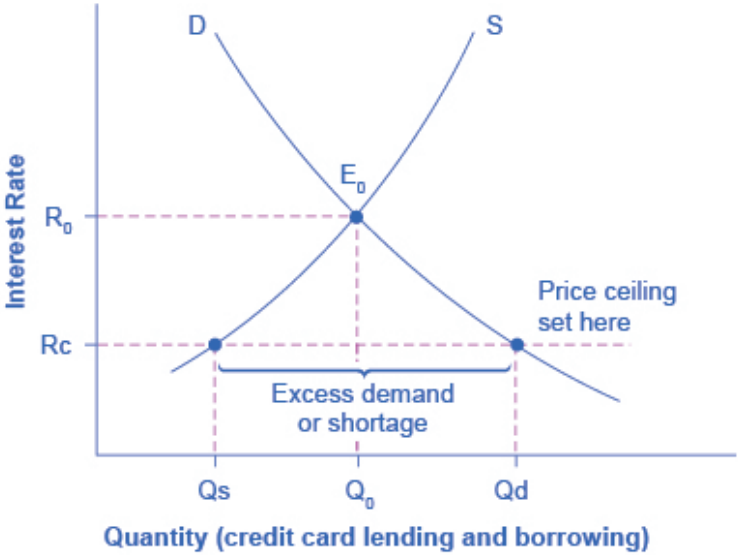

Figure 4.8. *Credit Card Interest Rates: Another Price Ceiling Example The original intersection of demand D and supply S occurs at equilibrium E0. However, a price ceiling is set at the interest rate Rc, below the equilibrium interest rate R0, and so the interest rate cannot adjust upward to the equilibrium. At the price ceiling, the quantity demanded, Qd, exceeds the quantity supplied, Qs. There is excess demand, also called a shortage.*

Many states do have *usury laws*, which impose an upper limit on the interest rate that lenders can charge. However, in many cases these upper limits are well above the market interest rate.

For example, if the interest rate is not allowed to rise above 30% per year, it can still fluctuate below that level according to market forces. A price ceiling that is set at a relatively high level is nonbinding, and it will have no practical effect unless the equilibrium price soars high enough to exceed the price ceiling.

Self Check: The Equilibrium Rate

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the Reading in this section.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

An interactive or media element has been excluded from this version of the text. You can view it online here: https://pressbooks.ccconline.org/accmacro/?p=581

230. Reading: The Demand for Money

Motives for Holding Money

In deciding how much money to hold, people make a choice about how to hold their wealth. How much wealth shall be held as money and how much as other assets? For a given amount of wealth, the answer to this question will depend on the relative costs and benefits of holding money versus other assets. The *demand for money* is the relationship between the quantity of money people want to hold and the factors that determine that quantity.

To simplify our analysis, we will assume there are only two ways to hold wealth: as money in a checking account, or as funds in a bond market mutual fund that purchases long-term bonds on behalf of its subscribers. A bond fund is not money. Some money deposits earn interest, but the return on these accounts is generally lower than what could be obtained in a bond fund. The advantage of checking accounts is that they are highly liquid and can thus be spent easily. We will think of the demand for money as a curve that represents the outcomes of choices between the greater liquidity of money deposits and the higher interest rates that can be earned by holding a bond fund. The difference between the interest rates paid on money deposits and the interest return available from bonds is the cost of holding money.

One reason people hold their assets as money is so that they can purchase goods and services. The money held for the purchase of goods and services may be for everyday transactions such as buying groceries or paying the rent, or it may be kept on hand for

contingencies such as having the funds available to pay to have the car fixed or to pay for a trip to the doctor.

The *transactions demand for money* is money people hold to pay for goods and services they anticipate buying. When you carry money in your purse or wallet to buy a movie ticket or maintain a checking account balance so you can purchase groceries later in the month, you are holding the money as part of your transactions demand for money.

The money people hold for contingencies represents their *precautionary demand for money*. Money held for precautionary purposes may include checking account balances kept for possible home repairs or health-care needs. People do not know precisely when the need for such expenditures will occur, but they can prepare for them by holding money so that they'll have it available when the need arises.

People also hold money for speculative purposes. Bond prices fluctuate constantly. As a result, holders of bonds not only earn interest but experience gains or losses in the value of their assets. Bondholders enjoy gains when bond prices rise and suffer losses when bond prices fall. Because of this, expectations play an important role as a determinant of the demand for bonds. Holding bonds is one alternative to holding money, so these same expectations can affect the demand for money.

John Maynard Keynes, who was an enormously successful speculator in bond markets himself, suggested that bondholders who anticipate a drop in bond prices will try to sell their bonds ahead of the price drop in order to avoid this loss in asset value. Selling a bond means converting it to money. Keynes referred to the *speculative demand for money* as the money held in response to concern that bond prices and the prices of other financial assets might change.

Of course, money is money. One cannot sort through someone's checking account and locate which funds are held for transactions and which funds are there because the owner of the account is worried about a drop in bond prices or is taking a precaution. We

distinguish money held for different motives in order to understand how the quantity of money demanded will be affected by a key determinant of the demand for money: the interest rate.

Interest Rates and the Demand for Money

The quantity of money people hold to pay for transactions and to satisfy precautionary and speculative demand is likely to vary with the interest rates they can earn from alternative assets such as bonds. When interest rates rise relative to the rates that can be earned on money deposits, people hold less money. When interest rates fall, people hold more money. The logic of these conclusions about the money people hold and interest rates depends on the people's motives for holding money.

The quantity of money households want to hold varies according to their income and the interest rate; different average quantities of money held can satisfy their transactions and precautionary demands for money. To see why, suppose a household earns and spends $3,000 per month. It spends an equal amount of money each day. For a month with 30 days, that is $100 per day. One way the household could manage this spending would be to leave the money in a checking account, which we will assume pays zero interest. The household would thus have $3,000 in the checking account when the month begins, $2,900 at the end of the first day, $1,500 halfway through the month, and zero at the end of the last day of the month. Averaging the daily balances, we find that the quantity of money the household demands equals $1,500. This approach to money management, which we will call the "cash approach," has the virtue of simplicity, but the household will earn no interest on its funds.

Consider an alternative money management approach that permits the same pattern of spending. At the beginning of the month, the household deposits $1,000 in its checking account and

the other $2,000 in a bond fund. Assume the bond fund pays 1% interest per month, or an annual interest rate of 12.7%. After 10 days, the money in the checking account is exhausted, and the household withdraws another $1,000 from the bond fund for the next 10 days. On the 20th day, the final $1,000 from the bond fund goes into the checking account. With this strategy, the household has an average daily balance of $500, which is the quantity of money it demands. Let us call this money management strategy the "bond fund approach."

Remember that both approaches allow the household to spend $3,000 per month, $100 per day. The cash approach requires a quantity of money demanded of $1,500, while the bond fund approach lowers this quantity to $500.

Bond Funds

The bond fund approach generates some interest income. The household has $1,000 in the fund for 10 days (1/3 of a month) and $1,000 for 20 days (2/3 of a month). With an interest rate of 1% per month, the household earns $10 in interest each month ([$1,000 × 0.01 × 1/3] + [$1,000 × 0.01 × 2/3]). The disadvantage of the bond fund, of course, is that it requires more attention—$1,000 must be transferred from the fund twice each month. There may also be fees associated with the transfers.

Of course, the bond fund strategy we have examined here is just one of many. The household could begin each month with $1,500 in the checking account and $1,500 in the bond fund, transferring $1,500 to the checking account midway through the month. This strategy requires one less transfer, but it also generates less interest—$7.50 (= $1,500 × 0.01 × 1/2). With this strategy, the household demands a quantity of money of $750. The household could also maintain a much smaller average quantity of money in its checking account and keep more in its bond fund. For simplicity,

we can think of any strategy that involves transferring money in and out of a bond fund or another interest-earning asset as a bond fund strategy.

Which approach should the household use? That is a choice each household must make—it is a question of weighing the interest a bond fund strategy creates against the hassle and possible fees associated with the transfers it requires. Our example does not yield a clear-cut choice for any one household, but we can make some generalizations about its implications.

First, a household is more likely to adopt a bond fund strategy when the interest rate is higher. At low interest rates, a household does not sacrifice much income by pursuing the simpler cash strategy. As the interest rate rises, a bond fund strategy becomes more attractive. That means that the higher the interest rate, the lower the quantity of money demanded.

Second, people are more likely to use a bond fund strategy when the cost of transferring funds is lower. The creation of savings plans, which began in the 1970s and 1980s, that allowed easy transfer of funds between interest-earning assets and checkable deposits tended to reduce the demand for money.

Some money deposits, such as savings accounts and money market deposit accounts, pay interest. In evaluating the choice between holding assets as some form of money or in other forms such as bonds, households will look at the differential between what those funds pay and what they could earn in the bond market. A higher interest rate in the bond market is likely to increase this differential; a lower interest rate will reduce it. An increase in the spread between rates on money deposits and the interest rate in the bond market reduces the quantity of money demanded; a reduction in the spread increases the quantity of money demanded.

Firms, too, must determine how to manage their earnings and expenditures. However, instead of worrying about $3,000 per month, even a relatively small firm may be concerned about $3,000,000 per month. Rather than facing the difference of $10 versus $7.50 in interest earnings used in our household example,

this small firm would face a difference of $2,500 per month ($10,000 versus $7,500). For very large firms such as Toyota or AT&T, interest rate differentials among various forms of holding their financial assets translate into millions of dollars per day.

How is the speculative demand for money related to interest rates? When financial investors believe that the prices of bonds and other assets will fall, their speculative demand for money goes up. The speculative demand for money thus depends on expectations about future changes in asset prices. Will this demand also be affected by present interest rates?

If interest rates are low, bond prices are high. It seems likely that if bond prices are high, financial investors will become concerned that bond prices might fall. That suggests that high bond prices—low interest rates—would increase the quantity of money held for speculative purposes. Conversely, if bond prices are already relatively low, it is likely that fewer financial investors will expect them to fall still further. They will hold smaller speculative balances. Economists thus expect that the quantity of money demanded for speculative reasons will vary negatively with the interest rate.

The Demand Curve for Money

We have seen that the transactions, precautionary, and speculative demands for money vary negatively with the interest rate. Putting those three sources of demand together, we can draw a demand curve for money to show how the interest rate affects the total quantity of money people hold. The demand curve for money shows the quantity of money demanded at each interest rate, all other things unchanged. Such a curve is shown in Figure 10.7 “The Demand Curve for Money.” An increase in the interest rate reduces the quantity of money demanded. A reduction in the interest rate increases the quantity of money demanded.

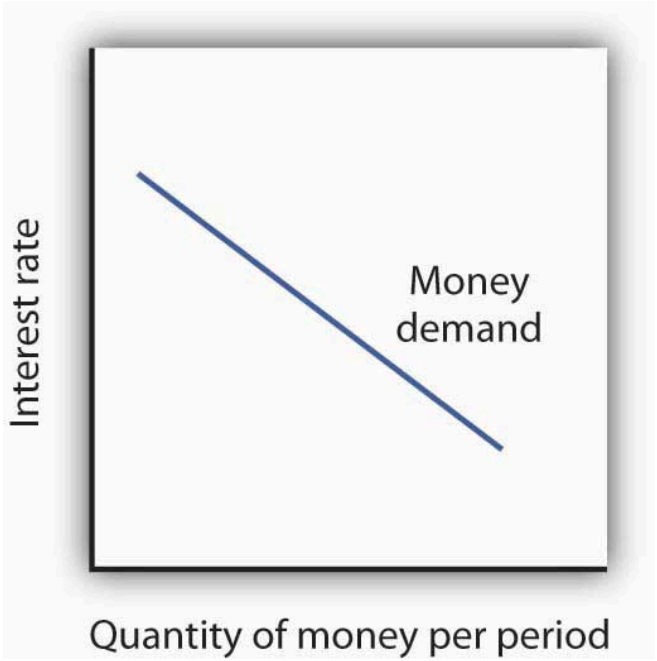

Figure 10.7. *The Demand Curve for Money. The demand curve for money shows the quantity of money demanded at each interest rate. Its downward slope expresses the negative relationship between the quantity of money demanded and the interest rate.*

The relationship between interest rates and the quantity of money demanded is an application of the law of demand. If we think of the alternative to holding money as holding bonds, then the interest rate—or the differential between the interest rate in the bond market and the interest paid on money deposits—represents the price of holding money. As is the case with all goods and services, an increase in price reduces the quantity demanded.

Other Determinants of the Demand for Money

We draw the demand curve for money to show the quantity of money people will hold at each interest rate, all other determinants of money demand unchanged. A change in those "other determinants" will shift the demand for money. Among the most important variables that can shift the demand for money are the level of income and real GDP, the price level, expectations, transfer costs, and preferences.

Real GDP

A household with an income of $10,000 per month is likely to demand a larger quantity of money than a household with an income of $1,000 per month. That relationship suggests that money is a normal good: as income increases, people demand more money at each interest rate, and as income falls, they demand less.

An increase in real GDP increases incomes throughout the economy. The demand for money in the economy is therefore likely to be greater when real GDP is greater.

The Price Level

The higher the price level, the more money is required to purchase a given quantity of goods and services. All other things unchanged, the higher the price level, the greater the demand for money.

Expectations

The speculative demand for money is based on expectations about bond prices. All other things unchanged, if people expect bond prices to fall, they will increase their demand for money. If they expect bond prices to rise, they will reduce their demand for money.

The expectation that bond prices are about to change actually causes bond prices to change. If people expect bond prices to fall, for example, they will sell their bonds, exchanging them for money. That will shift the supply curve for bonds to the right, thus lowering their price. The importance of expectations in moving markets can lead to a self-fulfilling prophecy.

Expectations about future price levels also affect the demand for money. The expectation of a higher price level means that people expect the money they are holding to fall in value. Given that expectation, they are likely to hold less of it in anticipation of a jump in prices.

Expectations about future price levels play a particularly important role during periods of hyperinflation. If prices rise very rapidly and people expect them to continue rising, people are likely to try to reduce the amount of money they hold, knowing that it will fall in value as it sits in their wallets or their bank accounts. Toward the end of the great German hyperinflation of the early 1920s, prices were doubling as often as three times a day. Under those circumstances, people tried not to hold money even for a few minutes—within the space of eight hours money would lose half its value!

Transfer Costs

For a given level of expenditures, reducing the quantity of money demanded requires more frequent transfers between nonmoney

and money deposits. As the cost of such transfers rises, some consumers will choose to make fewer of them. They will therefore increase the quantity of money they demand. In general, the demand for money will increase as it becomes more expensive to transfer between money and nonmoney accounts. The demand for money will fall if transfer costs decline. In recent years, transfer costs have fallen, leading to a decrease in money demand.

Preferences

Preferences also play a role in determining the demand for money. Some people place a high value on having a considerable amount of money on hand. For others, this may not be important.

Household attitudes toward risk are another aspect of preferences that affect money demand. As we have seen, bonds pay higher interest rates than money deposits, but holding bonds entails a risk that bond prices might fall. There is also a chance that the issuer of a bond will default, that is, will not pay the amount specified on the bond to bondholders; indeed, bond issuers may end up paying nothing at all. A money deposit, such as a savings deposit, might earn a lower yield, but it is a safe yield. People's attitudes about the trade-off between risk and yields affect the degree to which they hold their wealth as money. Heightened concerns about risk in the last half of 2008 led many households to increase their demand for money.

Figure 10.8 "An Increase in Money Demand" shows an increase in the demand for money. Such an increase could result from a higher real GDP, a higher price level, a change in expectations, an increase in transfer costs, or a change in preferences.

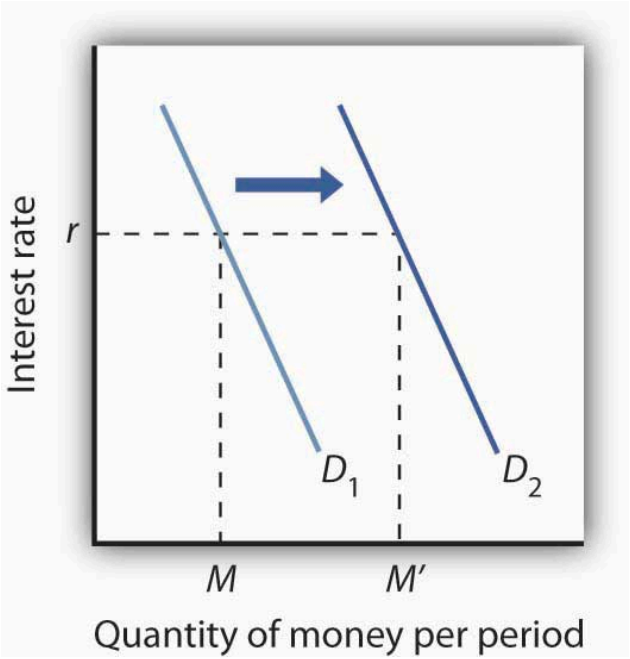

Figure 10.8. *An Increase in Money Demand. An increase in real GDP, the price level, or transfer costs, for example, will increase the quantity of money demanded at any interest rate r, increasing the demand for money from D1 to D2. The quantity of money demanded at interest rate r rises from M to M′. The reverse of any such events would reduce the quantity of money demanded at every interest rate, shifting the demand curve to the left.*

Self Check: Demand for Money

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the Reading in this section.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

An interactive or media element has been excluded from this version of the text. You can view it online here: https://pressbooks.ccconline.org/accmacro/?p=583

231. Outcome: Open Market Operations

What you'll learn to do: explain the mechanism by which open market operations affect the money supply and interest rates

In this section, we will see how the Federal Reserve changes bank reserves in order to change interest rates.

LEARNING ACTIVITIES

The learning activities for this section include:

- Reading: Monetary Policy and Interest Rates
- Self Check: Open Market Operations

Take time to review and reflect on each of these activities in order to improve your performance on the assessment for this section.

232. Reading: Monetary Policy and Interest Rates

The Effect of Monetary Policy on Interest Rates

A monetary policy that lowers interest rates and stimulates borrowing is known as an *expansionary monetary policy* or *loose monetary policy*. Conversely, a monetary policy that raises interest rates and reduces borrowing in the economy is a *contractionary monetary policy* or *tight monetary policy*. This module will discuss how expansionary and contractionary monetary policies affect interest rates and aggregate demand, and how such policies will affect macroeconomic goals like unemployment and inflation. We will conclude with a look at the Fed's monetary policy practice in recent decades.

Consider the market for loanable bank funds, shown in Figure 14.7. The original equilibrium (E_0) occurs at an interest rate of 8% and a quantity of funds loaned and borrowed of $10 billion. An expansionary monetary policy will shift the supply of loanable funds to the right from the original supply curve (S_0) to S_1, leading to an equilibrium (E_1) with a lower interest rate of 6% and a quantity of funds loaned of $14 billion. Conversely, a contractionary monetary policy will shift the supply of loanable funds to the left from the original supply curve (S_0) to S_2, leading to an equilibrium (E_2) with a higher interest rate of 10% and a quantity of funds loaned of $8 billion.

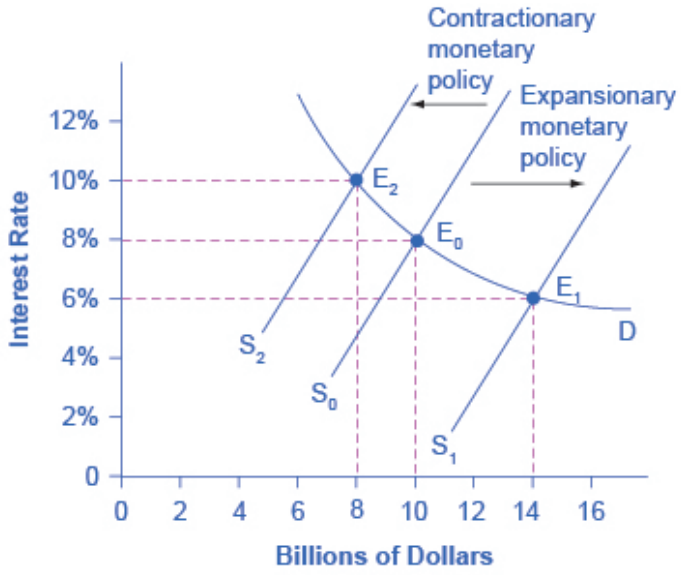

***Figure 14.7**. Monetary Policy and Interest Rates The original equilibrium occurs at E0. An expansionary monetary policy will shift the supply of loanable funds to the right from the original supply curve (S0) to the new supply curve (S1) and to a new equilibrium of E1, reducing the interest rate from 8% to 6%. A contractionary monetary policy will shift the supply of loanable funds to the left from the original supply curve (S0) to the new supply (S2), and raise the interest rate from 8% to 10%.*

So how does a central bank "raise" interest rates? When describing the monetary policy actions taken by a central bank, it is common to hear that the central bank "raised interest rates" or "lowered interest rates." We need to be clear about this: more precisely, through open market operations the central bank changes bank reserves in a way which affects the supply curve of loanable funds. As a result, interest rates change, as shown in Figure 14.7. If they do not meet the Fed's target, the Fed can supply more or less reserves until interest rates do.

Recall that the specific interest rate the Fed targets is the *federal*

funds rate. The Federal Reserve has, since 1995, established its target federal funds rate in advance of any open market operations.

Of course, financial markets display a wide range of *interest rates*, representing borrowers with different risk premiums and loans that are to be repaid over different periods of time. In general, when the federal funds rate drops substantially, other interest rates drop, too, and when the federal funds rate rises, other interest rates rise. However, a fall or rise of one percentage point in the federal funds rate—which remember is for borrowing overnight—will typically have an effect of less than one percentage point on a 30-year loan to purchase a house or a three-year loan to purchase a car. Monetary policy can push the entire spectrum of interest rates higher or lower, but the specific interest rates are set by the forces of supply and demand in those specific markets for lending and borrowing.

Self Check: Open Market Operations

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the Reading in this section.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

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233. Outcome: Monetary Policy and GDP

What you'll learn to do: explain how monetary policy affects GDP and the price level

Expansionary and contractionary monetary policies affect interest rates, loanable funds, aggregate demand, and inevitably, GDP. In this section, you will take a look at some of the Federal Reserve's policies over the last four decades and the impact its decisions had on the economy.

LEARNING ACTIVITIES

The learning activities for this section include:

- Reading: Monetary Policy and Aggregate Demand
- Self Check: Monetary Policy and GDP

Take time to review and reflect on each of these activities in order to improve your performance on the assessment for this section.

234. Reading: Monetary Policy and Aggregate Demand

Monetary Policy and Aggregate Demand

Monetary policy affects interest rates and the available quantity of loanable funds, which in turn affects several components of aggregate demand. Tight or contractionary monetary policy that leads to higher interest rates and a reduced quantity of loanable funds will reduce two components of aggregate demand. Business investment will decline because it is less attractive for firms to borrow money, and even firms that have money will notice that, with higher interest rates, it is relatively more attractive to put those funds in a financial investment than to make an investment in physical capital. In addition, higher interest rates will discourage consumer borrowing for big-ticket items like houses and cars. Conversely, loose or expansionary monetary policy that leads to lower interest rates and a higher quantity of loanable funds will tend to increase business investment and consumer borrowing for big-ticket items.

If the economy is suffering a recession and high unemployment, with output below *potential GDP*, expansionary monetary policy can help the economy return to potential GDP. Figure 14.8 (a) illustrates this situation. This example uses a short-run upward-sloping *Keynesian aggregate supply curve* (AS). The original equilibrium during a recession of Er occurs at an output level of 600. An expansionary monetary policy will reduce interest rates and stimulate investment and consumption spending, causing the original aggregate demand curve (AD_0) to shift right to AD_1, so that the new equilibrium (Ep) occurs at the potential GDP level of 700.

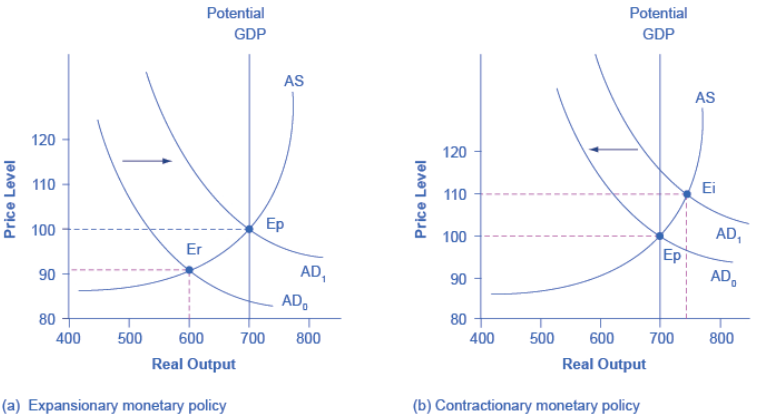


Figure 14.8. *Expansionary or Contractionary Monetary Policy. (a) The economy is originally in a recession with the equilibrium output and price level shown at Er. Expansionary monetary policy will reduce interest rates and shift aggregate demand to the right from AD0 to AD1, leading to the new equilibrium (Ep) at the potential GDP level of output with a relatively small rise in the price level. (b) The economy is originally producing above the potential GDP level of output at the equilibrium Ei and is experiencing pressures for an inflationary rise in the price level. Contractionary monetary policy will shift aggregate demand to the left from AD0 to AD1, thus leading to a new equilibrium (Ep) at the potential GDP level of output.*

Conversely, if an economy is producing at a quantity of output above its potential GDP, a contractionary monetary policy can reduce the inflationary pressures for a rising price level. In Figure 14.8 (b), the original equilibrium (Ei) occurs at an output of 750, which is above potential GDP. A contractionary monetary policy will raise interest rates, discourage borrowing for investment and consumption spending, and cause the original demand curve (AD_0) to shift left to AD_1, so that the new equilibrium (Ep) occurs at the potential GDP level of 700.

These examples suggest that monetary policy should be *countercyclical*; that is, it should act to counterbalance the business cycles of economic downturns and upswings. Monetary policy

should be loosened when a recession has caused unemployment to increase and tightened when inflation threatens. Of course, countercyclical policy does pose a danger of overreaction. If loose monetary policy seeking to end a recession goes too far, it may push aggregate demand so far to the right that it triggers inflation. If tight monetary policy seeking to reduce inflation goes too far, it may push aggregate demand so far to the left that a recession begins. Figure 14.9 (a) summarizes the chain of effects that connect loose and tight monetary policy to changes in output and the price level.

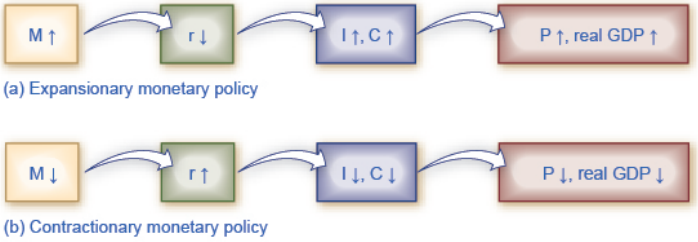


Figure 14.9. *The Pathways of Monetary Policy. (a) In expansionary monetary policy the central bank causes the supply of money and loanable funds to increase, which lowers the interest rate, stimulating additional borrowing for investment and consumption, and shifting aggregate demand right. The result is a higher price level and, at least in the short run, higher real GDP. (b) In contractionary monetary policy, the central bank causes the supply of money and credit in the economy to decrease, which raises the interest rate, discouraging borrowing for investment and consumption, and shifting aggregate demand left. The result is a lower price level and, at least in the short run, lower real GDP.*

Federal Reserve Actions Over Last Four Decades

For the period from the mid-1970s up through the end of 2007, Federal Reserve monetary policy can largely be summed up by

looking at how it targeted the federal funds interest rate using open market operations.

Of course, telling the story of the U.S. economy since 1975 in terms of Federal Reserve actions leaves out many other macroeconomic factors that were influencing unemployment, recession, economic growth, and inflation over this time. The nine episodes of Federal Reserve action outlined in the sections below also demonstrate that the central bank should be considered one of the leading actors influencing the macro economy. As noted earlier, the single person with the greatest power to influence the U.S. economy is probably the chairperson of the Federal Reserve.

Figure 14.10 shows how the Federal Reserve has carried out monetary policy by targeting the federal funds interest rate in the last few decades. The graph shows the federal funds interest rate (remember, this interest rate is set through open market operations), the *unemployment rate*, and the *inflation rate* since 1975. Different episodes of monetary policy during this period are indicated in the figure.

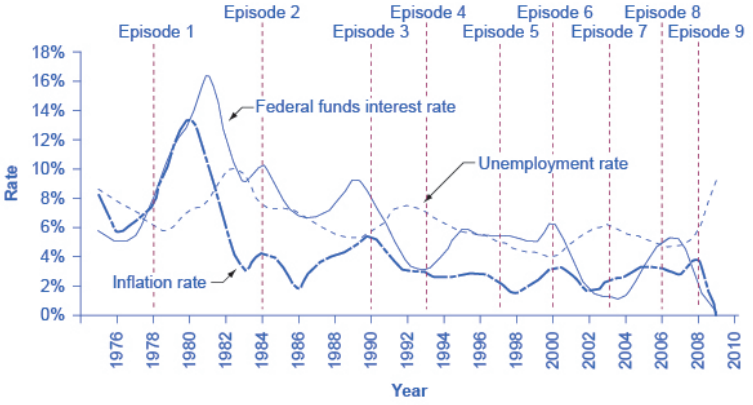


Figure 14.10. *Monetary Policy, Unemployment, and Inflation. Through the episodes shown here, the Federal Reserve typically reacted to higher inflation with a contractionary monetary policy and a higher interest rate, and reacted to higher unemployment with an expansionary monetary policy and a lower interest rate.*

EPISODE 1

Consider Episode 1 in the late 1970s. The rate of inflation was very high, exceeding 10% in 1979 and 1980, so the Federal Reserve used tight monetary policy to raise interest rates, with the federal funds rate rising from 5.5% in 1977 to 16.4% in 1981. By 1983, inflation was down to 3.2%, but aggregate demand contracted sharply enough that back-to-back recessions occurred in 1980 and in 1981–1982, and the unemployment rate rose from 5.8% in 1979 to 9.7% in 1982.

EPISODE 2

In Episode 2, when the Federal Reserve was persuaded in the early 1980s that inflation was declining, the Fed began slashing interest rates to reduce unemployment. The federal funds interest rate fell from 16.4% in 1981 to 6.8% in 1986. By 1986 or so, inflation had fallen to about 2% and the unemployment rate had come down to 7%, and was still falling.

EPISODE 3

However, in Episode 3 in the late 1980s, inflation appeared to be creeping up again, rising from 2% in 1986 up toward 5% by 1989. In response, the Federal Reserve used contractionary monetary policy to raise the federal funds rates from 6.6% in 1987 to 9.2% in 1989. The tighter monetary policy stopped inflation, which fell from above 5% in 1990 to under 3% in 1992, but it also helped to cause the recession of 1990–1991, and the unemployment rate rose from 5.3% in 1989 to 7.5% by 1992.

EPISODE 4

In Episode 4, in the early 1990s, when the Federal Reserve was confident that inflation was back under control, it reduced interest rates, with the federal funds interest rate falling from 8.1% in 1990 to 3.5% in 1992. As the economy expanded, the unemployment rate declined from 7.5% in 1992 to less than 5% by 1997.

EPISODES 5 AND 6

In Episodes 5 and 6, the Federal Reserve perceived a risk of inflation and raised the federal funds rate from 3% to 5.8% from 1993 to 1995. Inflation did not rise, and the period of economic growth during the 1990s continued. Then in 1999 and 2000, the Fed was concerned that inflation seemed to be creeping up so it raised the federal funds interest rate from 4.6% in December 1998 to 6.5% in June 2000. By early 2001, inflation was declining again, but a recession occurred in 2001. Between 2000 and 2002, the unemployment rate rose from 4.0% to 5.8%.

EPISODES 7 AND 8

In Episodes 7 and 8, the Federal Reserve conducted a loose monetary policy and slashed the federal funds rate from 6.2% in 2000 to just 1.7% in 2002, and then again to 1% in 2003. They actually did this because of fear of Japan-style deflation; this persuaded them to lower the Fed funds further than they otherwise would have. The recession ended, but, unemployment rates were slow to decline in the early 2000s. Finally, in 2004, the unemployment rate declined and the Federal Reserve began to raise the federal funds rate until it reached 5% by 2007.

EPISODE 9

In Episode 9, as the Great Recession took hold in 2008, the Federal Reserve was quick to slash interest rates, taking them down to 2% in 2008 and to nearly 0% in 2009. When the Fed had taken interest rates down to near-zero by December 2008, the economy was still deep in recession. Open market operations could not make the interest rate turn negative. The Federal Reserve had to think "outside the box."

Quantitative Easing

The most powerful and commonly used of the three traditional tools of monetary policy—open market operations—works by expanding or contracting the money supply in a way that influences the interest rate. In late 2008, as the U.S. economy struggled with recession, the Federal Reserve had already reduced the interest rate to near-zero. With the recession still ongoing, the Fed decided to adopt an innovative and nontraditional policy known as *quantitative easing* (QE). This is the purchase of long-term government and private mortgage-backed securities by central banks to make credit available so as to stimulate *aggregate demand*.

Quantitative easing differed from traditional monetary policy in several key ways. First, it involved the Fed purchasing long term *Treasury bonds*, rather than short term *Treasury bills*. The logic was the following: investment spending decisions are typically based on long term interest rates. Home mortgages, for example, have maturities up to 30 years. With traditional monetary policy, the idea is that since short term and long term interest rates tend to rise or fall together, lowering short term rates will ultimately lower long term rates and stimulate investment spending. Quantitative easing

attempted to skip the middle step and directly lower long-term interest rates.

This leads to a second way QE is different from traditional monetary policy. Instead of purchasing Treasury securities, the Fed also began purchasing private mortgage-backed securities, something it had never done before. During the financial crisis, which precipitated the recession, mortgage-backed securities were termed "toxic assets," because when the housing market collapsed, no one knew what these securities were worth, which put the financial institutions which were holding those securities on very shaky ground. By offering to purchase mortgage-backed securities, the Fed was both pushing long term interest rates down and also removing possibly "toxic assets" from the balance sheets of private financial firms, which would strengthen the financial system.

Quantitative easing (QE) occurred in three episodes:

1. During QE_1, which began in November 2008, the Fed purchased $600 billion in mortgage-backed securities from government enterprises Fannie Mae and Freddie Mac.
2. In November 2010, the Fed began QE_2, in which it purchased $600 billion in U.S. Treasury bonds.
3. QE_3, began in September 2012 when the Fed commenced purchasing $40 billion of additional mortgage-backed securities per month. This amount was increased in December 2012 to $85 billion per month. The Fed has stated that, when economic conditions permit, it will begin tapering (or reducing the monthly purchases). This has not yet happened as of early 2014.

The quantitative easing policies adopted by the Federal Reserve (and by other central banks around the world) are usually thought of as temporary emergency measures. If these steps are, indeed, to be temporary, then the Federal Reserve will need to stop making these additional loans and sell off the financial securities it has

accumulated. The concern is that the process of quantitative easing may prove more difficult to reverse than it was to enact.

Self Check: Monetary Policy and GDP

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the Reading in this section.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

An interactive or media element has been excluded from this version of the text. You can view it online here: https://pressbooks.ccconline.org/accmacro/?p=591

235. Putting It Together: Monetary Policy

Summary

The goal of this module was to teach you the role of money, credit and monetary policy on the economy. You learned how to:

- Define money; Explain the functions of money; Define liquidity
- Define credit (or debt)
- Explain what a bank does
- Understand how money is created by lending
- Explain the structure, functions and responsibilities of the Federal Reserve System
- Differentiate between M1 and M2 (measures of the supply of money)
- Define monetary policy and differentiate it from fiscal policy
- Define interest rates
- Explain how the equilibrium interest rate is determined in the market for money
- Explain how monetary policy affects GDP and the price level
- List and explain the goals of monetary policy

Examples

Debit vs. Credit Cards by *PersonalMoneyNetwork*, CC-BY.

Money is not a specific item, but rather anything that has the functions of money, including its general acceptability as a means of payment, and its service as a store of value. Money is an asset, in contrast to credit, which while it serves as a means of payment is actually a liability. In other words, credit is a loan that must be repaid, usually with interest. Thus, a credit card is not money, but a debit card is.

Interest Rates by *401k* (2012), CC-BY-SA.

Interest rates are the price of borrowed money, or the reward for lending. Interest rates are determined in financial markets through the interaction of supply and demand for financial assets, such as loans. It is through monetary policy that the Federal Reserve, the nation's central bank, manipulates interest rates and credit conditions to stimulate or contract economic activity.

Returning to the question posed in the Why it Matters feature, interest rates will rise back to normal, either when the economy recovers enough either for the private sector to increase demand for borrowed money, or for the Fed to be willing to reduce the expansionary monetary policy its been conducting since 2008. In short, either the demand for money will rise or the supply of money will fall.

236. Glossary: Monetary Policy

Money and Banking

asset
item of value owned by a firm or an individual

asset–liability time mismatch
a bank's liabilities can be withdrawn in the short term while its assets are repaid in the long term

balance sheet
an accounting tool that lists assets and liabilities

bank capital
a bank's net worth

barter
literally, trading one good or service for another, without using money

coins and currency in circulation
the coins and bills that circulate in an economy that are not held by the U.S Treasury, at the Federal Reserve Bank, or in bank vaults

commodity money
an item that is used as money, but which also has value from its use as something other than money

commodity-backed currencies
are dollar bills or other currencies with values backed up by gold or another commodity

credit card
: immediately transfers money from the credit card company's checking account to the seller, and at the end of the month the user owes the money to the credit card company; a credit card is a short-term loan

debit card
: like a check, is an instruction to the user's bank to transfer money directly and immediately from your bank account to the seller

demand deposit
: checkable deposit in banks that is available by making a cash withdrawal or writing a check

depository institution
: institution that accepts money deposits and then uses these to make loans

diversify
: making loans or investments with a variety of firms, to reduce the risk of being adversely affected by events at one or a few firms

double coincidence of wants
: a situation in which two people each want some good or service that the other person can provide

fiat money
: has no intrinsic value, but is declared by a government to be the legal tender of a country

financial intermediary
: an institution that operates between a saver with financial assets to invest and an entity who will borrow those assets and pay a rate of return

liability
any amount or debt owed by a firm or an individual

M1 money supply
a narrow definition of the money supply that includes currency and checking accounts in banks, and to a lesser degree, traveler's checks.

M2 money supply
a definition of the money supply that includes everything in M1, but also adds savings deposits, money market funds, and certificates of deposit

medium of exchange
whatever is widely accepted as a method of payment

money market fund
the deposits of many investors are pooled together and invested in a safe way like short-term government bonds

money multiplier formula
total money in the economy divided by the original quantity of money, or change in the total money in the economy divided by a change in the original quantity of money

money
whatever serves society in four functions: as a medium of exchange, a store of value, a unit of account, and a standard of deferred payment.

net worth
the excess of the asset value over and above the amount of the liability; total assets minus total liabilities

payment system
helps an economy exchange goods and services for money or other financial assets

reserves
: funds that a bank keeps on hand and that are not loaned out or invested in bonds

savings deposit
: bank account where you cannot withdraw money by writing a check, but can withdraw the money at a bank—or can transfer it easily to a checking account

smart card
: stores a certain value of money on a card and then the card can be used to make purchases

standard of deferred payment
: money must also be acceptable to make purchases today that will be paid in the future

store of value
: something that serves as a way of preserving economic value that can be spent or consumed in the future

T-account
: a balance sheet with a two-column format, with the T-shape formed by the vertical line down the middle and the horizontal line under the column headings for "Assets" and "Liabilities"

time deposit
: account that the depositor has committed to leaving in the bank for a certain period of time, in exchange for a higher rate of interest; also called certificate of deposit

transaction costs
: the costs associated with finding a lender or a borrower for money

unit of account
: the common way in which market values are measured in an economy

Monetary Policy

bank run
when depositors race to the bank to withdraw their deposits for fear that otherwise they would be lost

basic quantity equation of money
money supply × velocity = nominal GDP

central bank
institution which conducts a nation's monetary policy and regulates its banking system

contractionary monetary policy
a monetary policy that reduces the supply of money and loans

countercyclical
moving in the opposite direction of the business cycle of economic downturns and upswings

deposit insurance
an insurance system that makes sure depositors in a bank do not lose their money, even if the bank goes bankrupt

discount rate
the interest rate charged by the central bank on the loans that it gives to other commercial banks

excess reserves
reserves banks hold that exceed the legally mandated limit

expansionary monetary policy
a monetary policy that increases the supply of money and the quantity of loans

federal funds rate
the interest rate at which one bank lends funds to another bank overnight

inflation targeting
: a rule that the central bank is required to focus only on keeping inflation low

lender of last resort
: an institution that provides short-term emergency loans in conditions of financial crisis

loose monetary policy
: see expansionary monetary policy

open market operations
: the central bank selling or buying Treasury bonds to influence the quantity of money and the level of interest rates

quantitative easing (QE)
: the purchase of long term government and private mortgage-backed securities by central banks to make credit available in hopes of stimulating aggregate demand

reserve requirement
: the percentage amount of its total deposits that a bank is legally obligated to to either hold as cash in their vault or deposit with the central bank

tight monetary policy
: see contractionary monetary policy

velocity
: the speed with which money circulates through the economy; calculated as the nominal GDP divided by the money supply

237. Discussion: Impact of Low Interest Rates on Monetary Policy

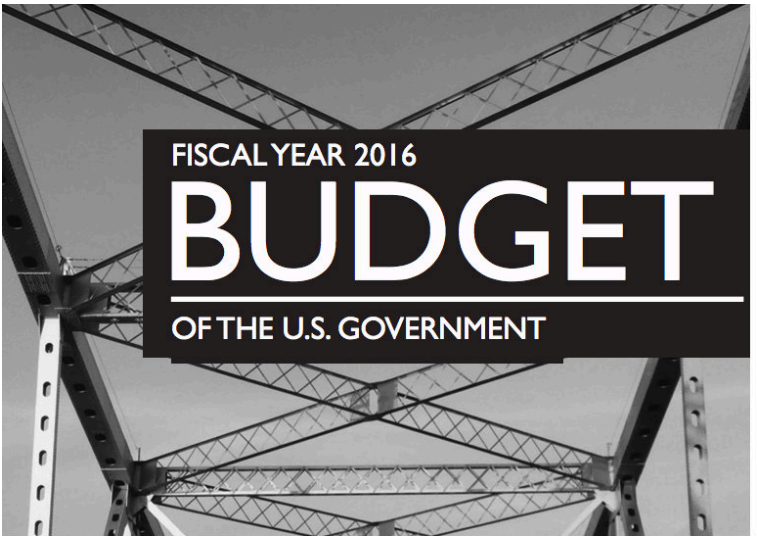
Since the end of the Great Recession, interest rates have been at historic lows—in some cases, close to zero. How is expansionary monetary policy supposed to work? How do near-zero interest rates limit the ability of expansionary monetary policy to work?

PART XIII

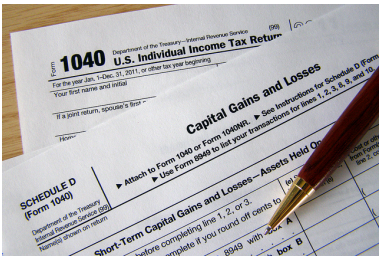
LESSON 12: OTHER MODELS AND POLICY

238. Why It Matters: Fiscal Policy

Why Understand What Government Budgets Consist of, and How Fiscal Policy Affects the Economy?



Federal Budget by Steve, CC-BY.



[1040 & Schedule D](#) *by Chris Potter,* [CC-BY](#).

This module has great practical knowledge for you. This is not primarily because it's important for the course, though it is. Rather, this model presents information that every citizen (or at least every voter) should know. The topic of the module is how government budgets affect the economy. The material is divided into two categories: first, understanding government budgets at the federal, state and local levels, and second, learning how government spending and taxes affect different parts of the economy as well as the economy as a whole.

- People often complain about taxes, but what proportion of federal revenue comes from individuals, what proportion comes from corporations, and what proportion comes from foreigners? What proportion of tax revenue is based on income?
- What proportion is based on property?
- What proportion is based on our purchases?
- What does government spend our tax dollars on?
- How much of the federal budget is spent on "welfare" type expenditures?
- How much is spent on foreign aid?
- How much is spent making payments on the national debt?
- What do states and local areas spend their budgets on?
- What is the difference between the federal deficit and the public or national debt?
- Are tax cuts good or bad for the economy? In what ways are they good or bad?
- Is government spending good or bad for the economy? Is all government spending the same in this respect?

These are questions that are relevant every time we have an election, whether it is at the national, state or local levels. These are also questions that most Americans can't answer correctly. How can you vote intelligently if you can't accurately evaluate the candidate's positions on government budgets? This module will help you become a more intelligent voter.

Government Spending Collage. [*Tomb of the Unknown Soldier*](#) *by Tony Fischer,* [CC-BY](#). [*Social Security Card*](#) *by Donkeyhotey,* [CC-BY](#). [*Old Style Food Stamps*](#) *by chrstphre campbell,* [CC-BY](#). [*WIC*](#) *by Capital Area Food Bank of Texas,* [CC-BY-ND](#).

LEARNING OUTCOMES

- Identify the major spending categories and major revenue sources in the U.S. Federal budget
- Identify the major spending categories and major revenue sources in U.S. state and local budgets
- Define fiscal policy, identifying the roles of tax rates and government spending.

- Differentiate between discretionary and automatic fiscal policy
- Compare/Contrast expansionary/contractionary fiscal policies
- Compare/Contrast the way tax changes and government spending changes work

239. Reading: The Phillips Curve

The Phillips Curve

The simplified AS–AD model that we have used so far is fully consistent with Keynes's original model. More recent research, though, has indicated that in the real world, an aggregate supply curve is more curved than the right angle used in this chapter. Rather, the real-world AS curve is very flat at levels of output far below potential ("the Keynesian zone"), very steep at levels of output above potential ("the neoclassical zone") and curved in between ("the intermediate zone"). This is illustrated in Figure 11.7. The typical aggregate supply curve leads to the concept of the Phillips curve.

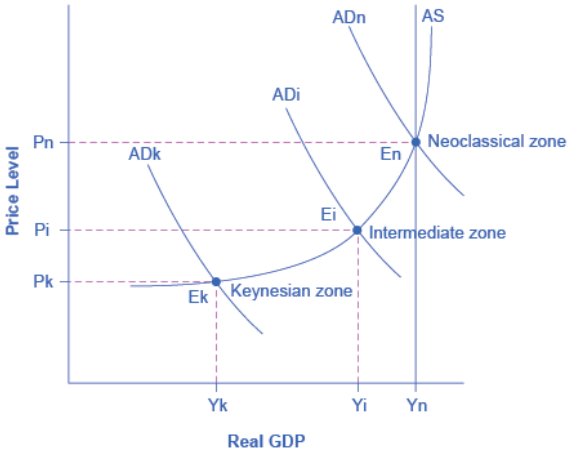


Figure 11.7. *Keynes, Neoclassical, and Intermediate Zones in the Aggregate Supply Curve Near the equilibrium Ek, in the Keynesian zone at the far left of the AS curve, small shifts in AD, either to the right or the left, will affect the output level Yk, but will not much affect the price level. In the Keynesian zone, AD largely determines the quantity of output. Near the equilibrium En, in the neoclassical zone, at the far right of the AS curve, small shifts in AD, either to the right or the left, will have relatively little effect on the output level Yn, but instead will have a greater effect on the price level. In the neoclassical zone, the near-vertical AS curve close to the level of potential GDP largely determines the quantity of output. In the intermediate zone around equilibrium Ei, movement in AD to the right will increase both the output level and the price level, while a movement in AD to the left would decrease both the output level and the price level.*

The Discovery of the Phillips Curve

In the 1950s, A.W. *Phillips*, an economist at the London School of Economics, was studying the Keynesian analytical framework. The Keynesian theory implied that during a recession inflationary pressures are low, but when the level of output is at or even pushing beyond potential GDP, the economy is at greater risk for inflation. Phillips analyzed 60 years of British data and did find that tradeoff between unemployment and inflation, which became known as a *Phillips curve*. Figure 11.8 shows a theoretical Phillips curve, and the

following Work It Out feature shows how the pattern appears for the United States.

Figure 11.8. *A Keynesian Phillips Curve Tradeoff between Unemployment and Inflation A Phillips curve illustrates a tradeoff between the unemployment rate and the inflation rate; if one is higher, the other must be lower. For example, point A illustrates an inflation rate of 5% and an unemployment rate of 4%. If the government attempts to reduce inflation to 2%, then it will experience a rise in unemployment to 7%, as shown at point B.*

TRY IT

THE PHILLIPS CURVE FOR THE UNITED STATES

Step 1. Go to this website to see the 2005 Economic Report of the President.

Step 2. Scroll down and locate Table B-63 in the Appendices. This table is titled "Changes in special consumer price indexes, 1960–2004."

Step 3. Download the table in Excel by selecting the XLS option and then selecting the location in which to save the file.

Step 4. Open the downloaded Excel file.

Step 5. View the third column (labeled "Year to year"). This is the inflation rate, measured by the percentage change in the Consumer Price Index.

Step 6. Return to the website and scroll to locate the Appendix Table B-42 "Civilian unemployment rate, 1959–2004.

Step 7. Download the table in Excel.

Step 8. Open the downloaded Excel file and view the second column. This is the overall unemployment rate.

Step 9. Using the data available from these two tables, plot the Phillips curve for 1960–69, with unemployment rate on the x-axis and the inflation rate on the y-axis. Your graph should look like Figure 11.9.

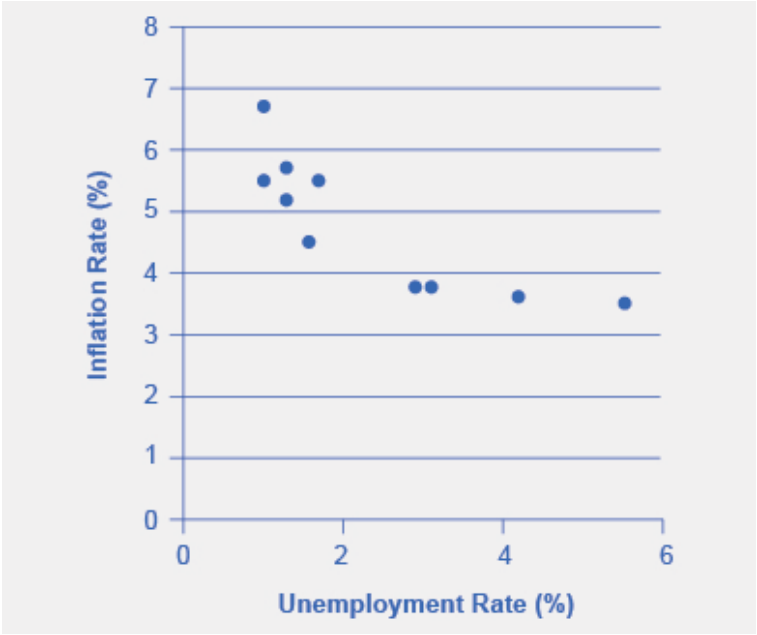


Figure 11.9. *The Phillips Curve from 1960–1969 This chart shows the negative relationship between unemployment and inflation.*

Step 10. Plot the Phillips curve for 1960–1979. What does the graph look like? Do you still see the tradeoff between inflation and unemployment? Your graph should look like Figure 11.10.

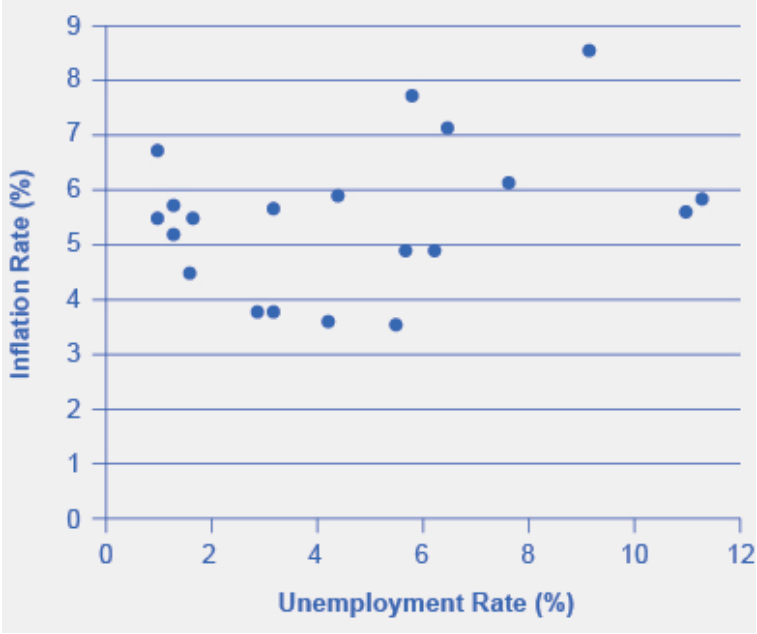


Figure 11.10. *U.S. Phillips Curve, 1960–1979 The tradeoff between unemployment and inflation appeared to break down during the 1970s as the Phillips Curve shifted out to the right.*

Over this longer period of time, the Phillips curve appears to have shifted out. There is no longer a tradeoff.

The Instability of the Phillips Curve

During the 1960s, the Phillips curve was seen as a policy menu.

A nation could choose low inflation and high unemployment, or high inflation and low unemployment, or anywhere in between. Fiscal and monetary policy could be used to move up or down the Phillips curve as desired. Then a curious thing happened. When policymakers tried to exploit the tradeoff between inflation and unemployment, the result was an increase in both inflation and unemployment. What had happened? The Phillips curve shifted.

The U.S. economy experienced this pattern in the deep recession from 1973 to 1975, and again in back-to-back recessions from 1980 to 1982. Many nations around the world saw similar increases in unemployment and inflation. This pattern became known as *stagflation*. (Recall from The Aggregate Supply-Aggregate Demand Model that stagflation is an unhealthy combination of high unemployment and high inflation.) Perhaps most important, stagflation was a phenomenon that could not be explained by traditional Keynesian economics.

Economists have concluded that two factors cause the Phillips curve to shift. The first is supply shocks, like the Oil Crisis of the mid-1970s, which first brought stagflation into our vocabulary. The second is changes in people's expectations about inflation. In other words, there may be a tradeoff between *inflation* and *unemployment* when people expect no inflation, but when they realize inflation is occurring, the tradeoff disappears. Both factors (supply shocks and changes in inflationary expectations) cause the aggregate supply curve, and thus the Phillips curve, to shift.

In short, a downward-sloping Phillips curve should be interpreted as valid for short-run periods of several years, but over longer periods, when aggregate supply shifts, the downward-sloping Phillips curve can shift so that unemployment and inflation are both higher (as in the 1970s and early 1980s) or both lower (as in the early 1990s or first decade of the 2000s).

240. Outcome: Fiscal Policy and Tax Rates

What you'll learn to do: define fiscal policy and identify the roles of tax rates and government spending

In this section, you will learn the basics of fiscal policy.

LEARNING ACTIVITIES

The learning activities for this section include:

- Reading: Fiscal Policy
- Self Check: Fiscal Policy and Tax Rates

Take time to review and reflect on each of these activities in order to improve your performance on the assessment for this section.

241. Reading: Fiscal Policy

Fiscal Policy

Fiscal policy is one of two major sets of policy tools that governments can employ to manage the economy. Fiscal policy is the use of changes in taxes and government expenditure to influence aggregate demand and thus the level of economic activity. Government expenditure, that is, government spending on goods and services, is a component of aggregate demand, while tax rates affect either consumption or investment expenditure, which are components of aggregate demand. Fiscal policy can either be expansionary, which means it attempts to increase aggregate demand, or contractionary, which means it attempts to decrease aggregate demand.

Government expenditures and tax revenues are the two sides of the government budget. Since most states in the U.S. are statutorily required to run balanced budgets, fiscal policy usually refers to spending and tax changes by the federal government.

Self Check: Fiscal Policy and Tax Rates

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the Reading in this section.

Use this quiz to check your understanding and decide whether

to (1) study the previous section further or (2) move on to the next section.

An interactive or media element has been excluded from this version of the text. You can view it online here: https://pressbooks.ccconline.org/accmacro/?p=502

242. Outcome: Expansionary and Contractionary Fiscal Policies

What you'll learn to do: compare and contrast expansionary and contractionary fiscal policies

In this section, you will use the AS-AD model to help you understand how governments use fiscal policies to fight against recession and inflation.

LEARNING ACTIVITIES

The learning activities for this section include:

- Reading: Using Fiscal Policy to Fight Recession, Unemployment, and Inflation
- Self Check: Expansionary and Contractionary Fiscal Policies

Take time to review and reflect on each of these activities in order to improve your performance on the assessment for this section.

243. Reading: Using Fiscal Policy to Fight Recession, Unemployment, and Inflation

Using Fiscal Policy to Fight Recession, Unemployment, and Inflation

We need to emphasize that fiscal policy is the use of government spending and tax policy to alter the economy. Fiscal policy does not include all spending (such as the increase in spending that accompanies a war).

Graphically, we see that fiscal policy, whether through change in spending or taxes, shifts the *aggregate demand* rightward in the case of *expansionary fiscal policy* and leftward in the case of *contractionary fiscal policy*. Figure 16.10 illustrates the process by using an aggregate demand/aggregate supply diagram in a growing economy. The original equilibrium occurs at E_0, the intersection of aggregate demand curve AD_0 and aggregate supply curve AS_0, at an output level of 200 and a price level of 90.

One year later, *aggregate supply* has shifted to the right to AS_1 in the process of long-term economic growth, and aggregate demand has also shifted to the right to AD_1, keeping the economy operating at the new level of potential GDP. The new equilibrium (E_1) is an output level of 206 and a price level of 92. One more year later, aggregate supply has again shifted to the right, now to AS_2, and aggregate demand shifts right as well to AD_2. Now the equilibrium is E_2, with an output level of 212 and a price level of 94. In short, the figure shows an economy that is growing steadily year to year, producing at its potential GDP each year, with only small inflationary increases in the price level.

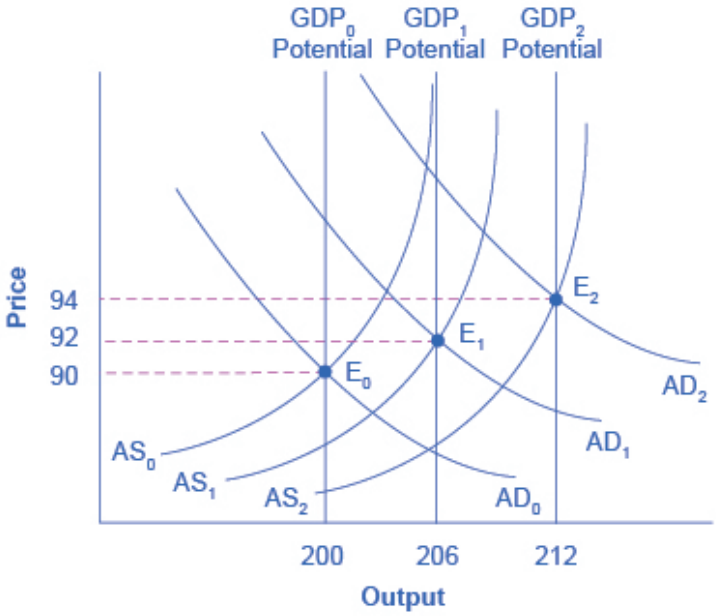


Figure 16.10. *A Healthy, Growing Economy. In this well-functioning economy, each year aggregate supply and aggregate demand shift to the right so that the economy proceeds from equilibrium E0 to E1 to E2. Each year, the economy produces at potential GDP with only a small inflationary increase in the price level. But if aggregate demand does not smoothly shift to the right and match increases in aggregate supply, growth with deflation can develop.*

Aggregate demand and aggregate supply do not always move neatly together. Aggregate demand may fail to increase along with aggregate supply, or aggregate demand may even shift left, for a number of possible reasons: households become hesitant about consuming; firms decide against investing as much; or perhaps the demand from other countries for exports diminishes. For example, investment by private firms in physical capital in the U.S. economy boomed during the late 1990s, rising from 14.1% of GDP in 1993 to 17.2% in 2000, before falling back to 15.2% by 2002. Conversely, if shifts in aggregate demand run ahead of increases in aggregate

supply, inflationary increases in the price level will result. Business cycles of recession and recovery are the consequence of shifts in aggregate supply and aggregate demand.

Monetary Policy and Bank Regulation shows us that a central bank can use its powers over the banking system to engage in countercyclical—or "against the business cycle"—actions. If recession threatens, the central bank uses an expansionary monetary policy to increase the supply of money, increase the quantity of loans, reduce interest rates, and shift aggregate demand to the right. If inflation threatens, the central bank uses contractionary monetary policy to reduce the supply of money, reduce the quantity of loans, raise interest rates, and shift aggregate demand to the left. Fiscal policy is another macroeconomic policy tool for adjusting aggregate demand by using either government spending or taxation policy.

Expansionary Fiscal Policy

Expansionary fiscal policy increases the level of aggregate demand, through either increases in government spending or reductions in taxes. Expansionary policy can do this by (1) increasing consumption by raising disposable income through cuts in personal income taxes or payroll taxes; (2) increasing investments by raising after-tax profits through cuts in business taxes; and (3) increasing government purchases through increased spending by the federal government on final goods and services and raising federal grants to state and local governments to increase their expenditures on final goods and services. Contractionary fiscal policy does the reverse: it decreases the level of aggregate demand by decreasing consumption, decreasing investments, and decreasing government spending, either through cuts in government spending or increases in taxes. The aggregate demand/aggregate supply model is useful

in judging whether expansionary or contractionary fiscal policy is appropriate.

Consider first the situation in Figure 16.11, which is similar to the U.S. economy during the recession in 2008–2009. The intersection of aggregate demand (AD_0) and aggregate supply (AS_0) is occurring below the level of potential GDP. At the equilibrium (E_0), a recession occurs and unemployment rises. (The figure uses the upward-sloping AS curve associated with a Keynesian economic approach, rather than the vertical AS curve associated with a neoclassical approach, because our focus is on macroeconomic policy over the short-run business cycle rather than over the long run.) In this case, expansionary fiscal policy using tax cuts or increases in government spending can shift aggregate demand to AD_1, closer to the full-employment level of output. In addition, the price level would rise back to the level P_1 associated with potential GDP.

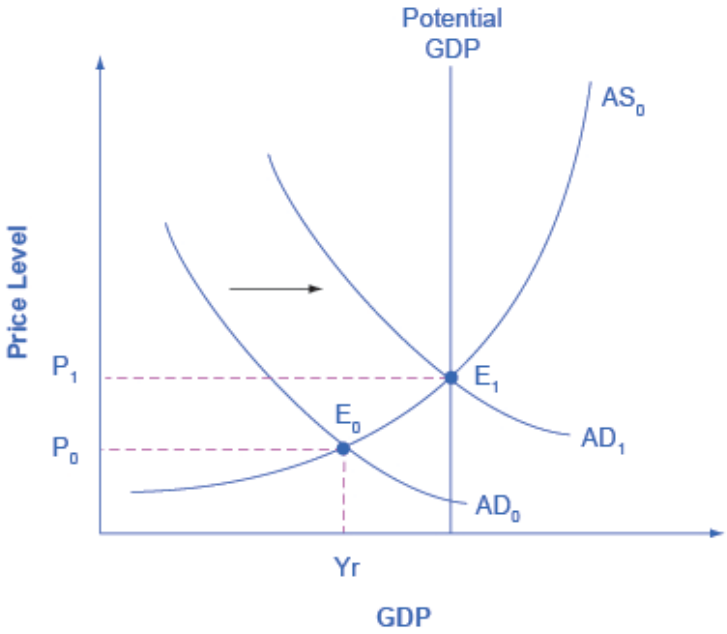


Figure 16.11. *Expansionary Fiscal Policy. The original equilibrium (E0) represents a recession, occurring at a quantity of output (Yr) below potential GDP. However, a shift of aggregate demand from AD0 to AD1, enacted through an expansionary fiscal policy, can move the economy to a new equilibrium output of E1 at the level of potential GDP. Since the economy was originally producing below potential GDP, any inflationary increase in the price level from P0 to P1 that results should be relatively small.*

Should the government use tax cuts or spending increases, or a mix of the two, to carry out expansionary fiscal policy? After the Great Recession of 2008–2009 (which started, actually, in very late 2007), U.S. government spending rose from 19.6% of GDP in 2007 to 24.6% in 2009, while tax revenues declined from 18.5% of GDP in 2007 to 14.8% in 2009. The choice between whether to use tax or spending tools often has a political tinge. As a general statement, conservatives and Republicans prefer to see expansionary fiscal policy carried out by tax cuts, while liberals and Democrats prefer

that expansionary fiscal policy be implemented through spending increases. The Obama administration and Congress passed an $830 billion expansionary policy in early 2009 involving both tax cuts and increases in government spending, according to the Congressional Budget Office. However, state and local governments, whose budgets were also hard hit by the recession, began cutting their spending—a policy that offset federal expansionary policy.

The conflict over which policy tool to use can be frustrating to those who want to categorize economics as "liberal" or "conservative," or who want to use economic models to argue against their political opponents. But the AD–AS model can be used both by advocates of smaller government, who seek to reduce taxes and government spending, and by advocates of bigger government, who seek to raise taxes and government spending. Economic studies of specific taxing and spending programs can help to inform decisions about whether taxes or spending should be changed, and in what ways. Ultimately, decisions about whether to use tax or spending mechanisms to implement macroeconomic policy is, in part, a political decision rather than a purely economic one.

Contractionary Fiscal Policy

Fiscal policy can also contribute to pushing aggregate demand beyond potential GDP in a way that leads to inflation. As shown in Figure 16.12, a very large budget deficit pushes up aggregate demand, so that the intersection of aggregate demand (AD_0) and aggregate supply (AS_0) occurs at equilibrium E_0, which is an output level above potential GDP. This is sometimes known as an "overheating economy" where demand is so high that there is upward pressure on wages and prices, causing inflation. In this situation, contractionary fiscal policy involving federal spending cuts or tax increases can help to reduce the upward pressure on

the price level by shifting aggregate demand to the left, to AD_1, and causing the new equilibrium E_1 to be at potential GDP.

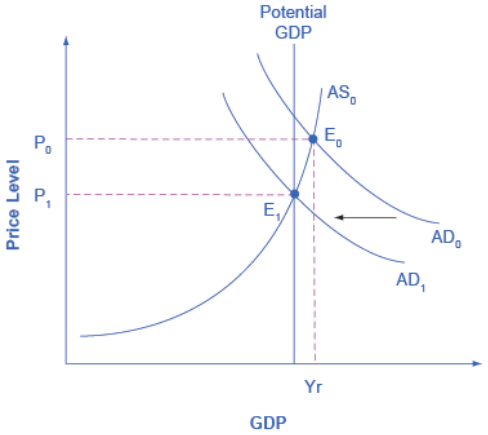


Figure 16.12. *A Contractionary Fiscal Policy. The economy starts at the equilibrium quantity of output Yr, which is above potential GDP. The extremely high level of aggregate demand will generate inflationary increases in the price level. A contractionary fiscal policy can shift aggregate demand down from AD0 to AD1, leading to a new equilibrium output E1, which occurs at potential GDP.*

Again, the AD–AS model does not dictate how this contractionary fiscal policy is to be carried out. Some may prefer spending cuts; others may prefer tax increases; still others may say that it depends on the specific situation. The model only argues that, in this situation, aggregate demand needs to be reduced.

Self Check: Expansionary and Contractionary Fiscal Policies

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not**

count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the Reading in this section.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

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244. Outcome: Discretionary and Automatic Fiscal Policy

What you'll learn to do: differentiate between discretionary and automatic fiscal policy

In this section, you will look at the fiscal policy decisions that governments make when trying to stabilize the economy.

The specific things you'll learn in this section include:

- Define Automatic Stabilization Tools
- Define discretionary fiscal policy
- Differentiate between structural and cylical budget balance

LEARNING ACTIVITIES

The learning activities for this section include:

- Reading: Fiscal Policy and Stabilizers
- Reading: Counterbalancing Recession and Boom
- Reading: The Standardized Employment Deficit or Surplus
- Self Check: Discretionary and Automatic Fiscal Policy

Take time to review and reflect on each of these activities in order to improve your performance on the assessment for this section.

245. Reading: Fiscal Policy and Stabilizers

Automatic Stabilizers

Some tax and expenditure programs change automatically with the level of economic activity. We will examine these first. Then we will look at how discretionary fiscal policies work. Four examples of discretionary fiscal policy choices were the tax cuts introduced by the Kennedy, Reagan, and George W. Bush administrations and the increase in government purchases proposed by President Clinton in 1993. The 2009 fiscal stimulus bill passed in the first months of the administration of Barack Obama included both tax cuts and spending increases. All were designed to stimulate aggregate demand and close recessionary gaps.

Certain government expenditure and taxation policies tend to insulate individuals from the impact of shocks to the economy. Transfer payments have this effect. Because more people become eligible for income supplements when income is falling, transfer payments reduce the effect of a change in real GDP on disposable personal income and thus help to insulate households from the impact of the change. Income taxes also have this effect. As incomes fall, people pay less in income taxes.

Any government program that tends to reduce fluctuations in GDP automatically is called an automatic stabilizer. Automatic stabilizers tend to increase GDP when it is falling and reduce GDP when it is rising.

To see how automatic stabilizers work, consider the decline in real GDP that occurred during the recession of 1990–1991. Real GDP fell 1.6% from the peak to the trough of that recession. The

reduction in economic activity automatically reduced tax payments, reducing the impact of the downturn on disposable personal income. Furthermore, the reduction in incomes increased transfer payment spending, boosting disposable personal income further. Real disposable personal income thus fell by only 0.9% during the 2001 recession, a much smaller percentage than the reduction in real GDP. Rising transfer payments and falling tax collections helped cushion households from the impact of the recession and kept real GDP from falling as much as it would have otherwise.

Automatic stabilizers have emerged as key elements of fiscal policy. Increases in income tax rates and unemployment benefits have enhanced their importance as automatic stabilizers. The introduction in the 1960s and 1970s of means-tested federal transfer payments, in which individuals qualify depending on their income, added to the nation's arsenal of automatic stabilizers. The advantage of automatic stabilizers is suggested by their name. As soon as income starts to change, they go to work. Because they affect disposable personal income directly, and because changes in disposable personal income are closely linked to changes in consumption, automatic stabilizers act swiftly to reduce the degree of changes in real GDP.

It is important to note that changes in expenditures and taxes that occur through automatic stabilizers do not shift the aggregate demand curve. Because they are automatic, their operation is already incorporated in the curve itself.

Discretionary Fiscal Policy Tools

As we begin to look at deliberate government efforts to stabilize the economy through fiscal policy choices, we note that most of the government's taxing and spending is for purposes other than economic stabilization. For example, the increase in defense spending in the early 1980s under President Ronald Reagan and in

the administration of George W. Bush were undertaken primarily to promote national security. That the increased spending affected real GDP and employment was a by-product. The effect of such changes on real GDP and the price level is secondary, but it cannot be ignored. Our focus here, however, is on discretionary fiscal policy that is undertaken with the intention of stabilizing the economy. As we have seen, the tax cuts introduced by the Bush administration were justified as expansionary measures.

Discretionary government spending and tax policies can be used to shift aggregate demand. Expansionary fiscal policy might consist of an increase in government purchases or transfer payments, a reduction in taxes, or a combination of these tools to shift the aggregate demand curve to the right. A contractionary fiscal policy might involve a reduction in government purchases or transfer payments, an increase in taxes, or a mix of all three to shift the aggregate demand curve to the left.

246. Reading: Counterbalancing Recession and Boom

Counterbalancing Recession and Boom

The millions of unemployed in 2008–2009 could collect unemployment insurance benefits to replace some of their salaries. Federal fiscal policies include *discretionary fiscal policy*, when the government passes a new law that explicitly changes tax or spending levels. The stimulus package of 2009 is an example. Changes in tax and spending levels can also occur automatically, due to *automatic stabilizers*, such as unemployment insurance and food stamps, which are programs that are already laws that stimulate aggregate demand in a recession and hold down aggregate demand in a potentially inflationary boom.

Consider first the situation where aggregate demand has risen sharply, causing the equilibrium to occur at a level of output above potential GDP. This situation will increase inflationary pressure in the economy. The policy prescription in this setting would be a dose of contractionary fiscal policy, implemented through some combination of higher taxes and lower spending. To some extent, *both* changes happen automatically. On the tax side, a rise in aggregate demand means that workers and firms throughout the economy earn more. Because taxes are based on personal income and corporate profits, a rise in aggregate demand automatically increases tax payments. On the spending side, stronger aggregate demand typically means lower unemployment and fewer layoffs, and so there is less need for government spending on

unemployment benefits, welfare, Medicaid, and other programs in the social safety net.

The process works in reverse, too. If aggregate demand were to fall sharply so that a recession occurs, then the prescription would be for expansionary fiscal policy—some mix of tax cuts and spending increases. The lower level of aggregate demand and higher unemployment will tend to pull down personal incomes and corporate profits, an effect that will reduce the amount of taxes owed automatically. Higher unemployment and a weaker economy should lead to increased government spending on unemployment benefits, welfare, and other similar domestic programs. In 2009, the stimulus package included an extension in the time allowed to collect unemployment insurance. In addition, the automatic stabilizers react to a weakening of aggregate demand with expansionary fiscal policy and react to a strengthening of aggregate demand with contractionary fiscal policy, just as the AS–AD analysis suggests.

The very large budget deficit of 2009 was produced by a combination of automatic stabilizers and discretionary fiscal policy. The Great Recession, starting in late 2007, meant less tax-generating economic activity, which triggered the automatic stabilizers that reduce taxes. Most economists, even those who are concerned about a possible pattern of persistently large budget deficits, are much less concerned or even quite supportive of larger budget deficits in the short run of a few years during and immediately after a severe recession.

A glance back at economic history provides a second illustration of the power of automatic stabilizers. Remember that the length of economic upswings between recessions has become longer in the U.S. economy in recent decades (as discussed in Unemployment). The three longest economic booms of the twentieth century happened in the 1960s, the 1980s, and the 1991–2001 time period. One reason why the economy has tipped into recession less frequently in recent decades is that the size of government spending and taxes has increased in the second half of the twentieth

century. Thus, the automatic stabilizing effects from spending and taxes are now larger than they were in the first half of the twentieth century. Around 1900, for example, federal spending was only about 2% of GDP. In 1929, just before the Great Depression hit, government spending was still just 4% of GDP. In those earlier times, the smaller size of government made automatic stabilizers far less powerful than in the last few decades, when government spending often hovers at 20% of GDP or more.

247. Reading: The Standardized Employment Deficit or Surplus

The Standardized Employment Deficit or Surplus

Each year, the nonpartisan Congressional Budget Office (CBO) calculates the *standardized employment budget*—that is, what the budget deficit or surplus would be if the economy were producing at potential GDP, where people who look for work were finding jobs in a reasonable period of time and businesses were making normal profits, with the result that both workers and businesses would be earning more and paying more taxes.

LINK IT UP

Visit this website to learn more from the Congressional Budget Office.

In effect, the standardized employment deficit eliminates the impact of the automatic stabilizers. Figure 16.13 compares the actual budget deficits of recent decades with the CBO's standardized deficit.

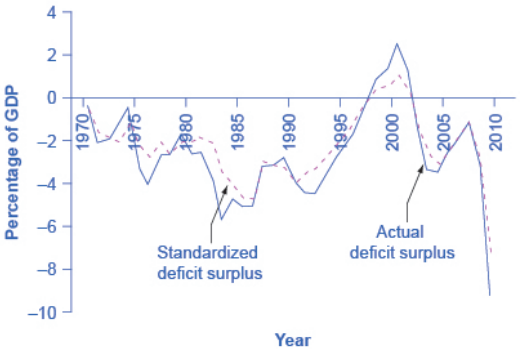

Figure 16.13. *Comparison of Actual Budget Deficits with the Standardized Employment Deficit. When the economy is in recession, the standardized employment budget deficit is less than the actual budget deficit because the economy is below potential GDP, and the automatic stabilizers are reducing taxes and increasing spending. When the economy is performing extremely well, the standardized employment deficit (or surplus) is higher than the actual budget deficit (or surplus) because the economy is producing about potential GDP, so the automatic stabilizers are increasing taxes and reducing the need for government spending. (Sources: Actual and Cyclically Adjusted Budget Surpluses/Deficits, http://www.cbo.gov/publication/42323; and Economic Report of the President, Table B-1, http://www.gpo.gov/fdsys/pkg/ERP-2013/content-detail.html).*

Notice that in recession years, like the early 1990s, 2001, or 2009, the standardized employment deficit is smaller than the actual deficit. During recessions, the automatic stabilizers tend to increase the budget deficit, so if the economy was instead at full employment, the deficit would be reduced. However, in the late 1990s the standardized employment budget surplus was lower than the actual budget surplus. The gap between the standardized budget deficit or surplus and the actual budget deficit or surplus shows the impact of the automatic stabilizers. More generally, the standardized budget figures allow you to see what the budget deficit would look like with the economy held constant—at its potential GDP level of output.

Automatic stabilizers occur quickly. Lower wages means that a lower amount of taxes is withheld from paychecks right away.

Higher unemployment or poverty means that government spending in those areas rises as quickly as people apply for benefits. However, while the automatic stabilizers offset part of the shifts in aggregate demand, they do not offset all or even most of it. Historically, automatic stabilizers on the tax and spending side offset about 10% of any initial movement in the level of output. This offset may not seem enormous, but it is still useful. Automatic stabilizers, like shock absorbers in a car, can be useful if they reduce the impact of the worst bumps, even if they do not eliminate the bumps altogether.

Self Check: Discretionary and Automatic Fiscal Policy

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the three Readings in this section.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

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248. Outcome: Changes in Tax and Spending

What you'll learn to do: compare and contrast the way tax changes and government spending changes work

In this section, you will see how the government makes changes in fiscal policy, particularly changes in taxes, in order to stimulate the economy.

LEARNING ACTIVITIES

The learning activities for this section include:

- Reading: Tax Changes
- Video: Tax Cuts During the Recession
- Self Check: Changes in Tax and Spending

Take time to review and reflect on each of these activities in order to improve your performance on the assessment for this section.

249. Reading: Tax Changes

Discretionary Fiscal Policy Tools

As we begin to look at deliberate government efforts to stabilize the economy through fiscal policy choices, we note that most of the government's taxing and spending is for purposes other than economic stabilization. For example, the increase in defense spending in the early 1980s under President Ronald Reagan and in the administration of George W. Bush were undertaken primarily to promote national security. That the increased spending affected real GDP and employment was a by-product. The effect of such changes on real GDP and the price level is secondary, but it cannot be ignored. Our focus here, however, is on discretionary fiscal policy that is undertaken with the intention of stabilizing the economy. As we have seen, the tax cuts introduced by the Bush administration were justified as expansionary measures.

Discretionary government spending and tax policies can be used to shift aggregate demand. Expansionary fiscal policy might consist of an increase in government purchases or transfer payments, a reduction in taxes, or a combination of these tools to shift the aggregate demand curve to the right. A contractionary fiscal policy might involve a reduction in government purchases or transfer payments, an increase in taxes, or a mix of all three to shift the aggregate demand curve to the left.

Figure 12.8 "Expansionary and Contractionary Fiscal Policies to Shift Aggregate Demand" illustrates the use of fiscal policy to shift aggregate demand in response to a recessionary gap and an inflationary gap. In Panel (a), the economy produces a real GDP of Y_1, which is below its potential level of Y_p. An expansionary fiscal policy seeks to shift aggregate demand to AD_2 in order to close the gap. In Panel (b), the economy initially has an inflationary gap at

Y_1. A contractionary fiscal policy seeks to reduce aggregate demand to AD_2 and close the gap. Now we shall look at how specific fiscal policy options work. In our preliminary analysis of the effects of fiscal policy on the economy, we will assume that at a given price level these policies do not affect interest rates or exchange rates. We will relax that assumption later in the chapter.

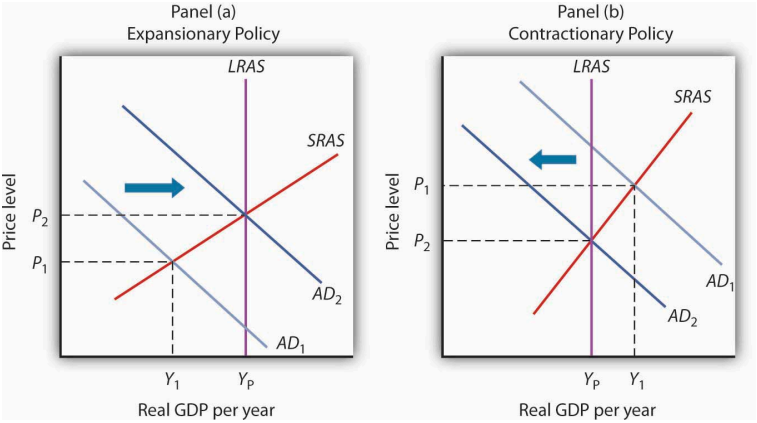

Figure 12.8. *Expansionary and Contractionary Fiscal Policies to Shift Aggregate Demand. In Panel (a), the economy faces a recessionary gap (YP – Y1). An expansionary fiscal policy seeks to shift aggregate demand to AD2 to close the gap. In Panel (b), the economy faces an inflationary gap (Y1 – YP). A contractionary fiscal policy seeks to reduce aggregate demand to AD2 to close the gap.*

Changes in Government Purchases

One policy through which the government could seek to shift the aggregate demand curve is a change in government purchases. We learned that the aggregate demand curve shifts to the right by an amount equal to the initial change in government purchases times the multiplier. This multiplied effect of a change in government purchases occurs because the increase in government purchases increases income, which in turn increases consumption. Then, part

of the impact of the increase in aggregate demand is absorbed by higher prices, preventing the full increase in real GDP that would have occurred if the price level did not rise.

Figure 12.9 "An Increase in Government Purchases" shows the effect of an increase in government purchases of $200 billion. The initial price level is P_1 and the initial equilibrium real GDP is $12,000 billion. Suppose the multiplier is 2. The $200 billion increase in government purchases increases the total quantity of goods and services demanded, at a price level of P_1, by $400 billion (the $200 billion increase in government purchases times the multiplier) to $12,400 billion. The aggregate demand thus shifts to the right by that amount to AD_2. The equilibrium level of real GDP rises to $12,300 billion, and the price level rises to P_2.

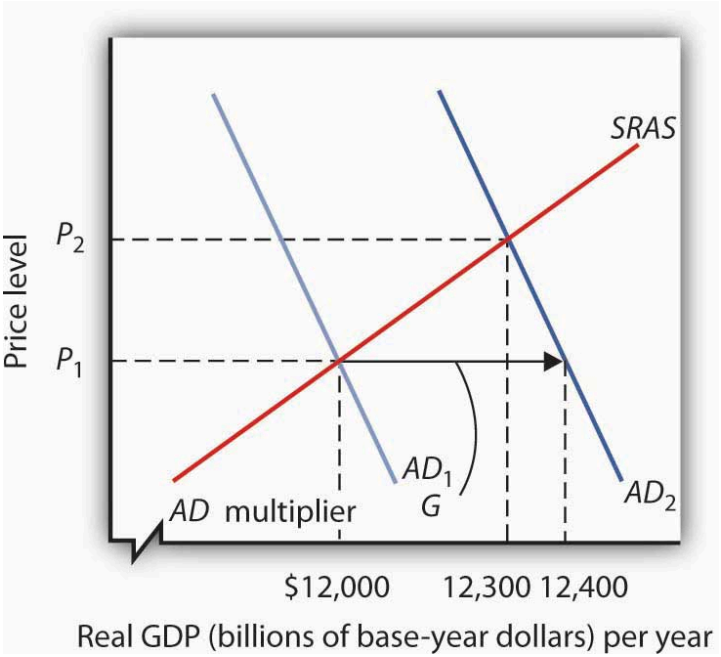

Figure 12.9. *An Increase in Government Purchases. The economy shown here is initially in equilibrium at a real GDP of $12,000 billion and a price level ofP1. An increase of $200 billion in the level of government purchases (ΔG) shifts the aggregate demand curve to the right by $400 billion to AD2. The equilibrium level of real GDP rises to $12,300 billion, while the price level rises to P2. A reduction in government purchases would have the opposite effect. The aggregate demand curve would shift to the left by an amount equal to the initial change in government purchases times the multiplier. Real GDP and the price level would fall.*

Changes in Business Taxes

One of the first fiscal policy measures undertaken by the Kennedy administration in the 1960s was an investment tax credit. An investment tax credit allows a firm to reduce its tax liability by a percentage of the investment it undertakes during a particular period. With an investment tax credit of 10%, for example, a firm

that engaged in $1 million worth of investment during a year could reduce its tax liability for that year by $100,000. The investment tax credit introduced by the Kennedy administration was later repealed. It was reintroduced during the Reagan administration in 1981, then abolished by the Tax Reform Act of 1986. President Clinton called for a new investment tax credit in 1993 as part of his job stimulus proposal, but that proposal was rejected by Congress. The Bush administration reinstated the investment tax credit as part of its tax cut package.

An investment tax credit is intended, of course, to stimulate additional private sector investment. A reduction in the tax rate on corporate profits would be likely to have a similar effect. Conversely, an increase in the corporate income tax rate or a reduction in an investment tax credit could be expected to reduce investment.

A change in investment affects the aggregate demand curve in precisely the same manner as a change in government purchases. It shifts the aggregate demand curve by an amount equal to the initial change in investment times the multiplier.

An increase in the investment tax credit, or a reduction in corporate income tax rates, will increase investment and shift the aggregate demand curve to the right. Real GDP and the price level will rise. A reduction in the investment tax credit, or an increase in corporate income tax rates, will reduce investment and shift the aggregate demand curve to the left. Real GDP and the price level will fall. [1]

1. Investment also affects the long-run aggregate supply curve, since a change in the capital stock changes the potential level of real GDP. We examined this earlier in the module on economic growth.

Changes in Income Taxes

Income taxes affect the consumption component of aggregate demand. An increase in income taxes reduces disposable personal income and thus reduces consumption (but by less than the change in disposable personal income). That shifts the aggregate demand curve leftward by an amount equal to the initial change in consumption that the change in income taxes produces times the multiplier. [2]A reduction in income taxes increases disposable personal income, increases consumption (but by less than the change in disposable personal income), and increases aggregate demand.

Suppose, for example, that income taxes are reduced by $200 billion. Only some of the increase in disposable personal income will be used for consumption and the rest will be saved. Suppose the initial increase in consumption is $180 billion. Then the shift in the aggregate demand curve will be a multiple of $180 billion; if the multiplier is 2, aggregate demand will shift to the right by $360 billion. Thus, as compared to the $200-billion increase in government purchases that we saw in Figure 12.9 "An Increase in Government Purchases," the shift in the aggregate demand curve due to an income tax cut is somewhat less, as is the effect on real GDP and the price level.

Changes in Transfer Payments

Changes in transfer payments, like changes in income taxes, alter the disposable personal income of households and thus affect their

2. A change in tax rates will change the value of the multiplier. The reason is explained in another chapter.

consumption, which is a component of aggregate demand. A change in transfer payments will thus shift the aggregate demand curve because it will affect consumption. Because consumption will change by less than the change in disposable personal income, a change in transfer payments of some amount will result in a smaller change in real GDP than would a change in government purchases of the same amount. As with income taxes, a $200-billion increase in transfer payments will shift the aggregate demand curve to the right by less than the $200-billion increase in government purchases that we saw in Figure 12.9 "An Increase in Government Purchases."

Table 12.3 "Fiscal Policy in the United States Since 1964" summarizes U.S. fiscal policies undertaken to shift aggregate demand since the 1964 tax cuts. We see that expansionary policies have been chosen in response to recessionary gaps and that contractionary policies have been chosen in response to inflationary gaps. Changes in government purchases and in taxes have been the primary tools of fiscal policy in the United States.

Table 12.3 Fiscal Policy in the United States Since 1964

Year	Situation	Policy response
1968	Inflationary gap	A temporary tax increase, first recommended by President Johnson's Council of Economic Advisers in 1965, goes into effect. This one-time surcharge of 10% is added to individual income tax liabilities.
1969	Inflationary gap	President Nixon, facing a continued inflationary gap, orders cuts in government purchases.
1975	Recessionary gap	President Ford, facing a recession induced by an OPEC oil-price increase, proposes a temporary 10% tax cut. It is passed almost immediately and goes into effect within two months.
1981	Recessionary gap	President Reagan had campaigned on a platform of increased defense spending and a sharp cut in income taxes. The tax cuts are approved in 1981 and are implemented over a period of three years. The increased defense spending begins in 1981. While the Reagan administration rejects the use of fiscal policy as a stabilization tool, its policies tend to increase aggregate demand early in the 1980s.
1992	Recessionary gap	President Bush had rejected the use of expansionary fiscal policy during the recession of 1990–1991. Indeed, he agreed late in 1990 to a cut in government purchases and a tax increase. In a campaign year, however, he orders a cut in withholding rates designed to increase disposable personal income in 1992 and to boost consumption.
1993	Recessionary gap	President Clinton calls for a $16-billion jobs package consisting of increased government purchases and tax cuts aimed at stimulating investment. The president says the plan will create 500,000 new jobs. The measure is rejected by Congress.
2001	Recessionary gap	President Bush campaigned to reduce taxes in order to reduce the size of government and encourage long-term growth. When he took office in 2001, the economy was weak and the $1.35-billion tax cut was aimed at both long-term tax relief and at stimulating the economy in the short term. It included, for example, a personal income tax rebate of $300 to $600 per household. With unemployment still high a couple of years into the expansion, another tax cut was passed in 2003.
2008	Recessionary gap	Fiscal stimulus package of $150 billion to spur economy. It included $100 billion in tax rebates and $50 in tax cuts for businesses.

Year	Situation	Policy response
2009	Recessionary gap	Fiscal stimulus package of $787 billion included tax cuts and increased government spending passed in early days of President Obama's administration.

250. Video: Tax Cuts During the Recession

Tax Cuts During the Recession

Watch this video to learn about how some small business owners and economists felt about the possibility of ending the Bush tax cuts in 2010. Note that these tax cuts were eventually extended, although changes were made later in the American Taxpayer Relief Act of 2012.

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251. Putting It Together: Fiscal Policy

Summary

The goal of this module was to teach you to understand what government budgets consist of, and how fiscal policy affects the economy. You learned how to:

- Identify the major spending categories and major revenue sources in the U.S. Federal budget
- Identify the major spending categories and major revenue sources in U.S. state and local budgets
- Define fiscal policy, identifying the roles of tax rates and government spending.
- Differentiate between discretionary and automatic fiscal policy
- Compare/Contrast expansionary/contractionary fiscal policies
- Compare/Contrast the way tax changes and government spending changes work

Examples

You learned that the federal government spends most of its budget in a small number of areas, including national defense, social security, other social welfare programs, healthcare and interest on the federal debt. Most federal tax revenue comes from individuals' income, though some comes from corporate profits.

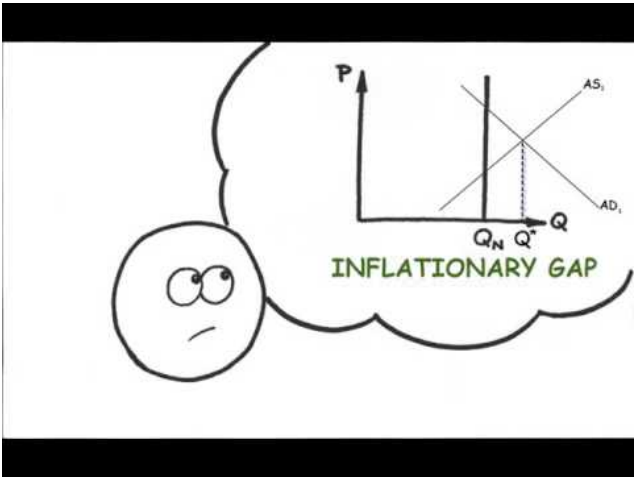
State and local governments spend the majority of their budgets

on education and transportation, while their tax revenue comes primarily from property and sales taxes. Some states don't even have an income tax.

The balance on a government budget is not always easy to read, since budget balances change automatically, going into deficit during economic slowdowns and going into surpluses (or smaller deficits) during economic booms.

Congress can intentionally try to stimulate the economy using expansionary fiscal policy, either tax cuts or increases in government spending. Congress can also try to slow the economy down if is overheating by using contractionary fiscal policy, either tax increases or spending cuts.

Watch this video to review fiscal policy:



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https://pressbooks.ccconline.org/accmacro/?p=522

We will develop a more sophisticated understanding of fiscal policy in a future module, but first we need to learn about monetary policy.

252. Self Check: Changes in Tax and Spending

Check Your Understanding

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the Reading in this section.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

An interactive or media element has been excluded from this version of the text. You can view it online here: https://pressbooks.ccconline.org/accmacro/?p=524

253. Glossary: Fiscal Policy

automatic stabilizers
: tax and spending rules that have the effect of slowing down the rate of decrease in aggregate demand when the economy slows down and restraining aggregate demand when the economy speeds up, without any additional change in legislation

balanced budget
: when government spending and taxes are equal

budget deficit
: when the federal government spends more money than it receives in taxes in a given year

budget surplus
: when the government receives more money in taxes than it spends in a year

contractionary fiscal policy
: fiscal policy that decreases the level of aggregate demand, either through cuts in government spending or increases in taxes

corporate income tax
: a tax imposed on corporate profits

crowding out
: federal spending and borrowing causes interest rates to rise and business investment to fall

discretionary fiscal policy
: the government passes a new law that explicitly changes overall tax or spending levels with the intent of influencing the level or overall economic activity

estate and gift tax
a tax on people who pass assets to the next generation—either after death or during life in the form of gifts

excise tax
a tax on a specific good—on gasoline, tobacco, and alcohol

expansionary fiscal policy
fiscal policy that increases the level of aggregate demand, either through increases in government spending or cuts in taxes

implementation lag
the time it takes for the funds relating to fiscal policy to be dispersed to the appropriate agencies to implement the programs

individual income tax
a tax based on the income, of all forms, received by individuals

legislative lag
the time it takes to get a fiscal policy bill passed

marginal tax rates
or the tax that must be paid on all yearly income

national debt
the total accumulated amount the government has borrowed, over time, and not yet paid back

payroll tax
a tax based on the pay received from employers; the taxes provide funds for Social Security and Medicare

progressive tax
a tax that collects a greater share of income from those with high incomes than from those with lower incomes

proportional tax
a tax that is a flat percentage of income earned, regardless of level of income

recognition lag
the time it takes to determine that a recession has occurred

regressive tax
a tax in which people with higher incomes pay a smaller share of their income in tax

standardized employment budget
the budget deficit or surplus in any given year adjusted for what it would have been if the economy were producing at potential GDP

254. Discussion: Economic Impact of Lower Corporate Tax Rate

Suppose Congress votes to decrease corporate income tax rates. Use the AD/AS model to analyze the likely impact of the tax cuts on the macroeconomy. Show graphically and explain your reasoning. What exactly causes AD and/or AS to shift? What happens to GDP and the aggregate price level? Why?

255. Why It Matters: Policy Application

Why use an understanding of the strengths and weakness of fiscal and monetary policy to determine an appropriate stabilization policy for a given macroeconomic situation?

The module really ties together everything we've learned about macroeconomics. In earlier modules we introduced the concepts of fiscal and monetary policy. In this module, we examine the two types of policy in more detail, incorporating all the pros and cons of the real world. By extension, we will be evaluating the policy prescriptions of Keynesian and Neoclassical economics. As you work through this module, use the following questions to guide your thinking:

- Under what circumstances do fiscal and monetary policy work well or not so well at managing the economy?
- For the activist Keynesians, what are the limits to fiscal and monetary policy that you would endorse, and why?
- For the laissez-faire Neoclassicals, what is the minimalist fiscal and monetary policy that makes sense, and why?

Suppose you are asked to provide guidance about the macro economy in a given situation. Knowing what you know about the strengths and weaknesses of using fiscal or monetary policy, what would you recommend? For example, suppose after a period of solid economic growth, low unemployment, and modest inflation, the economy slows down a bit and unemployment shoots up several percentage points. What should be done about that?

LEARNING OUTCOMES

- Understand the Keynesian view on changes in government spending and taxation; define the multiplier effect; define the crowding out effect and explain why it occurs and how it reduces the fiscal multiplier; define the Keynesian concept of the Liquidity Trap and explain why it occurs and how it reduces the effectiveness of monetary policy
- Understand the effects of tax and spending policy from a neoclassical perspective; define and give examples of supply-side economics; explain the types of lag times that often occur when solving economic problems; describe the neoclassical long-run aggregate supply curve; understand and describe the emergence of New Classical Economics, along with its main tenets; define Ricardian Equivalence
- Identify appropriate macro policy options in response to the state of the economy; understand the effectiveness and limitations of fiscal and/or monetary policy for a given state of the economy; choose an appropriate fiscal and monetary policy for a given state of the economy

256. Outcome: Keynesian Policy Prescriptions

What you'll learn to do: understand the Keynesian view on changes in government spending and taxation

Here are some of the specific things you'll learn to do in this section:

- Describe the multiplier effect
- Define the crowding out effect and explain why it occurs and how it reduces the fiscal multiplier.
- Define the Keynesian concept of the Liquidity Trap and explain why it occurs and how it reduces the effectiveness of monetary policy.

LEARNING ACTIVITIES

The learning activities for this section include:

- Reading: Keynesian View on Changes in Government Spending and Taxation
- Reading: Liquidity Trap
- Self Check: Liquidity Trap
- Reading: The Expenditure Multiplier
- Self Check: The Expenditure Multiplier
- Reading: Crowding Out
- Self Check: Crowding Out

Take time to review and reflect on each of these activities in order to improve your performance on the assessment for this section.

257. Reading: Keynesian View on Changes in Government Spending and Taxation

Understand the Keynesian View on Changes in Government Spending and Taxation

Keynesians believe, based on the experience of the Great Depression, that the economy can be in equilibrium at a level of GDP that does not correspond to full employment, and that the economy can stay at that level for an extended period of time. This equilibrium can correspond to either a recession or an inflationary boom.

Because of this belief that either the economy is not self-correcting, or that the correction may take a long period of time, Keynesians also believe that government has a responsibility to manage the economy. They encourage stimulating the economy during recessionary times and slowing the economy down during booms, using a combination of fiscal and monetary policy. Let's consider how this might work in the real world.

One criticism of early Keynesians was that they didn't believe monetary policy was very useful. The reality is more nuanced. Keynes was the preeminent monetary economist of his generation. Indeed, before he wrote *The General Theory*, his magnum opus on macroeconomics/the book which founded macroeconomics, he wrote a two volume *Treatise on Money*. To say that he didn't understand or believe monetary policy could be effective was simply not true. That said, he did identify a situation when expansionary monetary policy wouldn't work. It is to that "Liquidity Trap" that we now turn.

258. Reading: Liquidity Trap

The Degree of Impact on the Economy

What if the Fed cannot bring about a change in interest rates? A liquidity trap is said to exist when a change in monetary policy has no effect on interest rates. This would be the case if the money demand curve were horizontal at some interest rate, as shown in Figure 11.5 "A Liquidity Trap." If a change in the money supply from M to M' cannot change interest rates, then, unless there is some other change in the economy, there is no reason for investment or any other component of aggregate demand to change. Hence, traditional monetary policy is rendered totally ineffective; its degree of impact on the economy is nil. At an interest rate of zero, since bonds cease to be an attractive alternative to money, which is at least useful for transactions purposes, there would be a liquidity trap.

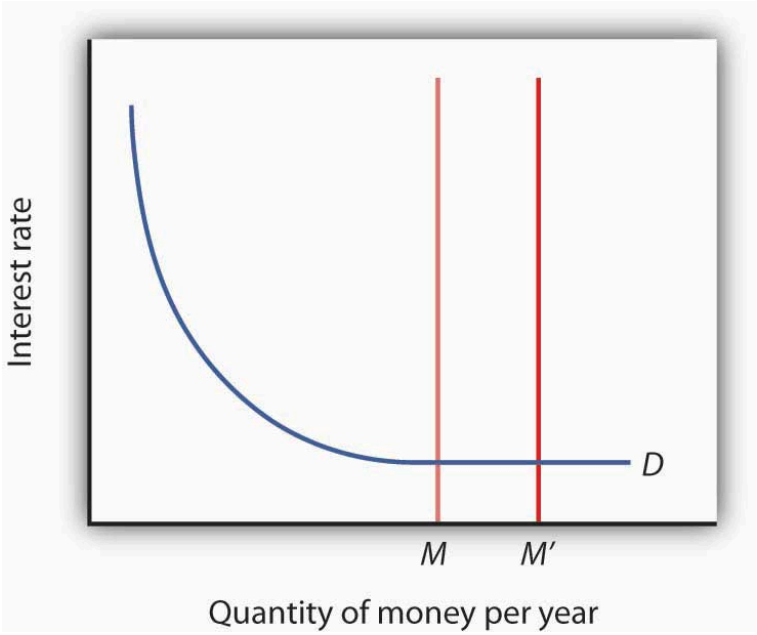

Figure 11.5. *A Liquidity Trap. When a change in the money supply has no effect on the interest rate, the economy is said to be in a liquidity trap.*

With the federal funds rate in the United States close to zero at the end of 2008, the possibility that the country is in or nearly in a liquidity trap cannot be dismissed. As discussed in the introduction to the chapter, at the same time the Fed lowered the federal funds rate to close to zero, it mentioned that it intended to pursue additional, nontraditional measures. What the Fed seeks to do is to make firms and consumers want to spend now by using a tool not aimed at reducing the interest rate, since it cannot reduce the interest rate below zero. It thus shifts its focus to the price level and to avoiding expected deflation. For example, if the public expects the price level to fall by 2% and the interest rate is zero, by holding money, the money is actually earning a positive *real* interest rate of 2%—the difference between the *nominal* interest

rate and the expected deflation rate. Since the nominal rate of interest cannot fall below zero (Who would, for example, want to lend at an interest rate below zero when lending is risky whereas cash is not? In short, it does not make sense to lend $10 and get less than $10 back.), expected deflation makes holding cash very attractive and discourages spending since people will put off purchases because goods and services are expected to get cheaper.

To combat this "wait-and-see" mentality, the Fed or other central bank, using a strategy referred to as quantitative easing, must convince the public that it will keep interest rates very low by providing substantial reserves for as long as is necessary to avoid deflation. In other words, it is aimed at creating expected inflation. For example, at the Fed's October 2003 meeting, it announced that it would keep the federal funds rate at 1% for "a considerable period." When the Fed lowered the rate to between 0% and 0.25% in December 2008, it added that "the Committee anticipates that weak economic conditions are likely to warrant exceptionally low levels of the federal funds rate for some time." After working so hard to convince economic players that it will not tolerate inflation above 2%, the Fed must now convince the public that it will, but of course not too much! If it is successful, this extraordinary form of expansionary monetary policy will lead to increased purchases of goods and services, compared to what they would have been with expected deflation. Also, by providing banks with lots of liquidity, it is hoping to encourage them to lend.

The Japanese economy provides an interesting modern example of a country that attempted quantitative easing. With a recessionary gap starting in the early 1990s and deflation in most years from 1995 on, Japan's central bank, the Bank of Japan, began to lower the call money rate (equivalent to the federal funds rate in the United States), reaching near zero by the late 1990s. With growth still languishing, Japan appeared to be in a traditional liquidity trap. In late 1999, the Bank of Japan announced that it would maintain a zero interest rate policy for the foreseeable future, and in March 2001 it officially began a policy of quantitative easing. In 2006, with

the price level rising modestly, Japan ended quantitative easing and began increasing the call rate again. It should be noted that the government simultaneously engaged in expansionary fiscal policy.

How well did these policies work? The economy began to grow modestly in 2003, though deflation between 1% and 2% remained. Some researchers feel that the Bank of Japan ended quantitative easing too early. Also, delays in implementing the policy, as well as delays in restructuring the banking sector, exacerbated Japan's problems.

Former Fed Chairman Bernanke and other Fed officials have argued that the Fed is also engaged in credit easing. Credit easing is a strategy that involves the extension of central bank lending to influence more broadly the proper functioning of credit markets and to improve liquidity. In general, the Fed is hoping that these new credit facilities will improve liquidity in a variety of credit markets, ranging from those used by money market mutual funds to those involved in student and car loans.

Self Check: Liquidity Trap

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the two Readings in this section.

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259. Reading: The Expenditure Multiplier

The Expenditure Multiplier

One of the key claims of Keynes was the existence of an "expenditure multiplier." Remember from previous readings that Keynes said that aggregate demand was highly volatile, that even if the economy started at a level of GDP where equaled it's potential so that the economy was at full employment, AD could shift abruptly causing a recessionary or inflationary gap. In the Keynesian model, not only did changes in spending cause GDP to change, but the change in GDP was more than proportionate than the initial change in autonomous spending. In other words, aggregate demand is powerful since a change in spending results in a multiplied change in GDP. This spending multiplier was part of the reasoning behind the Keynesian view that fiscal policy is a powerful tool for managing the economy.

Self Check: The Expenditure Multiplier

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the Reading in this section.

Use this quiz to check your understanding and decide whether

to (1) study the previous section further or (2) move on to the next section.

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260. Reading: Crowding Out

Fiscal Policy and Interest Rates

Because an expansionary fiscal policy either increases government spending or reduces revenues, it increases the government budget deficit or reduces the surplus. A contractionary policy is likely to reduce a deficit or increase a surplus. In either case, fiscal policy thus affects the bond market. Our analysis of monetary policy showed that developments in the bond market can affect investment. We shall find in this section that the same is true for fiscal policy.

Because fiscal policy affects the quantity that the government borrows in financial capital markets, it not only affects aggregate demand—it can also affect interest rates. In Figure 17.7, the original equilibrium (E_0) in the financial capital market occurs at a quantity of $800 billion and an interest rate of 6%. However, an increase in government budget deficits shifts the demand for financial capital from D_0 to D_1. The new equilibrium (E_1) occurs at a quantity of $900 billion and an interest rate of 7%.

A consensus estimate based on a number of studies is that an increase in budget deficits (or a fall in budget surplus) by 1% of GDP will cause an increase of 0.5–1.0% in the long-term interest rate.

The graph shows two demand curves that each intersect with a supply curve. Demand curve (D sub 0) intersects with supply curve (S) at E sub 0 (point $800, 6%). Demand curve (D sub 1) intersects with supply curve (S) at E sub 1 (point $900, 7%).

Figure 17.7. *Fiscal Policy and Interest Rates. When a government borrows money in the financial capital market, it causes a shift in the demand for financial capital from D0 to D1. As the equilibrium moves from E0 to E1, the equilibrium interest rate rises from 6% to 7% in this example. In this way, an expansionary fiscal policy intended to shift aggregate demand to the right can also lead to a higher interest rate, which has the effect of shifting aggregate demand back to the left.*

A problem arises here. An expansionary fiscal policy, with tax cuts or spending increases, is intended to increase aggregate demand. If an expansionary fiscal policy also causes higher interest rates, then firms and households are discouraged from borrowing and spending (as occurs with tight monetary policy), thus reducing aggregate demand. Even if the direct effect of expansionary fiscal policy on increasing demand is not totally offset by lower aggregate demand from higher interest rates, fiscal policy can end up being less powerful than was originally expected. This is referred to as crowding out, where government borrowing and spending results in higher interest rates, which reduces business investment and household consumption.

Note, however, that it is private investment that is crowded out. The expansionary fiscal policy could take the form of an increase in the investment component of government purchases. As we have learned, some government purchases are for goods, such as office supplies, and services. But the government can also purchase investment items, such as roads and schools. In that case, government investment may be crowding out private investment.

The reverse of crowding out occurs with a contractionary fiscal policy—a cut in government purchases or transfer payments, or an increase in taxes. Such policies reduce the deficit (or increase the surplus) and thus reduce government borrowing, shifting the supply curve for bonds to the left. Interest rates drop, inducing a greater quantity of investment. Lower interest rates also reduce the demand for and increase the supply of dollars, lowering the exchange rate and boosting net exports. This phenomenon is known as "crowding in."

Crowding out clearly weakens the impact of fiscal policy. An expansionary fiscal policy has less punch; a contractionary policy puts less of a damper on economic activity. Some economists argue that these forces are so powerful that a change in fiscal policy will have no effect on aggregate demand. Because empirical studies

have been inconclusive, the extent of crowding out (and its reverse) remains a very controversial area of study.

Also, the fact that government deficits today may reduce the capital stock that would otherwise be available to future generations does not imply that such deficits are wrong. If, for example, the deficits are used to finance public sector investment, then the reduction in private capital provided to the future is offset by the increased provision of public sector capital. Future generations may have fewer office buildings but more schools.

The Role of Monetary Policy

At this point, you may wonder about the Federal Reserve. After all, can the Federal Reserve not use expansionary monetary policy to reduce interest rates, or in this case, to prevent interest rates from rising? This useful question emphasizes the importance of considering how fiscal and monetary policies work in relation to each other. Imagine a central bank faced with a government that is running large budget deficits, causing a rise in interest rates and crowding out private investment. If the budget deficits are increasing aggregate demand when the economy is already producing near potential GDP, threatening an inflationary increase in price levels, the central bank may react with a contractionary monetary policy. In this situation, the higher interest rates from the government borrowing would be made even higher by contractionary monetary policy, and the government borrowing might crowd out a great deal of private investment.

On the other hand, if the budget deficits are increasing aggregate demand when the economy is producing substantially less than potential GDP, an inflationary increase in the price level is not much of a danger and the central bank might react with expansionary monetary policy. In this situation, higher interest rates from government borrowing would be largely offset by lower interest

rates from expansionary monetary policy, and there would be little crowding out of private investment.

However, even a central bank cannot erase the overall message of the national savings and investment identity. If government borrowing rises, then private investment must fall, or private saving must rise, or the trade deficit must fall. By reacting with contractionary or expansionary monetary policy, the central bank can only help to determine which of these outcomes is likely.

Self Check: Crowding Out

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the Reading in this section.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

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261. Outcome: Neoclassical Policy Prescriptions

What you'll learn to do: understand the effects of tax and spending policy from a neoclassical perspective

Here are some of the specific things you'll learn to do in this section:

- Define and give examples of supply-side economics
- Explain the types of lag times that often occur when solving economic problems
- Describe the neoclassical long-run aggregate supply curve
- Understand and describe the emergence of New Classical Economics, along with its main tenets
- Define Ricardian Equivalence

LEARNING ACTIVITIES

The learning activities for this section include:

- Reading: Effects of Tax and Spending Policy from a Neoclassical Perspective
- Reading: Supply-Side Economics
- Self Check: Supply-Side Economics
- Reading: Policy Implications of the Neoclassical Perspective: Policy Lags
- Self Check: Policy Lags
- Reading: Policy Implications: No Phillips Curve Tradeoff

- Self Check: No Phillips Curve Tradeoff
- Reading: New Classical Economics and Rational Expectations
- Self Check: New Classical Economics and Rational Expectations
- Reading: Ricardian Equivalence: How Government Borrowing Affects Private Saving
- Self Check: Ricardian Equivalence
- Reading: Policy Implications: Inflation, Recession, and Unemployment
- Self Check: Policy Implications: Inflation, Recession, and Unemployment

Take time to review and reflect on each of these activities in order to improve your performance on the assessment for this section.

262. Reading: Effects of Tax and Spending Policy from a Neoclassical Perspective

Understand the effects of tax and spending policy from a neoclassical perspective

Neoclassical economics covers several distinct schools of thought, including traditional neoclassical economics, supply side economics, and new classical economics. Each of these schools of thought shares a number of key beliefs, which makes them neoclassical. The first belief is that the macro economy is self-correcting, or that there is no need for government intervention. The second belief, for reasons to be discussed in the next reading, is that government "fine tuning" of the economy either through fiscal or monetary policy would be unwise and ineffective.

Self Check: Supply-Side Economics

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the two Readings in this section.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

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263. Reading: Supply-Side Economics

Supply-Side Economics

Supply-side economics is the school of thought that promotes the use of fiscal policy to stimulate long-run aggregate supply. Supply-side economists advocate reducing tax rates in order to encourage people to work more or more individuals to work and providing investment tax credits to stimulate capital formation.

While there is considerable debate over how strong the supply-side effects are in relation to the demand-side effects, such considerations may affect the choice of policies. Supply-siders tend to favor tax cuts over increases in government purchases or increases in transfer payments. President Reagan advocated tax cuts in 1981 on the basis of their supply-side effects. Coupled with increased defense spending in the early 1980s, fiscal policy under Mr. Reagan clearly stimulated aggregate demand by increasing both consumption and investment. Falling inflation and accelerated growth are signs that supply-side factors may also have been at work during that period. President George W. Bush's chief economic adviser, N. Gregory Mankiw, argued that the Bush tax cuts would encourage economic growth, a supply-side argument. Mr. Bush's next chief economic adviser, Ben Bernanke, who became the next chairman of the Federal Reserve Board in 2006, made a similar argument and urged that the Bush tax cuts be made permanent.

Finally, even when there is agreement to stimulate the economy, say through increasing government expenditures on highways, the *how* question remains. How should the expenditures be allocated? Specifically, which states should the highways run through? Each member of Congress has a political stake in the outcome. These

types of considerations make the implementation lag particularly long for fiscal policy.

264. Reading: Policy Implications of the Neoclassical Perspective: Policy Lags

Policy Implications of the Neoclassical Perspective: Policy Lags

To understand the policy recommendations of the neoclassical economists, it helps to start with the Keynesian perspective. Suppose a decrease in aggregate demand causes the economy to go into recession with high unemployment. The Keynesian response would be to use government policy to stimulate aggregate demand and eliminate the recessionary gap. The neoclassical economists believe that the Keynesian response, while perhaps well intentioned, will not have a good outcome for reasons we will discuss shortly. Since the neoclassical economists believe that the economy will correct itself over time, the only advantage of a Keynesian stabilization policy would be to speed up the process and minimize the time that the unemployed are out of work. Is that the likely outcome?

Keynesian macroeconomic policy requires some optimism about the ability of the government to recognize a situation of too little or too much *aggregate demand*, and to adjust aggregate demand accordingly with the right level of changes in taxes or spending, all enacted in a timely fashion. After all, neoclassical economists argue, it takes government statisticians months to produce even preliminary estimates of GDP so that politicians know whether a recession is occurring—and those preliminary estimates may be

revised substantially later. Moreover, there is the question of timely action. The political process can take more months to enact a tax cut or a spending increase; the amount of those tax or spending changes may be determined as much by political considerations as economic ones; and then the economy will take still more months to put changes in aggregate demand into effect through spending and production. When all of these time lags and political realities are considered, active stabilization (fiscal or monetary) may fail to address the current problem, and could even make the future economy worse. The average U.S. post-World War II recession has lasted only about a year. By the time government policy kicks in, the recession will likely be over. As a consequence, the only result of government fine-tuning will be to stimulate the economy when it is already recovering (or to contract the economy when it is already falling). In other words, an active macroeconomic policy is likely to exacerbate the cycles rather than dampen them. Indeed, some neoclassical economists believe a large part of the business cycles we observe are due to this flawed government policy. Let's explore the issue of lags in more detail.

Long and Variable Time Lags

Monetary policy can be changed several times each year, but fiscal policy is much slower to be enacted. Imagine that the economy starts to slow down. It often takes some months before the economic statistics signal clearly that a downturn has started, and a few months more to confirm that it is truly a recession and not just a one- or two-month blip. The time it takes to determine that a recession has occurred is often called the recognition lag. After this lag, policymakers become aware of the problem and propose fiscal policy bills. The bills go into various congressional committees for hearings, negotiations, votes, and then, if passed, eventually for the president's signature. Many fiscal policy bills about spending

or taxes propose changes that would start in the next budget year or would be phased in gradually over time. The time to get a bill passed is often referred to as the legislative lag. Finally, once the bill is passed it takes some time for the funds to be dispersed to the appropriate agencies to implement the programs. The time to get the projects started is often called the implementation lag.

Moreover, the exact level of fiscal policy to be implemented is never completely clear. Should the budget deficit be increased by 0.5% of GDP? By 1% of GDP? By 2% of GDP? In an AS–AD diagram, it is straightforward to sketch an aggregate demand curve shifting to the potential GDP level of output. In the real world, the actual level of potential output is known only roughly, not precisely, and exactly how a spending cut or tax increase will affect aggregate demand is always somewhat controversial. Also unknown is the state of the economy at any point in time. During the early days of the Obama administration, for example, no one knew how deep in the hole the economy really was. During the financial crisis of 2008-09, the rapid collapse of the banking system and automotive sector made it difficult to assess how quickly the economy was collapsing.

Thus, it can take many months or even more than a year to begin an expansionary fiscal policy after a recession has started—and even then, uncertainty will remain over exactly how much to expand or contract taxes and spending. When politicians attempt to use countercyclical fiscal policy to fight recession or inflation, they run the risk of responding to the macroeconomic situation of two or three years ago, in a way that may be exactly wrong for the economy at that time. George P. Schultz, a professor of economics, former Secretary of the Treasury, and Director of the Office of Management and Budget, once wrote: "While the economist is accustomed to the concept of lags, the politician likes instant results. The tension comes because, as I have seen on many occasions, the economist's lag is the politician's nightmare."

Recognition Lag

Both monetary and fiscal policy involve lags in execution. It is easy enough to show a recessionary gap on a graph and then to show how monetary policy can shift aggregate demand and close the gap. In the real world, however, it may take several months before anyone even realizes that a particular macroeconomic problem is occurring. When monetary authorities become aware of a problem, they can act quickly to inject reserves into the system or to withdraw reserves from it. Once that is done, however, it may be a year or more before the action affects aggregate demand.

The delay between the time a macroeconomic problem arises and the time at which policy makers become aware of it is called a recognition lag. The 1990–1991 recession, for example, began in July 1990. It was not until late October that members of the FOMC noticed a slowing in economic activity, which prompted a stimulative monetary policy. In contrast, the most recent recession began in December 2007, and Fed easing began in September 2007.

Recognition lags stem largely from problems in collecting economic data. First, data are available only after the conclusion of a particular period. Preliminary estimates of real GDP, for example, are released about a month after the end of a quarter. Thus, a change that occurs early in a quarter will not be reflected in the data until several months later. Second, estimates of economic indicators are subject to revision. The first estimates of real GDP in the third quarter of 1990, for example, showed it increasing. Not until several months had passed did revised estimates show that a recession had begun. And finally, different indicators can lead to different interpretations. Data on employment and retail sales might be pointing in one direction while data on housing starts and industrial production might be pointing in another. It is one thing to look back after a few years have elapsed and determine whether the economy was expanding or contracting. It is quite another to decipher changes in real GDP when one is right in the middle of events.

Even in a world brimming with computer-generated data on the economy, recognition lags can be substantial.

Only after policy makers recognize there is a problem can they take action to deal with it. The delay between the time at which a problem is recognized and the time at which a policy to deal with it is enacted is called the implementation lag. For monetary policy changes, the implementation lag is quite short. The FOMC meets eight times per year, and its members may confer between meetings through conference calls. Once the FOMC determines that a policy change is in order, the required open-market operations to buy or sell federal bonds can be put into effect immediately.

Implementation Lag

Then, more time elapses before a fiscal policy, such as a change in government purchases or a change in taxes, is agreed to and put into effect—the implementation lag. Finally, still more time goes by before the policy has its full effect on aggregate demand—the impact lag.

Changes in fiscal policy are likely to involve a particularly long implementation lag. A tax cut was proposed to presidential candidate John F. Kennedy in 1960 as a means of ending the recession that year. He recommended it to Congress in 1962. It was not passed until 1964, three years after the recession had ended. Some economists have concluded that the long implementation lag for discretionary fiscal policy makes this stabilization tool ineffective. Fortunately, automatic stabilizers respond automatically to changes in the economy. They thus avoid not only the implementation lag but also the recognition lag.

The implementation lag results partly from the nature of bureaucracy itself. The CBO estimate that only a portion of the spending for the stimulus plan passed in 2009 was spent over the next two years is an example of the implementation lag.

Government spending requires bureaucratic approval of that spending. For example, a portion of the stimulus plan had to go through the Department of Energy. One division of the department focuses on approving loan guarantees for energy-saving industrial projects. It was created early in 2007 as part of another effort to stimulate economic activity. A Minnesota company, Sage Electrochromics, has developed a process for producing windows that can be darkened or lightened on demand to reduce energy use in buildings. Sage applied two years ago for a guarantee on a loan of $66 million to build a plant that would employ 250 workers. Its application has not been approved. In fact, the loan approval division, which will be crucial for projects in the stimulus plan, has never approved any application made to it in its two years in existence!

Energy Secretary Steven Chu, a Nobel Prize-winning physicist, recognizes the urgency of the problem. In an interview with the Wall Street Journal, Dr. Chu said that his agency would have to do better. "Otherwise, it's just going to be a bust," he said.

Impact Lag

Policy makers still have to contend with the impact lag, the delay between the time a policy is enacted and the time that policy has its impact on the economy.

The impact lag for monetary policy occurs for several reasons. First, it takes some time for the deposit multiplier process to work itself out. The Fed can inject new reserves into the economy immediately, but the deposit expansion process of bank lending will need time to have its full effect on the money supply. Interest rates are affected immediately, but the money supply grows more slowly. Second, firms need some time to respond to the monetary policy with new investment spending—if they respond at all. Third, a monetary change is likely to affect the exchange rate, but that

translates into a change in net exports only after some delay. Thus, the shift in the aggregate demand curve due to initial changes in investment and in net exports occurs after some delay. Finally, the multiplier process of an expenditure change takes time to unfold. It is only as incomes start to rise that consumption spending picks up.

The problem of lags suggests that monetary policy should respond not to statistical reports of economic conditions in the recent past but to conditions expected to exist in the future. In justifying the imposition of a contractionary monetary policy early in 1994, when the economy still had a recessionary gap, Greenspan indicated that the Fed expected a one-year impact lag. The policy initiated in 1994 was a response not to the economic conditions thought to exist at the time but to conditions expected to exist in 1995. When the Fed used contractionary policy in the middle of 1999, it argued that it was doing so to forestall a possible increase in inflation. When the Fed began easing in September 2007, it argued that it was doing so to forestall adverse effects to the economy of falling housing prices. In these examples, the Fed appeared to be looking forward. It must do so with information and forecasts that are far from perfect.

Estimates of the length of time required for the impact lag to work itself out range from six months to two years. Worse, the length of the lag can vary—when they take action, policy makers cannot know whether their choices will affect the economy within a few months or within a few years. Because of the uncertain length of the impact lag, efforts to stabilize the economy through monetary policy could be destabilizing. Suppose, for example, that the Fed responds to a recessionary gap with an expansionary policy but that by the time the policy begins to affect aggregate demand, the economy has already returned to potential GDP. The policy designed to correct a recessionary gap could create an inflationary gap. Similarly, a shift to a contractionary policy in response to an inflationary gap might not affect aggregate demand until after a self-correction process had already closed the gap. In that case, the policy could plunge the economy into a recession.

Self Check: Policy Lags

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

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265. Reading: Policy Implications: No Phillips Curve Tradeoff

The Neoclassical Phillips Curve Tradeoff

The Keynesian Perspective introduced the *Phillips curve* and explained how it is derived from the aggregate supply curve. The short run upward sloping aggregate supply curve implies a downward sloping Phillips curve; thus, there is a tradeoff between inflation and unemployment in the short run. By contrast, a neoclassical long-run aggregate supply curve will imply a vertical shape for the Phillips curve, indicating no long run tradeoff between inflation and unemployment. Figure 12.6 (a) shows the vertical AS curve, with three different levels of aggregate demand, resulting in three different equilibria, at three different price levels. At every point along that vertical AS curve, potential GDP and the rate of unemployment remains the same. Assume that for this economy, the natural rate of unemployment is 5%. As a result, the long-run Phillips curve relationship, shown in Figure 12.6 (b), is a vertical line, rising up from 5% unemployment, at any level of inflation.

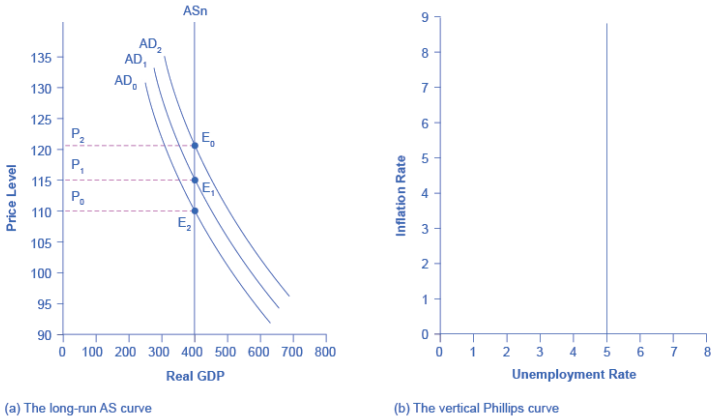

Figure 12.6. *From a Long-Run AS Curve to a Long-Run Phillips Curve. (a) With a vertical AS curve, shifts in aggregate demand do not alter the level of output but do lead to changes in the price level. Because output is unchanged between the equilibria E0, E1, and E2, all unemployment in this economy will be due to the natural rate of unemployment. (b) If the natural rate of unemployment is 5%, then the Phillips curve will be vertical. That is, regardless of changes in the price level, the unemployment rate remains at 5%.*

TRACKING INFLATION AND UNEMPLOYMENT RATES

Suppose that you have collected data for years on the rates of inflation and unemployment and recorded them in a table, such as Table 12.1. How do you interpret that information?

Table 12.2.

Year	Inflation Rate	Unemployment Rate
1970	2%	4%
1975	3%	3%
1980	2%	4%
1985	1%	6%
1990	1%	4%
1995	4%	2%
2000	5%	4%

Step 1. Plot the data points in a graph with inflation rate on the vertical axis and unemployment rate on the horizontal axis. Your graph will appear similar to Figure 12.7.

Figure 12.7. Inflation Rates

Step 2. What patterns do you see in the data? You should notice that there are years when unemployment falls but inflation rises, and other years where unemployment rises and inflation falls.

Step 3. Can you determine the natural rate of unemployment from

the data or from the graph? As you analyze the graph, it appears that the natural rate of unemployment lies at 4%; this is the rate that the economy appears to adjust back to after an apparent change in the economy. For example, in 1975 the economy appeared to have an increase in aggregate demand; the unemployment rate fell to 3% but inflation increased from 2% to 3%. By 1980, the economy had adjusted back to 4% unemployment and the inflation rate had returned to 2%. In 1985, the economy looks to have suffered a recession as unemployment rose to 6% and inflation fell to 1%. This would be consistent with a decrease in aggregate demand. By 1990, the economy recovered back to 4% unemployment, but at a lower inflation rate of 1%. In 1995 the economy again rebounded and unemployment fell to 2%, but inflation increased to 4%, which is consistent with a large increase in aggregate demand. The economy adjusted back to 4% unemployment but at a higher rate of inflation of 5%. Then in 2000, both unemployment and inflation increased to 5% and 4%, respectively.

Step 4. Do you see the Phillips curve(s) in the data? If we trace the downward sloping trend of data points, we could see a short-run Phillips curve that exhibits the inverse tradeoff between higher unemployment and lower inflation rates. If we trace the vertical line of data points, we could see a long-run Phillips curve at the 4% natural rate of unemployment.

The unemployment rate on the long-run Phillips curve will be the natural rate of unemployment. A small inflationary increase in the price level from AD_0 to AD_1 will have the same natural rate of unemployment as a larger inflationary increase in the price level from AD_0 to AD_2. The macroeconomic equilibrium along the vertical aggregate supply curve can occur at a variety of different price levels, and the natural rate of unemployment can be consistent with all different rates of inflation. The great economist *Milton Friedman* (1912–2006) summed up the neoclassical view of the long-term Phillips curve tradeoff in a 1967 speech: "[T]here is always a temporary trade-off between inflation and unemployment; there is no permanent trade-off."

In the Keynesian perspective, the primary focus is on getting the level of aggregate demand right in relationship to an upward-sloping aggregate supply curve. That is, AD should be adjusted so that the economy produces at its potential GDP, not so low that cyclical unemployment results and not so high that inflation results. In the neoclassical perspective, aggregate supply will determine output at potential GDP, unemployment is determined by the natural rate of unemployment churned out by the forces of supply and demand in the labor market, and shifts in aggregate demand are the primary determinant of changes in the price level.

LINK IT UP

Visit this website to read about the effects of economic intervention.

Self Check: No Phillips Curve Tradeoff

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

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266. Reading: New Classical Economics and Rational Expectations

New Classical Economics and Rational Expectations

Much of the difficulty policy makers encountered during the decade of the 1970s resulted from shifts in aggregate supply. Keynesian economics and, to a lesser degree, monetarism had focused on aggregate demand. As it became clear that an analysis incorporating the supply side was an essential part of the macroeconomic puzzle, some economists turned to an entirely new way of looking at macroeconomic issues.

These economists started with a focus on individuals and their decisions. Keynesian economics employed aggregate analysis and paid little attention to individual choices. Monetarist doctrine was based on the analysis of individuals' maximizing behavior with respect to money demand, but it did not extend that analysis to decisions that affect aggregate supply. The new approach aimed at an analysis of how individual choices would affect the entire spectrum of economic activity.

These economists rejected the entire framework of conventional macroeconomic analysis. Indeed, they rejected the very term. For them there is no macroeconomics, nor is there something called microeconomics. For them, there is only economics, which they regard as the analysis of behavior based on individual maximization. The analysis of the determination of the price level and real GDP becomes an application of basic economic theory, not a separate body of thought. The approach to macroeconomic analysis built

from an analysis of individual maximizing choices is called new classical economics.

New Classical Economics

Like classical economic thought, new classical economics focuses on the determination of long-run aggregate supply and the economy's ability to reach this level of output quickly. But the similarity ends there. Classical economics emerged in large part before economists had developed sophisticated mathematical models of maximizing behavior. The new classical economics puts mathematics to work in an extremely complex way to generalize from individual behavior to aggregate results.

Because the new classical approach suggests that the economy will remain at or near its potential output, it follows that the changes we observe in economic activity result not from changes in aggregate demand but from changes in long-run aggregate supply. New classical economics suggests that economic changes don't necessarily imply economic problems.

New classical economists pointed to the supply-side shocks of the 1970s, both from changes in oil prices and changes in expectations, as evidence that their emphasis on aggregate supply was on the mark. They argued that the large observed swings in real GDP reflected underlying changes in the economy's potential output. The recessionary and inflationary gaps that so perplexed policy makers during the 1970s were not gaps at all, the new classical economists insisted. Instead, they reflected changes in the economy's own potential output.

Rational Expectations

Two particularly controversial propositions of new classical theory relate to the impacts of monetary and of fiscal policy. Both are implications of the rational expectations hypothesis, which assumes that individuals form expectations about the future based on the information available to them, and that they act on those expectations.

The rational expectations hypothesis suggests that monetary policy, even though it will affect the aggregate demand curve, might have no effect on real GDP. This possibility, which was suggested by Robert Lucas, is illustrated in Figure 17.9 "Contractionary Monetary Policy: With and Without Rational Expectations." Suppose the economy is initially in equilibrium at point 1 in Panel (a). Real GDP equals its potential output, Y_P. Now suppose a reduction in the money supply causes aggregate demand to fall to AD_2. In our model, the solution moves to point 2; the price level falls to P_2, and real GDP falls to Y_2. There is a recessionary gap. In the long run, the short-run aggregate supply curve shifts to $SRAS_2$, the price level falls to P_3, and the economy returns to its potential output at point 3.

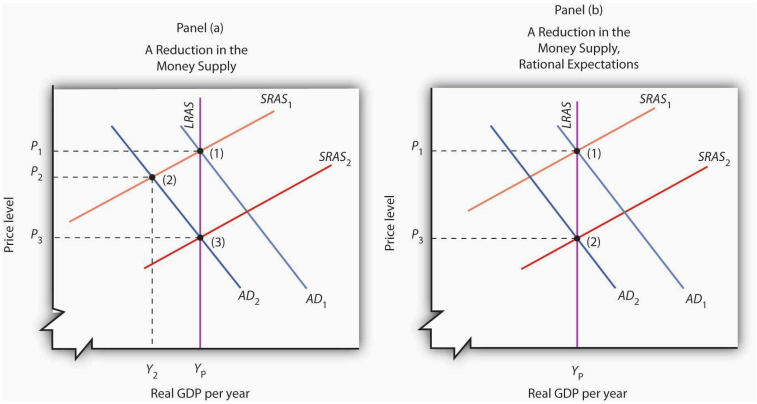

Figure 17.9. *Contractionary Monetary Policy: With and Without Rational Expectations. Panels (a) and (b) show an economy operating at potential output (1); a contractionary monetary policy shifts aggregate demand to AD2. Panel (a) shows the kind of response we have studied up to this point; real GDP falls to Y2 in period (2); the recessionary gap is closed in the long run by falling nominal wages that cause an increase in short-run aggregate supply in period (3). Panel (b) shows the rational expectations argument. People anticipate the impact of the contractionary policy when it is undertaken, so that the short-run aggregate supply curve shifts to the right at the same time the aggregate demand curve shifts to the left. The result is a reduction in the price level but no change in real GDP; the solution moves from (1) to (2).*

The new classical story is quite different. Consumers and firms observe that the money supply has fallen and anticipate the eventual reduction in the price level to P_3. They adjust their expectations accordingly. Workers agree to lower nominal wages, and the short-run aggregate supply curve shifts to $SRAS_2$. This occurs as aggregate demand falls. As suggested in Panel (b), the price level falls to P_3, and output remains at potential. The solution moves from (1) to (2) with no loss in real GDP.

In this new classical world, there is only one way for a change in the money supply to affect output, and that is for the change to take people by surprise. An unexpected change cannot affect expectations, so the short-run aggregate supply curve does not

shift in the short run, and events play out as in Panel (a). Monetary policy can affect output, but only if it takes people by surprise.

The new classical school offers an even stronger case against the operation of fiscal policy. It argues that fiscal policy does not shift the aggregate demand curve at all! Consider, for example, an expansionary fiscal policy. Such a policy involves an increase in government purchases or transfer payments or a cut in taxes. Any of these policies will increase the deficit or reduce the surplus. New classical economists argue that households, when they observe the government carrying out a policy that increases the debt, will anticipate that they, or their children, or their children's children, will end up paying more in taxes. And, according to the new classical story, these households will reduce their consumption as a result. This will, the new classical economists argue, cancel any tendency for the expansionary policy to affect aggregate demand.

Self Check: New Classical Economics and Rational Expectations

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

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267. Reading: Ricardian Equivalence: How Government Borrowing Affects Private Saving

Ricardian Equivalence: How Government Borrowing Affects Private Saving

A change in government budgets may impact private saving. Imagine that people watch government budgets and adjust their savings accordingly. For example, whenever the government runs a budget deficit, people might reason: "Well, a higher budget deficit means that I'm just going to owe more taxes in the future to pay off all that government borrowing, so I'll start saving now." If the government runs budget surpluses, people might reason: "With these budget surpluses (or lower budget deficits), interest rates are falling, so that saving is less attractive. Moreover, with a budget surplus the country will be able to afford a tax cut sometime in the future. I won't bother saving as much now."

The theory that rational private households might shift their saving to offset government saving or borrowing is known as *Ricardian equivalence* because the idea has intellectual roots in the writings of the early nineteenth-century economist David Ricardo (1772–1823). If Ricardian equivalence holds completely true, then in the national saving and investment identity, any change in budget deficits or budget surpluses would be completely offset by a corresponding change in private saving. As a result, changes in government borrowing would have no effect at all on either physical capital investment or trade balances.

In practice, the private sector only sometimes and partially adjusts its savings behavior to offset government budget deficits and surpluses. Figure 17.7 shows the patterns of U.S. government budget deficits and surpluses and the rate of private saving—which includes saving by both households and firms—since 1980. The connection between the two is not at all obvious. In the mid-1980s, for example, government budget deficits were quite large, but there is no corresponding surge of private saving. However, when budget deficits turn to surpluses in the late 1990s, there is a simultaneous decline in private saving. When budget deficits get very large in 2008 and 2009, on the other hand, there is some sign of a rise in saving. A variety of statistical studies based on the U.S. experience suggests that when government borrowing increases by $1, private saving rises by about 30 cents. A World Bank study done in the late 1990s, looking at government budgets and private saving behavior in countries around the world, found a similar result.

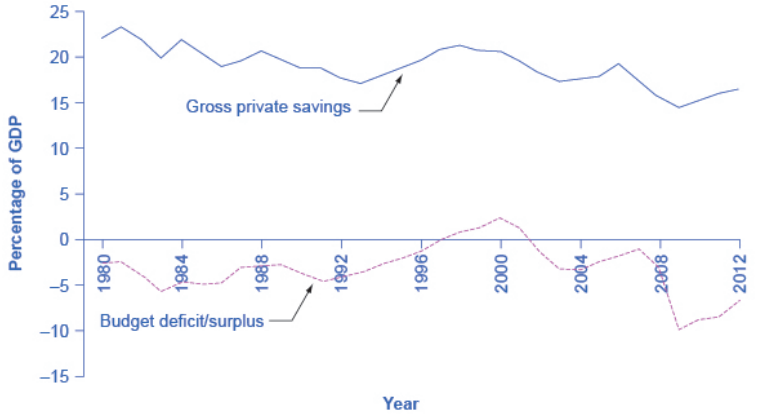

Figure 17.7. *U.S. Budget Deficits and Private Savings. The theory of Ricardian equivalence suggests that any increase in government borrowing will be offset by additional private saving, while any decrease in government borrowing will be offset by reduced private saving. Sometimes this theory holds true, and sometimes it does not hold true at all. (Source: Bureau of Economic Analysis and Federal Reserve Economic Data).*

So private saving does increase to some extent when governments run large budget deficits, and private saving falls when governments reduce deficits or run large budget surpluses. However, the offsetting effects of private saving compared to government borrowing are much less than one-to-one. In addition, this effect can vary a great deal from country to country, from time to time, and over the short run and the long run.

If the funding for a larger budget deficit comes from international financial investors, then a budget deficit may be accompanied by a trade deficit. In some countries, this pattern of a *twin deficits* has set the stage for international financial investors first to send their funds to a country and cause an appreciation of its exchange rate and then to pull their funds out and cause a depreciation of the exchange rate and a financial crisis as well. It depends on whether funding comes from international financial investors.

Self Check: Ricardian Equivalence

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

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268. Reading: Policy Implications: Inflation, Recession, and Unemployment

Fighting Unemployment or Inflation?

As explained in the unemployment section, unemployment can be divided into two categories: *cyclical unemployment* and the *natural rate of unemployment*, which is the sum of frictional and structural unemployment. Cyclical unemployment results from fluctuations in the business cycle and is created when the economy is producing below potential GDP—giving potential employers less incentive to hire. When the economy is producing at potential GDP, cyclical unemployment will be zero. Because of the dynamics of the labor market, in which people are always entering or exiting the labor force, the unemployment rate never falls to 0%, not even when the economy is producing at or even slightly above potential GDP. Probably the best we can hope for is for the number of job vacancies to equal the number of job seekers. We know that it takes time for job seekers and employers to find each other, and this time is the cause of frictional unemployment. Most economists do not consider frictional unemployment to be a "bad" thing. After all, there will always be workers who are unemployed while looking for a job that is a better match for their skills. There will always be employers that have an open position, while looking for a worker that is a better match for the job. Ideally, these matches happen quickly, but even when the economy is very strong there will be some natural

unemployment and this is what is measured by the natural rate of unemployment.

The neoclassical view of unemployment tends to focus attention away from the problem of cyclical unemployment—that is, unemployment caused by recession—while putting more attention on the issue of the rates of unemployment that prevail even when the economy is operating at potential GDP. To put it another way, the neoclassical view of unemployment tends to focus on how public policy can be adjusted to reduce the natural rate of unemployment. Such policy changes might involve redesigning unemployment and welfare programs so that they support those in need, but also offer greater encouragement for job-hunting. It might involve redesigning business rules with an eye to whether they are unintentionally discouraging businesses from taking on new employees. It might involve building institutions to improve the flow of information about jobs and the mobility of workers, to help bring workers and employers together more quickly. For those workers who find that their skills are permanently no longer in demand (for example, the structurally unemployed), policy can be designed to provide opportunities for retraining so that these workers can reenter the labor force and seek employment.

Neoclassical economists will not tend to see aggregate demand as a useful tool for reducing unemployment; after all, if economic output is determined by a vertical *aggregate supply curve*, then aggregate demand has no long-run effect on unemployment. Instead, neoclassical economists believe that aggregate demand should be allowed to expand only to match the gradual shifts of aggregate supply to the right—keeping the price level much the same and inflationary pressures low.

If *aggregate demand* rises rapidly in the neoclassical model, in the long run it leads only to inflationary pressures. Figure 12.8 shows a vertical long-run AS curve and three different levels of aggregate demand, rising from AD_0 to AD_1 to AD_2. As the macroeconomic equilibrium rises from E_0 to E_1 to E_2, the price level rises, but real GDP does not budge; nor does the rate of unemployment, which

adjusts to its natural rate. Conversely, reducing inflation has no long-term costs, either. Think about Figure 12.8 in reverse, as the aggregate demand curve shifts from AD_2 to AD_1 to AD_0, and the equilibrium moves from E_2 to E_1 to E_0. During this process, the price level falls, but, in the long run, neither real GDP nor the natural rate of unemployment is changed.

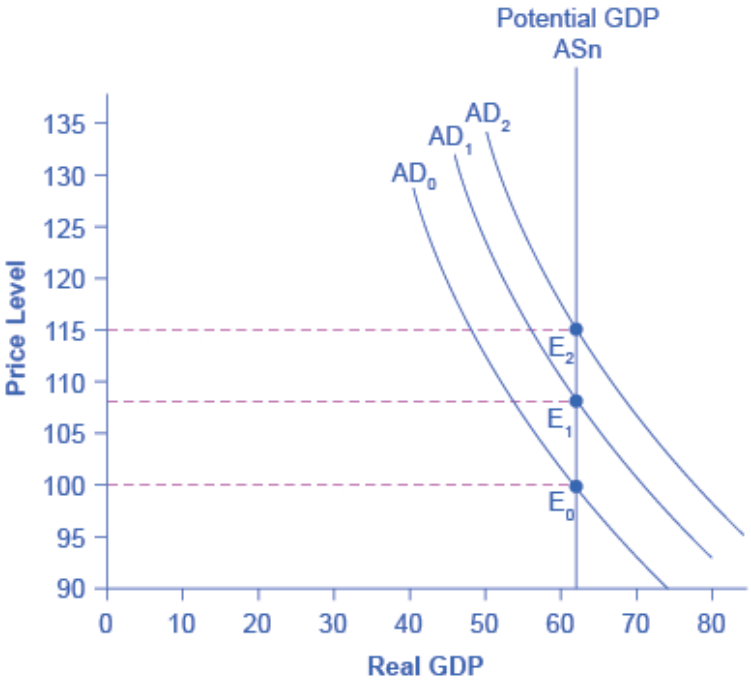

Figure 12.8. *How Aggregate Demand Determines the Price Level in the Long Run As aggregate demand shifts to the right, from AD0 to AD1 to AD2, real GDP in this economy and the level of unemployment do not change. However, there is inflationary pressure for a higher price level as the equilibrium changes from E0 to E1 to E2.*

LINK IT UP

Visit this website to read about how inflation and unemployment are related.

Fighting Recession or Encouraging Long-Term Growth?

Neoclassical economists believe that the economy will rebound out of a recession or eventually contract during an expansion because prices and wage rates are flexible and will adjust either upward or downward to restore the economy to its potential GDP. Thus, the key policy question for neoclassicals is how to promote growth of potential GDP. We know that economic growth ultimately depends on the growth rate of long-term productivity. Productivity measures how effective inputs are at producing outputs. We know that U.S. productivity has grown on average about 2% per year. That means that the same amount of inputs produce 2% more output than the year before. We also know that productivity growth varies a great deal in the short term due to cyclical factors. It also varies somewhat in the long term. From 1953–1972, U.S. labor productivity (as measured by output per hour in the business sector) grew at 3.2% per year. From 1973–1992, productivity growth declined significantly to 1.8% per year. Then, from 1993–2012, productivity growth increased to 2.2% per year. The neoclassical economists believe the underpinnings of long-run productivity growth to be an economy's investments in human capital, physical capital, and technology, operating together in a market-oriented environment that rewards innovation. Promotion of these factors is what government policy should focus on.

Summary of Neoclassical Macroeconomic Policy Recommendations

Let's summarize what neoclassical economists recommend for macroeconomic policy. Neoclassical economists do not believe in "fine-tuning" the economy. They believe that economic growth is fostered by a stable economic environment with a low rate of inflation. Similarly, tax rates should be low and unchanging. In this environment, private economic agents can make the best possible investment decisions, which will lead to optimal investment in physical and human capital as well as research and development to promote improvements in technology.

Summary of Neoclassical Economics versus Keynesian Economics

Table 12.2 summarizes the key differences between the two schools of thought.

Table 12.2. Neoclassical versus Keynesian Economics

Summary	Neoclassical Economics	Keynesian Economics
Focus: long-term or short term	Long-term	Short-term
Prices and wages: sticky or flexible?	Flexible	Sticky
Economic output: Primarily determined by aggregate demand or aggregate supply?	Aggregate supply	Aggregate demand
Aggregate supply: vertical or upward-sloping?	Vertical	Upward-sloping
Phillips curve vertical or downward-sloping	Vertical	Downward sloping
Is aggregate demand a useful tool for controlling inflation?	Yes	Yes
What should be the primary area of policy emphasis for reducing unemployment?	Reform labor market institutions to reduce natural rate of unemployment	Increase aggregate demand to eliminate cyclical unemployment
Is aggregate demand a useful tool for ending recession?	At best, only in the short-run temporary sense, but may just increase inflation instead	Yes

Self Check: Policy Implications: Inflation, Recession, and Unemployment

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269. Outcome: Real World Macro Policy Options

What you'll learn to do: Identify appropriate macro policy options in response to the state of the economy

In this section, we will analyze how changes in the market impact the equilibrium price.

The specific things you'll learn in this section include:

- Understand the effectiveness and limitations of fiscal and/or monetary policy for a given state of the economy
- Choose an appropriate fiscal and monetary policy for a given state of the economy

LEARNING ACTIVITIES

The learning activities for this section include:

- Reading: Introduction to Real World Macro Policy Options
- Self Check: Real World Macro Policy Options
- Reading: Lessons from the 1970s
- Self Check: Lesson from the 1970s
- Reading: Crowding Out Revisited
- Self Check: Crowding Out Revisited
- Reading: Practical Problems with Discretionary Fiscal Policy
- Self Check: Practical Problems with Discretionary Fiscal Policy

Take time to review and reflect on each of these activities in order to improve your performance on the assessment for this section.

270. Reading: Introduction to Real World Macro Policy Options

Introduction to Real World Macro Policy Options

Neither fiscal nor monetary policies are as mechanical and surgical effectively as we learned about in earlier modules. Fiscal policy is subject to crowding out, but crowding out only reduces the effectiveness of fiscal policy it doesn't eliminate it. Monetary policy may be better at slowing an economy down than stimulating it. Expectations clearly matter to economic decision making and economic policy, but do real world actors have Ricardian Equivalence and Rational Expectations? Most economists would say no. Where does that leave us? Read on to learn more about the real-world applications of these policies.

Self Check: Real World Macro Policy Options

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271. Reading: Lessons from the 1970s

Lessons from the 1970s

The 1970s put Keynesian economics and its prescription for activist policies on the defensive. The period lent considerable support to the monetarist argument that changes in the money supply were the primary determinant of changes in the nominal level of GDP. A series of dramatic shifts in aggregate supply gave credence to the new classical emphasis on long-run aggregate supply as the primary determinant of real GDP. Events did not create the new ideas, but they produced an environment in which those ideas could win greater support.

For economists, the period offered some important lessons. These lessons, as we will see in the next section, forced a rethinking of some of the ideas that had dominated Keynesian thought. The experience of the 1970s suggested the following:

1. The short-run aggregate supply curve could not be viewed as something that provided a passive path over which aggregate demand could roam. The short-run aggregate supply curve could shift in ways that clearly affected real GDP, unemployment, and the price level.
2. Money mattered more than Keynesians had previously suspected. Keynes had expressed doubts about the effectiveness of monetary policy, particularly in the face of a recessionary gap. Work by monetarists suggested a close correspondence between changes in M2 and subsequent changes in nominal GDP, convincing many Keynesian economists that money was more important than they had

thought.

3. Stabilization was a more difficult task than many economists had anticipated. Shifts in aggregate supply could frustrate the efforts of policy makers to achieve certain macroeconomic goals.

Self Check: Lessons from the 1970s

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272. Reading: Crowding Out Revisited

Public Investment in Physical Capital

One of the flaws of early Keynesian thinking was its omission of the crowding out effect, which reduces the size of the government spending multiplier and thus the effectiveness of fiscal policy. This criticism can be overstated, though, since the degree of crowding out depends on the state of the economy, among other factors. When the economy is in a deep recession, for example, like the one that began in 2007, savings are sitting idle instead of being used by private borrowers, so government borrowing may result in little or no crowding out.

Government can invest in physical capital directly: roads and bridges; water supply and sewers; seaports and airports; schools and hospitals; plants that generate electricity, like hydroelectric dams or windmills; telecommunications facilities; and weapons used by the military. In 2011, the U.S. federal government budget for Fiscal Year 2012 shows that the United States spent $59.9 billion on transportation, including highways, mass transit, and airports. Table 17.1 shows the total outlay for 2011 for major public physical capital investment by the federal government in the United States. Physical capital related to the military or to residences where people live is omitted from this table, because the focus here is on public investments that have a direct effect on raising output in the private sector.

Grants for Major Physical Capital Investment, 2011

Type of Public Physical Capital	Federal Outlays 2011 ($ billions)
Transportation	$59,920
Community and regional development	$10,544
Natural resources and the environment	$6,741
Education, training, employment, and social services	$71
Other	$8,427
Total	**$85,703**

Public physical capital investment of this sort can increase the output and productivity of the economy. An economy with reliable roads and electricity will be able to produce more. But it is hard to quantify how much government investment in physical capital will benefit the economy, because government responds to political as well as economic incentives. When a firm makes an investment in physical capital, it is subject to the discipline of the market: If it does not receive a positive return on investment, the firm may lose money or even go out of business.

In some cases, lawmakers make investments in physical capital as a way of spending money in the districts of key politicians. The result may be unnecessary roads or office buildings. Even if a project is useful and necessary, it might be done in a way that is excessively costly, because local contractors who make campaign contributions to politicians appreciate the extra business. On the other hand, governments sometimes do not make the investments they should because a decision to spend on infrastructure does not need to just make economic sense; it must be politically popular as well. Managing public investment so that it is done in a cost-effective way can be difficult.

If a government decides to finance an investment in public physical capital with higher taxes or lower government spending in other areas, it need not worry that it is directly crowding out private investment. Indirectly however, higher household taxes could cut

down on the level of private savings available and have a similar effect. If a government decides to finance an investment in public physical capital by borrowing, it may end up increasing the quantity of public physical capital at the cost of crowding out investment in private physical capital, which is more beneficial to the economy would be dependent on the project being considered.

Public Investment in Human Capital

The crowding out argument also assumes that government spending is on consumption-type goods, but what about government spending on investment-type goods? If crowding out of private investment occurs, it is replaced by public investment that can enhance GDP much like private investment does.

In most countries, the government plays a large role in society's investment in human capital through the education system. A highly educated and skilled workforce contributes to a higher rate of economic growth. For the low-income nations of the world, additional investment in human capital seems likely to increase productivity and growth. For the United States, tough questions have been raised about how much increases in government spending on education will improve the actual level of education.

Among economists, discussions of education reform often begin with some uncomfortable facts. As shown in Figure 17.6, spending per student for kindergarten through grade 12 (K–12) increased substantially in real dollars through 2010. The U.S. Census Bureau reports that current spending per pupil for elementary and secondary education rose from $5,001 in 1998 to $10,615 in 2010. However, as measured by standardized tests like the SAT, the level of student academic achievement has barely budged in recent decades. Indeed, on international tests, U.S. students lag behind students from many other countries. (Of course, test scores are an imperfect measure of education for a variety of reasons. It would be

difficult, however, to argue that there are not real problems in the U.S. education system and that the tests are just inaccurate.)

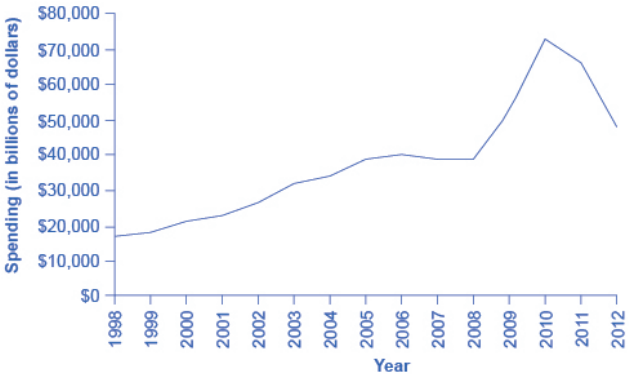

Figure 17.6. *Total Spending for Elementary, Secondary, and Vocational Education (1998–2012) in the United States. The graph shows that government spending on education was continually increasing up until 2006 where it leveled off until 2008 when it increased dramatically. Since 2010, spending has steadily decreased. (Source: Office of Management and Budget).*

The fact that increased financial resources have not brought greater measurable gains in student performance has led some education experts to question whether the problems may be due to structure, not just to the resources spent.

Other government programs seek to increase human capital either before or after the K–12 education system. Programs for early childhood education, like the federal *Head Start program*, are directed at families where the parents may have limited educational and financial resources. Government also offers substantial support for universities and colleges. For example, in the United States about 60% of students take at least a few college or university classes beyond the high school level. In Germany and Japan, about half of all students take classes beyond the comparable high school level. In the countries of Latin America, only about one student in four takes classes beyond the high school level, and in the nations of sub-Saharan Africa, only about one student in 20.

Not all spending on educational *human capital* needs to happen through the government: many college students in the United States pay a substantial share of the cost of their education. If low-income countries of the world are going to experience a widespread increase in their education levels for grade-school children, government spending seems likely to play a substantial role. For the U.S. economy, and for other high-income countries, the primary focus at this time is more on how to get a bigger return from existing spending on education and how to improve the performance of the average high school graduate, rather than dramatic increases in education spending.

How Fiscal Policy Can Improve Technology

Research and development (R&D) efforts are the lifeblood of new technology. According to the National Science Foundation, federal outlays for research, development, and physical plant improvements to various governmental agencies have remained at an average of 8.8% of GDP. About one-fifth of U.S. R&D spending goes to defense and space-oriented research. Although defense-oriented R&D spending may sometimes produce consumer-oriented spinoffs, R&D that is aimed at producing new weapons is less likely to benefit the civilian economy than direct civilian R&D spending.

Fiscal policy can encourage R&D using either direct spending or tax policy. Government could spend more on the R&D that is carried out in government laboratories, as well as expanding federal R&D grants to universities and colleges, nonprofit organizations, and the private sector. By 2010, the federal share of R&D outlays totaled $137.5 billion, or about 4% of the federal government's overall budget, according to data from the National Science Foundation. Fiscal policy can also support R&D through tax incentives, which allow firms to reduce their tax bill as they increase spending on research and development.

Summary of Fiscal Policy, Investment, and Economic Growth

Investment in physical capital, human capital, and new technology is essential for long-term economic growth, as summarized in Table 17.2. In a market-oriented economy, private firms will undertake most of the investment in physical capital, and fiscal policy should seek to avoid a long series of outsized budget deficits that might crowd out such investment. The effects of many growth-oriented policies will be seen very gradually over time, as students are better educated, physical capital investments are made, and new technologies are invented and implemented.

Table 17.2 Investment Role of Public and Private Sector in a Market Economy

	Physical Capital	**Human Capital**	**New Technology**
Private Sector	New investment in property and equipment	On-the-job training	Research and development
Public Sector	Public infrastructure	Public education Job training	Research and development encouraged through private sector incentives and direct spending.

Self Check: Crowding Out Revisited

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the Reading in this section.

Use this quiz to check your understanding and decide whether

to (1) study the previous section further or (2) move on to the next section.

An interactive or media element has been excluded from this version of the text. You can view it online here: https://pressbooks.ccconline.org/accmacro/?p=634

273. Video: Modern Monetary Theory

A TED element has been excluded from this version of the text. You can view it online here: https://pressbooks.ccconline.org/accmacro/?p=848

Stephanie Kelton explain a new macroeconomic model: Modern Monetary Theory. It is a mathematical model, like the Keynesian model, that focuses on inflation and interest rates instead of supply or demand.

At the end of the video you should be able to explain:

- the impact of government deficits
- what is important with inflation
- how the assets of the public sector are valued

274. Reading: Modern Monetary Theory

What Is Modern Monetary Theory?

Modern monetary theory (MMT) is a heterodox macroeconomic supposition that asserts that monetarily sovereign countries (such as the U.S., U.K., Japan, and Canada) which spend, tax, and borrow in a fiat currency that they fully control, are not operationally constrained by revenues when it comes to federal government spending.

Put simply, modern monetary theory decrees that such governments do not rely on taxes or borrowing for spending since they can print as much money as they need and are the monopoly issuers of the currency. Since their budgets aren't like a regular household's, their policies should not be shaped by fears of a rising national debt..

Several other differences also exist between mainstream monetary theory and modern monetary theory, the most important being the sequence of events that emerges from loans and deposits, and from government spending and taxes.

Can we buy everything we want, or will we cause an inflationary nightmare? This is what Modern Monetary Theory explores.

The key part of this argument is that money in the 21st century is digital and not currency.The key part of this argument is that money in the 21st century is digital and not currency. The central idea of modern monetary theory is that governments with a fiat currency system under their control can and should print (or create with a few keystrokes in today's digital age) as much money as they need to spend because they cannot go broke or be insolvent unless a political decision to do so is taken. Can the government afford

this? Can we afford to build 1,000 new bridges – could we fill all the potholes in Littleton, Colorado? Or will this cause inflation? Does not apply to all countries that has its own currency? (so no euro-currency countries), or those in debt in another currency.

Some say such spending would be fiscally irresponsible, as the debt would balloon and inflation would skyrocket. But according to MMT:

1. Large government debt isn't the precursor to collapse that we have been led to believe it is;
2. Countries like the U.S. can sustain much greater deficits without cause for concern; and
3. A small deficit or surplus can be extremely harmful and cause a recession since deficit spending is what builds people's savings.

MMT theorists explain that debt is simply money that the government put into the economy and didn't tax back. They also argue that comparing a government's budgets to that of an average household is a mistake.

While supporters of modern monetary theory acknowledge that inflation is theoretically a possible outcome from such spending, they say it is highly unlikely and can be fought with policy decisions in the future if required. They often cite the example of Japan, which has much higher public debt than the U.S.

Government Money Creation

According to modern monetary theory, the only limit that the government has when it comes to spending is the availability of real resources, like workers, construction supplies, etc. When government spending is too great with respect to the resources available, inflation can surge if decision-makers are not careful.

Taxes create an ongoing demand for currency and are a tool to

take money out of an economy that is getting overheated, says MMT. This goes against the conventional idea that taxes are primarily meant to provide the government with money to spend to build infrastructure, fund social welfare programs, etc.

"[W]hat happens if you were to go to your local IRS office to pay your taxes with actual cash?" wrote MMT pioneer and American economist Warren Mosler in his book "The 7 Deadly Innocent Frauds of Economic Policy." "First, you would hand over your pile of currency to the person on duty as payment. Next, they'd count it, give you a receipt and, hopefully, a thank you for helping to pay for social security, interest on the national debt, and the Iraq war. Then, after you, the taxpayer, left the room, they'd take that hard-earned cash you just forked over and throw it in a shredder."

Modern monetary theory says that a government doesn't need to sell bonds to borrow money, since that is the money it can create on its own. The government sells bonds to drain excess reserves and hit its overnight interest rate target. Thus the existence of bonds, which Mosler calls "savings accounts at the Fed," is not a requirement for the government but a policy choice.

Unemployment is the result of governments spending too little while collecting taxes, according to MMT. It says those looking for work and unable to find a job in the private sector should be given minimum-wage transition jobs funded by the government and managed by the local community. This labor would act as a buffer stock to help the government control inflation in the economy.

There are many critics of this theory from many main-stream economists because the question becomes – will the government make the right decisions to investment in? Will they spend too much into the economy that can't be supported by their assets, so uncontrolled inflation.

275. Middle Out Policy

Middle-Out Economic Policy

Like the Supply-Side economic model is also called Reaganomics, a different 21st Century Model is what is being called "Bidenomics". The best explanation is the speech from National Security Advisor, Jake Sullivan (copied from whitehouse.gov April 27, 2023). This policy focuses not only on domestic policy but also international policy and the integration of international policy with US security.

I want to start by thanking all of you for indulging a National Security Advisor to discuss economics. As most of you know, Secretary Yellen gave an important speech just down the street last week on our economic policy with respect to China. Today I'd like to zoom out to our broader international economic policy, particularly as it relates to President Biden's core commitment—indeed, to his daily direction to us—to more deeply integrate domestic policy and foreign policy. After the Second World War, the United States led a fragmented world to build a new international economic order. It lifted hundreds of millions of people out of poverty. It sustained thrilling technological revolutions. And it helped the United States and many other nations around the world achieve new levels of prosperity. But the last few decades revealed cracks in those foundations. A shifting global economy left many working Americans and their communities behind.

A financial crisis shook the middle class. A pandemic exposed the fragility of our supply chains. A changing climate threatened lives and livelihoods. Russia's invasion of Ukraine underscored the risks of overdependence. So this moment demands that we forge a new consensus. That's why the United States, under President Biden, is pursuing a modern industrial and innovation strategy—both at home and with partners around the world. One that invests in

the sources of our own economic and technological strength, that promotes diversified and resilient global supply chains, that sets high standards for everything from labor and the environment to trusted technology and good governance, and that deploys capital to deliver on public goods like climate and health. Now, the idea that a "new Washington consensus," as some people have referred to it, is somehow America alone, or America and the West to the exclusion of others, is just flat wrong. This strategy will build a fairer, more durable global economic order, for the benefit of ourselves and for people everywhere. So today, what I want to do is lay out what we are endeavoring to do. And I'll start by defining the challenges as we see them—the challenges that we face. To take them on, we've had to revisit some old assumptions. Then I'll walk through, step by step, how our approach is tailored to meeting those challenges. When President Biden came into office more than two years ago, the country faced, from our perspective, four fundamental challenges.

First, America's industrial base had been hollowed out. The vision of public investment that had energized the American project in the postwar years—and indeed for much of our history—had faded. It had given way to a set of ideas that championed tax cutting and deregulation, privatization over public action, and trade liberalization as an end in itself. There was one assumption at the heart of all of this policy: that markets always allocate capital productively and efficiently—no matter what our competitors did, no matter how big our shared challenges grew, and no matter how many guardrails we took down. Now, no one—certainly not me—is discounting the power of markets. But in the name of oversimplified market efficiency, entire supply chains of strategic goods—along with the industries and jobs that made them—moved overseas. And the postulate that deep trade liberalization would help America export goods, not jobs and capacity, was a promise made but not kept. Another embedded assumption was that the type of growth did not matter. All growth was good growth. So, various reforms combined and came together to privilege some sectors of the

economy, like finance, while other essential sectors, like semiconductors and infrastructure, atrophied. Our industrial capacity—which is crucial to any country's ability to continue to innovate—took a real hit. The shocks of a global financial crisis and a global pandemic laid bare the limits of these prevailing assumptions.

The second challenge we faced was adapting to a new environment defined by geopolitical and security competition, with important economic impacts. Much of the international economic policy of the last few decades had relied upon the premise that economic integration would make nations more responsible and open, and that the global order would be more peaceful and cooperative—that bringing countries into the rules-based order would incentivize them to adhere to its rules. It didn't turn out that way. In some cases it did, and in lot of cases it did not. By the time President Biden came into office, we had to contend with the reality that a large non-market economy had been integrated into the international economic order in a way that posed considerable challenges. The People's Republic of China continued to subsidize at a massive scale both traditional industrial sectors, like steel, as well as key industries of the future, like clean energy, digital infrastructure, and advanced biotechnologies. America didn't just lose manufacturing—we eroded our competitiveness in critical technologies that would define the future. Economic integration didn't stop China from expanding its military ambitions in the region, or stop Russia from invading its democratic neighbors. Neither country had become more responsible or cooperative.

And ignoring economic dependencies that had built up over the decades of liberalization had become really perilous—from energy uncertainty in Europe to supply-chain vulnerabilities in medical equipment, semiconductors, and critical minerals. These were the kinds of dependencies that could be exploited for economic or geopolitical leverage. The third challenge we faced was an accelerating climate crisis and the urgent need for a just and efficient energy transition. When President Biden came into office,

we were falling dramatically short of our climate ambitions, without a clear pathway to abundant supplies of stable and affordable clean energy, despite the best efforts of the Obama-Biden Administration to make significant headway. Too many people believed that we had to choose between economic growth and meeting our climate goals. President Biden has seen things totally differently. As he's often said, when he hears "climate," he thinks "jobs." He believes that building a twenty-first-century clean-energy economy is one of the most significant growth opportunities of the twenty-first century—but that to harness that opportunity, America needs a deliberate, hands-on investment strategy to pull forward innovation, drive down costs, and create good jobs. Finally, we faced the challenge of inequality and its damage to democracy. Here, the prevailing assumption was that trade-enabled growth would be inclusive growth—that the gains of trade would end up getting broadly shared within nations. But the fact is that those gains failed to reach a lot of working people.

The American middle class lost ground while the wealthy did better than ever. And American manufacturing communities were hollowed out while cutting-edge industries moved to metropolitan areas. Now, the drivers of economic inequality—as many of you know even better than I—are complex, and they include structural challenges like the digital revolution. But key among these drivers are decades of trickle-down economic policies—policies like regressive tax cuts, deep cuts to public investment, unchecked corporate concentration, and active measures to undermine the labor movement that initially built the American middle class. Efforts to take a different approach during the Obama Administration—including efforts to pass policies to address climate change, invest in infrastructure, expand the social safety net, and protect workers' rights to organize—were stymied by Republican opposition. And frankly, our domestic economic policies also failed to fully account for the consequences of our international economic policies. For example, the so-called "China shock" that hit pockets of our domestic manufacturing industry especially hard—with large

and long-lasting impacts—wasn't adequately anticipated and wasn't adequately addressed as it unfolded. And collectively, these forces had frayed the socioeconomic foundations on which any strong and resilient democracy rests.

Now, these four challenges were not unique to the United States. Established and emerging economies were confronting them, too—in some cases more acutely than we are. When President Biden came to office, he knew the solution to each of these challenges was to restore an economic mentality that champions building. And that is the core of our economic approach. To build. To build capacity, to build resilience, to build inclusiveness, at home and with partners abroad. The capacity to produce and innovate, and to deliver public goods like strong physical and digital infrastructure and clean energy at scale. The resilience to withstand natural disasters and geopolitical shocks. And the inclusiveness to ensure a strong, vibrant American middle class and greater opportunity for working people around the world. All of that is part of what we have called a foreign policy for the middle class. The first step is laying a new foundation at home—with a modern American industrial strategy. My friend and former colleague Brian Deese has spoken about this new industrial strategy at some length, and I commend his remarks to you, because they are better than any remarks I could give on the subject.

But in summary: A modern American industrial strategy identifies specific sectors that are foundational to economic growth, strategic from a national security perspective, and where private industry on its own isn't poised to make the investments needed to secure our national ambitions. It deploys targeted public investments in these areas that unlock the power and ingenuity of private markets, capitalism, and competition to lay a foundation for long-term growth. It helps enable American business to do what American business does best—innovate, scale, and compete. This is about crowding in private investment—not replacing it. It's about making long-term investments in sectors vital to our national wellbeing—not picking winners and losers. And it has a long

tradition in this country. In fact, even as the term "industrial policy" went out of fashion, in some form it remained quietly at work for America—from DARPA and the Internet to NASA and commercial satellites. Now, looking over the course of the last couple of years, the initial results of this strategy are remarkable.

The Financial Times has reported that large-scale investments in semiconductor and clean-energy production have already surged 20-fold since 2019, and a third of the investments announced since August involve a foreign investor investing here in the United States. We've estimated that the total public capital and private investment from President Biden's agenda will amount to some $3.5 trillion over the next decade. Consider semiconductors, which are as essential to our consumer goods today as they are to the technologies that will shape our future, from artificial intelligence to quantum computing to synthetic biology. America now manufactures only around 10 percent of the world's semiconductors, and production—in general and especially when it comes to the most advanced chips—is geographically concentrated elsewhere. This creates a critical economic risk and a national security vulnerability.

So thanks to the bipartisan CHIPS and Science Act, we've already seen an orders-of-magnitude increase in investment into America's semiconductor industry. And it's still early days. Or consider critical minerals—the backbone of the clean-energy future. Today, the United States produces only 4 percent of the lithium, 13 percent of the cobalt, 0 percent of the nickel, and 0 percent of the graphite required to meet current demand for electric vehicles. Meanwhile, more than 80 percent of critical minerals are processed by one country, China. Clean-energy supply chains are at risk of being weaponized in the same way as oil in the 1970s, or natural gas in Europe in 2022. So through the investments in the Inflation Reduction Act and Bipartisan Infrastructure Law, we're taking action. At the same time, it isn't feasible or desirable to build everything domestically. Our objective is not autarky—it's resilience and security in our supply chains. Now, building our domestic capacity is the starting point. But the effort extends beyond our

borders. And this brings me to the second step in our strategy: working with our partners to ensure they are building capacity, resilience, and inclusiveness, too. Our message to them has been consistent: We will unapologetically pursue our industrial strategy at home—but we are unambiguously committed to not leaving our friends behind. We want them to join us. In fact, we need them to join us.

Creating a secure and sustainable economy in the face of the economic and geopolitical realities will require all of our allies and partners to do more—and there's no time to lose. For industries like semiconductors and clean energy, we're nowhere near the global saturation point of investments needed, public or private. Ultimately, our goal is a strong, resilient, and leading-edge techno-industrial base that the United States and its like-minded partners, established and emerging economies alike, can invest in and rely upon together. President Biden and European Commission President Ursula von der Leyen talked about this here in Washington last month. They released a very important statement, which, if you haven't read it, I really encourage you to read. At its heart, what the statement said was the following: bold public investments in our respective industrial capacity needs to be at the heart of the energy transition. And President von der Leyen and President Biden committed to working together to ensure that the supply chains of the future are resilient, secure, and reflective of our values—including on labor. They laid out practical steps in the statement to achieve those goals—like aligning respective clean-energy incentives on each side of the Atlantic and launching a negotiation on supply chains for critical minerals and batteries. Shortly after that, President Biden went to Canada. He and Prime Minister Justin Trudeau established a task force to accelerate cooperation between Canada and the United States toward exactly the same end: ensuring our clean-energy supply and creating middle-class jobs on both sides of the border. And just a few days after that, the United States and Japan signed an agreement deepening our cooperation on critical-mineral supply chains. So we

are leveraging the Inflation Reduction Act to build a clean-energy manufacturing ecosystem rooted in supply chains here in North America, and extending to Europe, Japan, and elsewhere.

This is how we will turn the IRA from a source of friction into a source of strength and reliability. And I suspect you'll hear more on this at the G7 Summit in Hiroshima next month. Now, our cooperation with partners is not limited to clean energy. For example, we're working with partners—in Europe, the Republic of Korea, Japan, Taiwan, and India—to coordinate our approaches to semiconductor incentives. Analyst projections on where semiconductor investments will happen over the next three years have shifted dramatically, with the United States and key partners now topping the charts. Let me also underscore that our cooperation with partners is not limited to advanced industrial democracies. Fundamentally, we have to—and we intend to—dispel the notion that America's most important partnerships are only with established economies. Not just by saying it, but by proving it. Proving it with India—on everything from hydrogen to semiconductors. Proving it with Angola—on carbon-free solar power. Proving it with Indonesia—on its Just Energy Transition Partnership. Proving it with Brazil—on climate-friendly growth. This brings me to the third step in our strategy: moving beyond traditional trade deals to innovative new international economic partnerships focused on the core challenges of our time. The main international economic project of the 1990s was reducing tariffs. On average, applied U.S. tariff rates were nearly cut in half during the 1990s. Today, in 2023, our trade-weighted average tariff rate is 2.4 percent—which is low historically, and relative to other countries. Of course, those tariffs aren't uniform, and there is

still work to be done bringing tariff levels down in many other countries. As Ambassador Tai has said, "We have not sworn off market liberalization." We do intend to pursue modern trade agreements. But to define or measure our entire policy based on tariff reduction misses something important. Asking what our trade policy is now—narrowly framed as plans to reduce tariffs further—is

simply the wrong question. The right question is: how does trade fit into our international economic policy, and what problems is it seeking to solve? The project of the 2020s and the 2030s is different from the project of the 1990s. We know the problems we need to solve today: Creating diversified and resilient supply chains. Mobilizing public and private investment for a just clean energy transition and sustainable economic growth. Creating good jobs along the way, family-supporting jobs. Ensuring trust, safety, and openness in our digital infrastructure. Stopping a race-to-the-bottom in corporate taxation. Enhancing protections for labor and the environment. Tackling corruption. That is a different set of fundamental priorities than simply bringing down tariffs. And we have designed the elements of an ambitious regional economic initiative, the Indo-Pacific Economic Framework, to focus on those problems—and solving those problems. We're negotiating chapters with thirteen Indo-Pacific nations that will hasten the clean-energy transition, implement tax fairness and fight corruption, set high standards for technology, and ensure more resilient supply chains for critical goods and inputs. Let me speak a bit more concretely. Had IPEF been in place when COVID wreaked havoc on our supply chains and factories sat idling, we would have been able to react more quickly– companies and governments together– pivoting to new options for sourcing and sharing data in real-time. That's what a new approach can look like on that issue—as on many others. Our new Americas Partnership for Economic Prosperity, launched with a number of our key partners here in the Americas, is aimed at the same basic set of objectives. Meanwhile, through the U.S.-EU Trade and Technology Council, and through our trilateral coordination with Japan and Korea, we are coordinating on our industrial strategies to complement one another, and avert a race-to-the-bottom by all competing for the same targets. Some have looked at these initiatives and said, "but they aren't traditional FTAs." That's exactly the point. For the problems we are trying to solve today, the traditional model doesn't cut it. The era of after-the-fact policy patches and vague promises of redistribution is over. We need a

new approach. Simply put: In today's world, trade policy needs to be about more than tariff reduction, and trade policy needs to be fully integrated into our economic strategy, at home and abroad.

At the same time, the Biden Administration is developing a new global labor strategy that advances workers' rights through diplomacy, and we will be unveiling this strategy in the weeks ahead.

It builds on tools like the rapid-response labor mechanism in USMCA that enforces workers' association and collective-bargaining rights. Just this week, in fact, we resolved our eighth case with an agreement that improved working conditions—a win-win for Mexican workers and American competitiveness. We're in the process now of continuing to lead a historic agreement with 136 countries to finally end the race-to-the-bottom on corporate taxes that hurt middle-class and working people. Now Congress needs to follow through with the implementing legislation, and we are working them to do exactly that. And we're taking another kind of new approach that we think a critical blueprint for the future—linking trade and climate in a way that has never been done before. The Global Arrangement on Steel and Aluminum that we're negotiating with the European Union could be the first major trade deal to tackle both emissions intensity and over-capacity. And if we can apply it to steel and aluminum, we can look at how it applies to other sectors as well. We can help create a virtuous cycle and ensure our competitors aren't gaining an advantage by degrading the planet. Now, for those who have posed the question, the Biden Administration is still committed to the WTO and the shared values upon which it is based: fair competition, openness, transparency, and the rule of law. But serious challenges, most notably nonmarket economic practices and policies, threaten those core values. So that's why we're working with so many other WTO members to reform the multilateral trading system so that it benefits workers, accommodates legitimate national security interests, and confronts pressing issues that aren't fully embedded in the current WTO framework, like sustainable development and the clean-energy transition. In sum, in a world being transformed by that clean

energy transition, by dynamic emerging economies, by a quest for supply chain resilience—by digitization, by artificial intelligence, and by a revolution in biotechnology—the game is not the same. Our international economic policy has to adapt to the world as it is, so we can build the world that we want.

This brings me to the fourth step in our strategy: mobilizing trillions in investment into emerging economies—with solutions that those countries are fashioning on their own, but with capital enabled by a different brand of U.S. diplomacy. We've launched a major effort to evolve the multilateral development banks so they are up to the challenges of today. 2023 is a big year for this. As Secretary Yellen has outlined, we need to update the banks' operating models—especially the World Bank but the regional development banks as well. We need to stretch their balance sheets to address climate change, pandemics, and fragility and conflict. And we have to expand access to concessional, high-quality finance for low income and for middle-income countries as they deal with challenges that span beyond any single nation's borders. We saw an early down payment on this agenda last month, but we will need to do much more. And we're very excited for Ajay Banga's new leadership at the World Bank to make this vision a reality. At the same time as we are evolving the multilateral development banks, we've also launched a major effort to close the infrastructure gap in low- and middle-income countries. We call it the Partnership for Global Infrastructure and Investment—PGII. PGII will mobilize hundreds of billions of dollars in energy, physical, and digital infrastructure financing between now and the end of the decade. And unlike the financing that comes in the Belt and Road Initiative, projects under PGII are transparent and high-standard and in service of long-term, inclusive, and sustainable growth. And in just under a year since this initiative launched, we have already delivered significant investments in everything from the mines needed to power electric vehicles to global subsea telecom cables. At the same time, we're also committed to addressing the debt distress faced by an increasingly large number of vulnerable countries. We

need to see genuine relief, not just "extending and pretending." And we need to see all bilateral official and private creditors share the burden. That includes China, which has worked to build its influence through massive lending to the emerging world, almost always with strings attached. We share the view of many others that China now needs to step up as a constructive force in assisting debt-stressed countries. Finally, we are protecting our foundational technologies with a small yard and high fence. As I've argued before, our charge is to usher in a new wave of the digital revolution—one that ensures that next-generation technologies work for, not against, our democracies and our security. We've implemented carefully tailored restrictions on the most advanced semiconductor technology exports to China. Those restrictions are premised on straightforward national security concerns.

Key allies and partners have followed suit, consistent with their own security concerns. We're also enhancing the screening of foreign investments in critical areas relevant to national security. And we're making progress in addressing outbound investments in sensitive technologies with a core national security nexus. These are tailored measures. They are not, as Beijing says, a "technology blockade." They are not targeting emerging economies. They are focused on a narrow slice of technology and a small number of countries intent on challenging us militarily. A word on China more broadly. As President von der Leyen put it recently, we are for de-risking and diversifying, not decoupling. We'll keep investing in our own capacities, and in secure, resilient supply chains. We'll keep pushing for a level playing field for our workers and companies and defending against abuses. Our export controls will remain narrowly focused on technology that could tilt the military balance. We are simply ensuring that U.S. and allied technology is not used against us. We are not cutting off trade. In fact, the United States continues to have a very substantial trade and investment relationship with China. Bilateral trade between the United States and China set a new record last year. Now, when you zoom out from economics, we are competing with China on multiple dimensions, but we are

not looking for confrontation or conflict. We're looking to manage competition responsibly and seeking to work together with China where we can. President Biden has made clear that the United States and China can and should work together on global challenges like climate, like macroeconomic stability, health security, and food security. Managing competition responsibly ultimately takes two willing parties. It requires a degree of strategic maturity to accept that we must maintain open lines of communication even as we take actions to compete. As Secretary Yellen said last week in her speech on this topic, we can defend our national security interests, have a healthy economic competition, and work together where possible, but China has to be willing to play its part. So, what does success look like? The world needs an international economic system that works for our wage-earners, works for our industries, works for our climate, works for our national security, and works for the world's poorest and most vulnerable countries. That means replacing a singular approach focused the oversimplified assumptions that I set out at the top of my speech with one that encourages targeted and necessary investments in places that private markets are ill-suited to address on their own—even as we continue to harness the power of markets and integration. It means providing space for partners around the world to restore the compacts between governments and their voters and workers. It means grounding this new approach in deep cooperation and transparency to ensure that our investments and those of partners are mutually reinforcing and beneficial. And it means returning to the core belief we first championed 80 years ago: that America should be at the heart of a vibrant, international financial system that enables partners around the world to reduce poverty and enhance shared prosperity. And that a functioning social safety net for the world's most vulnerable countries is essential to our own core interests. It also means building new norms that allow us to address the challenges posed by the intersection of advanced technology and national security, without obstructing broader trade and innovation.

This strategy will take resolve—it will take a dedicated

commitment to overcoming the barriers that have kept this country and our partners from building rapidly, efficiently, and fairly as we were able to do in the past. But it is the surest path to restoring the middle class, to producing a just and effective clean-energy transition, to securing critical supply chains, and, through all of this, to repairing faith in democracy itself. As always, we need the full and bipartisan partnership of Congress if we are going to succeed. We need support from Congress to revive America's unique capacity to attract and retain the brightest talent from around the world. We need the Hill's full partnership in our reform initiatives in development finance. And we need to double down on our investments in infrastructure, innovation, and clean energy. Our national security and our economic vitality depend on it. Let me close with this. President Kennedy was fond of saying that "a rising tide lifts all boats." Over the years, advocates of trickle-down economics appropriated this phrase for their own uses. But President Kennedy wasn't saying what's good for the wealthy is good for the working class. He was saying we're all in this together. And look at what he said next: "If one section of the country is standing still, then sooner or later a dropping tide drops all the boats." That's true for our country. That's true for our world. End economically, over time, we're going to rise—or fall—together. And that goes for the strength of our democracies as well as for the strength of our economies. As we pursue this strategy at home and abroad, there will be reasonable debate. And this is going to take time. The international order that emerged after the end of the Second World War and then the Cold War were not built overnight. Neither will this one. But together, we can work to lift up all of America's people, communities, and industries, and we can do the same with our friends and partners everywhere around the globe as well. This is a vision the Biden Administration must and will fight to achieve. This is what is guiding us as we make our policy decisions at the intersection of economics, national security, and democracy. And this is the work that we will do not just as a government, but with every element of the United States, and with the support and

help of partners both in government and out of government around the world.

276. Reading: Practical Problems with Discretionary Fiscal Policy

Temporary and Permanent Fiscal Policy

A temporary tax cut or spending increase will explicitly last only for a year or two, and then revert back to its original level. A permanent tax cut or spending increase is expected to stay in place for the foreseeable future. The effect of temporary and permanent fiscal policies on aggregate demand can be very different. Consider how you would react if the government announced a tax cut that would last one year and then be repealed, in comparison with how you would react if the government announced a permanent tax cut. Most people and firms will react more strongly to a permanent policy change than a temporary one.

This fact creates an unavoidable difficulty for countercyclical fiscal policy. The appropriate policy may be to have an expansionary fiscal policy with large budget deficits during a recession, and then a contractionary fiscal policy with budget surpluses when the economy is growing well. But if both policies are explicitly temporary ones, they will have a less powerful effect than a permanent policy.

Structural Economic Change Takes Time

When an economy recovers from a recession, it does not usually revert back to its exact earlier shape. Instead, the internal structure

of the economy evolves and changes and this process can take time. For example, much of the economic growth of the mid-2000s was in the sectors of construction (especially of housing) and finance. However, when housing prices started falling in 2007 and the resulting financial crunch led into recession (as discussed in Section 14.), both sectors contracted. The manufacturing sector of the U.S. economy has been losing jobs in recent years as well, under pressure from technological change and foreign competition. Many of the people thrown out of work from these sectors in the Great Recession of 2008–2009 will never return to the same jobs in the same sectors of the economy; instead, the economy will need to grow in new and different directions, as the following feature demonstrates. Fiscal policy can increase overall demand, but the process of structural economic change—the expansion of a new set of industries and the movement of workers to those industries—inevitably takes time.

WHY DO JOBS VANISH?

People can lose jobs for a variety of reasons: because of a recession, but also because of longer-run changes in the economy, such as new technology. Productivity improvements in auto manufacturing, for example, can reduce the number of workers needed, and eliminate these jobs in the long run. The Internet has created jobs but also caused the loss of jobs as well, from travel agents to book store clerks. Many of these jobs may never come back. Short-run fiscal policy to reduce unemployment can create jobs, but it cannot replace jobs that will never return.

The Limitations of Fiscal Policy

Fiscal policy can help an economy that is producing below its potential GDP to expand aggregate demand so that it produces closer to potential GDP, thus lowering unemployment. But fiscal policy cannot help an economy produce at an output level above potential GDP without causing inflation At this point, unemployment becomes so low that workers become scarce and wages rise rapidly.

LINK IT UP

Visit this website to read about how the recovery is being affected by fiscal policies.

Political Realties and Discretionary Fiscal Policy

A final problem for discretionary fiscal policy arises out of the difficulties of explaining to politicians how countercyclical fiscal policy that runs against the tide of the business cycle should work. Politicians often have a gut-level belief that when the economy and tax revenues slow down, it is time to hunker down, pinch pennies, and trim expenses. Countercyclical policy, however, says that when the economy has slowed down, it is time for the government to go on a spree, raising spending, and cutting taxes. This offsets the drop in the economy in the other sectors. Conversely, when economic times are good and tax revenues are rolling in, politicians often feel that it is time for tax cuts and new spending. But countercyclical policy says that this economic boom should be an appropriate time for keeping taxes high and restraining spending.

Politicians tend to prefer expansionary fiscal policy over

contractionary policy. There is rarely a shortage of proposals for tax cuts and spending increases, especially during recessions. However, politicians are less willing to hear the message that in good economic times, they should propose tax increases and spending limits. In the economic upswing of the late 1990s and early 2000s, for example, the U.S. GDP grew rapidly. Estimates from respected government economic forecasters like the nonpartisan Congressional Budget Office and the Office of Management and Budget stated that the GDP was above potential GDP, and that unemployment rates were unsustainably low. However, no mainstream politician took the lead in saying that the booming economic times might be an appropriate time for spending cuts or tax increases.

Discretionary Fiscal Policy: Summing Up

Expansionary fiscal policy can help to end recessions and contractionary fiscal policy can help to reduce inflation. Given the uncertainties over interest rate effects, time lags, temporary and permanent policies, and unpredictable political behavior, many economists and knowledgeable policymakers had concluded by the mid-1990s that discretionary fiscal policy was a blunt instrument, more like a club than a scalpel. It might still make sense to use it in extreme economic situations, like an especially deep or long recession. For less extreme situations, it was often preferable to let fiscal policy work through the automatic stabilizers and focus on monetary policy to steer short-term countercyclical efforts.

Self Check: Practical Problems with Discretionary Fiscal Policy

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the Reading in this section.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

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277. Putting It Together: Policy Application

Summary

The goal of this module was to give you an understanding of the strengths and weakness of fiscal and monetary policy to determine an appropriate stabilization policy for a given macroeconomic situation.

You learned how to:

- Explain the Keynesian approach to a given macro problem, and how they would respond to criticisms of their approach.
- Explain the Neoclassical approach to the same problem, and how they would respond to criticisms of their approach.
- Incorporate both policy approaches to synthesize a reasonable response to a specific real world problem.

Examples

Watch these two videos to see contrasting opinions about what factors led to the financial crisis in 2007 and 2008. Consider both the Keynesian and Neoclassical perspectives that you learned about in this module and analyze what changes might have been made to avoid the financial crash in 2007.

A YouTube element has been excluded from this version of the text. You can view it online here: *https://pressbooks.ccconline.org/accmacro/?p=638*

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The real world is complicated. Both Keynesian and Neoclassical economist have insights to offer. Citizens expect government to "fix" problems in the macroeconomy, but the tools the government has to work with are somewhat blunt rather than precise instruments. Economists have a better sense of how to nudge the trajectory of the economy over the long term, than to accurately offset every short term up and down the economy experiences. This means that while government has some ability to address macro difficulties, it needs to be sure it does more good than harm.

Returning to the scenario posed in the Why it Matters feature, fiscal policy is probably not a good tool to address a small recession. Monetary policy could be loosened a bit, but sometimes the economy is better left to its own devices because government policy lacks precision. Contrast this scenario with that of the Great

Recession, when it was clear that the economic downturn was deep and would take a significant time to recover. In that case, it made sense for the government to use expansionary fiscal and monetary policy to speed up recovery. Given that more than five years down the road, the unemployment rate is still high, some economists even argue the government didn't do enough.

278. Glossary: Policy Application

aggregate demand (AD)
: the amount of total spending on domestic goods and services in an economy

aggregate supply (AS)
: the total quantity of output (i.e. real GDP) firms will produce and sell

aggregate demand (AD) curve
: the total spending on domestic goods and services at each price level

aggregate supply (AS) curve
: the total quantity of output (i.e. real GDP) that firms will produce and sell at each price level

aggregate demand/aggregate supply model
: a model that shows what determines total supply or total demand for the economy, and how total demand and total supply interact at the macroeconomic level

full-employment GDP
: another name for potential GDP, when the economy is producing at its potential and unemployment is at the natural rate of unemployment

long run aggregate supply (LRAS) curve
: vertical line at potential GDP showing no relationship between the price level for output and real GDP in the long run

potential GDP
: the maximum quantity that an economy can produce given full employment of its existing levels of labor, physical capital, technology, and institutions

short run aggregate supply (SRAS) curve
: positive short run relationship between the price level for

output and real GDP, holding the prices of inputs fixed

279. Discussion: Macropolicy

Given the state of the economy and the causes of that state—think back to our online discussions a few weeks ago—what should be the appropriate mix of fiscal and monetary policy, from a Keynesian perspective? From a neoclassical perspective? Show each policy mix graphically using the AD/AS model. Which makes the most sense to you? Why?

PART XIV

LESSON 13: ECONOMIC GROWTH

280. Outcome: Defining Economic Growth

What you'll learn to do: define economic growth

In this section, you will examine economic growth. You'll see why so much growth happened rapidly following the industrial revolution and determine what factors lead to improvements in standards of living.

The specific things you'll learn in this section include:

- Identify the sources of economic growth
- Explain productivity and relate productivity growth to improvements in the standard of living

LEARNING ACTIVITIES

The learning activities for this section include:

- Reading: Introduction to Economic Growth
- Reading: Economic Growth
- Reading: The Significance of Economic Growth
- Self Check: Defining Economic Growth
- Reading: Rule of Law and Economic Growth
- Reading: Components of Economic Growth
- Reading: Determinants of Economic Growth
- Self Check: Sources of Economic Growth
- Reading: Labor Productivity and Economic Growth
- Reading: The "New Economy" Controversy

- Self Check: Productivity

Take time to review and reflect on each of these activities in order to improve your performance on the assessment for this section.

281. Reading: Introduction to Economic Growth

CALORIES AND ECONOMIC GROWTH

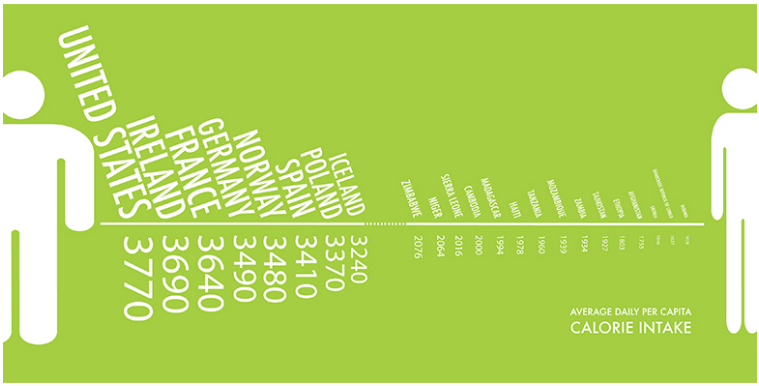


Figure 6.1. *Average Daily Calorie Consumption Not only has the number of calories consumer per day increased, so has the amount of food calories that people are able to afford based on their working wages. (Credit: modification of work by Lauren Manning/Flickr Creative Commons).*

On average, humans need about 2,500 calories a day to survive, depending on height, weight, and gender. The economist Brad DeLong estimates that the average worker in the early 1600s earned wages that could afford him 2,500 food calories. This worker lived in Western Europe. Two hundred years later, that same worker could afford 3,000 food calories. However, between 1800 and 1875, just a time span of just 75 years, economic growth was so rapid that western European workers could purchase 5,000 food calories a day. By 2012, a low skilled worker in an affluent Western European/

North American country could afford to purchase 2.4 million food calories per day.

What caused such a rapid rise in living standards between 1800 and 1875 and thereafter? Why is it that many countries, especially those in Western Europe, North America, and parts of East Asia, can feed their populations more than adequately, while others cannot? We will look at these and other questions as we examine long-run economic growth.

Global Economic Growth

Every country worries about economic growth. In the United States and other high-income countries, the question is whether economic growth continues to provide the same remarkable gains in our standard of living as it did during the twentieth century. Meanwhile, can middle-income countries like South Korea, Brazil, Egypt, or Poland catch up to the higher-income countries? Or must they remain in the second tier of per capita income? Of the world's population of roughly 6.7 billion people, about 2.6 billion are scraping by on incomes that average less than $2 per day, not that different from the standard of living 2,000 years ago. Can the world's poor be lifted from their fearful poverty? As the 1995 Nobel laureate in economics, Robert E. Lucas Jr., once noted: "The consequences for human welfare involved in questions like these are simply staggering: Once one starts to think about them, it is hard to think about anything else."

Dramatic improvements in a nation's standard of living are possible. After the Korean War in the late 1950s, the Republic of Korea, often called South Korea, was one of the poorest economies in the world. Most South Koreans worked in peasant agriculture. According to the British economist Angus Maddison, whose life's work was the measurement of GDP and population in the world economy, GDP per capita in 1990 international dollars was $854

per year. From the 1960s to the early twenty-first century, a time period well within the lifetime and memory of many adults, the South Korean economy grew rapidly. Over these four decades, GDP per capita increased by more than 6% per year. According to the World Bank, GDP for South Korea now exceeds $30,000 in nominal terms, placing it firmly among high-income countries like Italy, New Zealand, and Israel. Measured by total GDP in 2012, South Korea is the thirteenth-largest economy in the world. For a nation of 49 million people, this transformation is extraordinary.

South Korea is a standout example, but it is not the only case of rapid and sustained economic growth. Other nations of East Asia, like Thailand and Indonesia, have seen very rapid growth as well. China has grown enormously since market-oriented economic reforms were enacted around 1980. GDP per capita in high-income economies like the United States also has grown dramatically albeit over a longer time frame. Since the Civil War, the U.S. economy has been transformed from a primarily rural and agricultural economy to an economy based on services, manufacturing, and technology.

282. Reading: Economic Growth

The Relatively Recent Arrival of Economic Growth

Let's begin with a brief overview of the spectacular patterns of economic growth around the world in the last two centuries, commonly referred to as the period of *modern economic growth*. (Later in the chapter we will discuss lower rates of economic growth and some key ingredients for economic progress.) Rapid and sustained economic growth is a relatively recent experience for the human race. Before the last two centuries, although rulers, nobles, and conquerors could afford some extravagances and although economies rose above the subsistence level, the average person's standard of living had not changed much for centuries.

Progressive, powerful economic and institutional changes started to have a significant effect in the late eighteenth and early nineteenth centuries. According to the Dutch economic historian *Jan Luiten van Zanden*, slavery-based societies, favorable demographics, global trading routes, and standardized trading institutions that spread with different empires set the stage for the Industrial Revolution to succeed. The *Industrial Revolution* refers to the widespread use of power-driven machinery and the economic and social changes that resulted in the first half of the 1800s. Ingenious machines—the steam engine, the power loom, and the steam locomotive—performed tasks that otherwise would have taken vast numbers of workers to do. The Industrial Revolution began in Great Britain, and soon spread to the United States, Germany, and other countries.

The jobs for ordinary people working with these machines were

often dirty and dangerous by modern standards, but the alternative jobs of that time in peasant agriculture and small-village industry were often dirty and dangerous, too. The new jobs of the Industrial Revolution typically offered higher pay and a chance for social mobility. A self-reinforcing cycle began: New inventions and investments generated profits, the profits provided funds for new investment and inventions, and the investments and inventions provided opportunities for further profits. Slowly, a group of national economies in Europe and North America emerged from centuries of sluggishness into a period of rapid modern growth. During the last two centuries, the average rate of growth of GDP per capita in the leading industrialized countries has averaged about 2% per year. What were times like before then? Read on for the answer.

WHAT WERE ECONOMIC CONDITIONS LIKE BEFORE 1870?

Angus Maddison, a quantitative economic historian, led the most systematic inquiry into national incomes before 1870. His methods recently have been refined and used to compile GDP per capita estimates from year 1 C.E. to 1348. Table 6.1 is an important counterpoint to most of the narrative in this chapter. It shows that nations can decline as well as rise. The declines in income are explained by a wide array of forces, such as epidemics, natural and weather-related disasters, the inability to govern large empires, and the remarkably slow pace of technological and institutional progress. Institutions are the traditions, laws, and so on by which people in a community agree to behave and govern themselves. Such institutions include marriage, religion, education, and laws of governance. Institutional progress is the development and codification of these institutions to reinforce social order, and thus, economic growth.

One example of such an institution is the Magna Carta (Great

Charter), which the English nobles forced King John to sign in 1215. The Magna Carta codified the principles of due process, whereby a free man could not be penalized unless his peers had made a lawful judgment against him. This concept was later adopted by the United States in its own constitution. This social order may have contributed to England's GDP per capita in 1348, which was second to that of northern Italy.

In the study of economic growth, a country's institutional framework plays a critical role. Table 6.1 also shows relative global equality for almost 1,300 years. After this, we begin to see significant divergence in income (not shown in table).

Table 6.1 GDP Per Capita Estimates in Current International Dollars from AD 1 to 1348

Year	Northern Italy	Spain	England	Holland	Byzantium	Iraq	Egypt	Japan
1	$800	$600	$600	$600	$700	$700	$700	–
730	–	–	–	–	–	$920	$730	$402
1000	–	–	–	–	$600	$820	$600	–
1150	–	–	–	–	$580	$680	$660	$520
1280	–	–	–	–	–	–	$670	$527
1300	$1,588	$864	$892	–	–	–	$610	–
1348	$1,486	$907	$919	–	–	–	–	–

(Source: Bolt and van Zanden. "The First Update of the Maddison Project. Re-Estimating Growth Before 1820." 2013)

Another fascinating and underreported fact is the high levels of income, compared to others at that time, attained by the Islamic Empire Abbasid Caliphate—which was founded in present-day Iraq

in 730 C.E. At its height, the empire spanned large regions of the Middle East, North Africa, and Spain until its gradual decline over 200 years.

The Industrial Revolution led to increasing inequality among nations. Some economies took off, whereas others, like many of those in Africa or Asia, remained close to a subsistence standard of living. General calculations show that the 17 countries of the world with the most-developed economies had, on average, 2.4 times the GDP per capita of the world's poorest economies in 1870. By 1960, the most developed economies had 4.2 times the GDP per capita of the poorest economies.

However, by the middle of the twentieth century, some countries had shown that catching up was possible. Japan's economic growth took off in the 1960s and 1970s, with a growth rate of real GDP per capita averaging 11% per year during those decades. Certain countries in Latin America experienced a boom in economic growth in the 1960s as well. In Brazil, for example, GDP per capita expanded by an average annual rate of 11.1% from 1968 to 1973. In the 1970s, some East Asian economies, including South Korea, Thailand, and Taiwan, saw rapid growth. In these countries, growth rates of 11% to 12% per year in GDP per capita were not uncommon. More recently, China, with its population of 1.3 billion people, grew at a per capita rate 9% per year from 1984 into the 2000s. India, with a population of 1.1 billion, has shown promising signs of economic growth, with growth in GDP per capita of about 4% per year during the 1990s and climbing toward 7% to 8% per year in the 2000s.

LINK IT UP

Visit this website to read about the Asian Development Bank.

These waves of catch-up economic growth have not reached all shores. In certain African countries like Niger, Tanzania, and Sudan,

for example, GDP per capita at the start of the 2000s was still less than $300, not much higher than it was in the nineteenth century and for centuries before that. In the context of the overall situation of low-income people around the world, the good economic news from China (population: 1.3 billion) and India (population: 1.1 billion) is, nonetheless, astounding and heartening.

Economic growth in the last two centuries has made a striking change in the human condition. *Richard Easterlin*, an economist at the University of Southern California, wrote in 2000:

> By many measures, a revolution in the human condition is sweeping the world. Most people today are better fed, clothed, and housed than their predecessors two centuries ago. They are healthier, live longer, and are better educated. Women's lives are less centered on reproduction and political democracy has gained a foothold. Although Western Europe and its offshoots have been the leaders of this advance, most of the less developed nations have joined in during the 20th century, with the newly emerging nations of sub-Saharan Africa the latest to participate. Although the picture is not one of universal progress, it is the greatest advance in the human condition of the world's population ever achieved in such a brief span of time.

283. Reading: The Significance of Economic Growth

Defining Economic Growth

To demonstrate the impact of economic growth on living standards of a nation, we must start with a clear definition of economic growth and then study its impact over time. We will also see how population growth affects the relationship between economic growth and the standard of living an economy is able to achieve.

Economic growth is a long-run process that occurs as an economy's potential output increases. Changes in real GDP from quarter to quarter or even from year to year are short-run fluctuations that occur as aggregate demand and short-run aggregate supply change. Regardless of media reports stating that the economy grew at a certain rate in the last quarter or that it is expected to grow at a particular rate during the next year, short-run changes in real GDP say little about economic growth. In the long run, economic activity moves toward its level of potential output. Increases in potential constitute economic growth.

Earlier we defined economic growth as the process through which an economy achieves an outward shift in its production possibilities curve. How does a shift in the production possibilities curve relate to a change in potential output? To produce its potential level of output, an economy must operate on its production possibilities curve. An increase in potential output thus implies an outward shift in the production possibilities curve. In the framework of the macroeconomic model of aggregate demand and

aggregate supply, we show economic growth as a shift to the right in the long-run aggregate supply curve.

There are three key points about economic growth to keep in mind:

1. Growth is a process. It is not a single event; rather, it is an unfolding series of events.
2. We define growth in terms of the economy's ability to produce goods and services, as indicated by its level of potential output.
3. Growth suggests that the economy's ability to produce goods and services is rising. A discussion of economic growth is thus a discussion of the series of events that increase the economy's ability to produce goods and services.

Figure 8.1 "A Century of Economic Growth" shows the record of economic growth for the U.S. economy over the past century. The graph shows annual levels of actual real GDP and of potential output. We see that the economy has experienced dramatic growth over the past century; potential output has soared more than 30-fold. The figure also reminds us of a central theme of our analysis of macroeconomics: real GDP fluctuates about potential output. Real GDP sagged well below its potential during the Great Depression of the 1930s and rose well above its potential as the nation mobilized its resources to fight World War II. With the exception of these two periods, real GDP has remained close to the economy's potential output. Since 1950, the actual level of real GDP has deviated from potential output by an average of less than 2%.

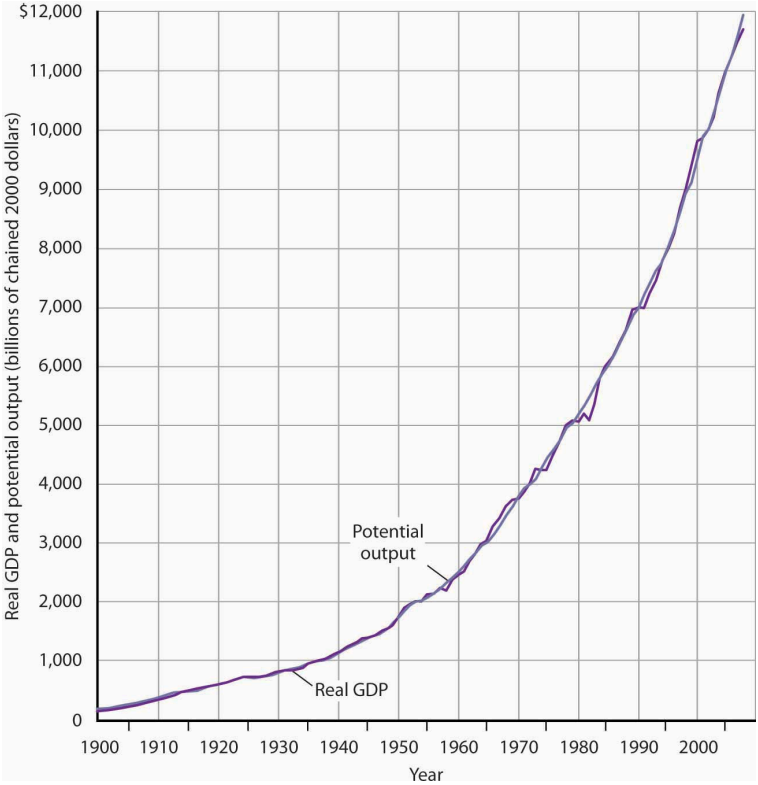


Figure 8.1. *A Century of Economic Growth. At the start of the 21st century, the level of potential output reached a level nearly 30 times its level a century earlier. Over the years, actual real GDP fluctuated about a rising level of potential output. Source: 1900–1949 data from Robert Gordon, Macroeconomics, 6th ed. (New York: HarperCollins, 1993), Table A-1, pp. A1–A3; data for 1950–2008 from Congressional Budget Office, The Budget and Economic Outlook, September 2008.*

We urge you to take some time with Figure 8.1 "A Century of Economic Growth." Over the course of the last century, it is economic growth that has taken center stage. Certainly, the fluctuations about potential output have been important. The recessionary gaps—periods when real GDP slipped below its potential—were often wrenching experiences in which millions of

people endured great hardship. The inflationary gaps—periods when real GDP rose above its potential level—often produced dramatic increases in price levels. Those fluctuations mattered. It was the unemployment and/or the inflation that came with them that made headlines. But it was the quiet process of economic growth that pushed living standards ever higher. We must understand growth if we are to understand how we got where we are, and where we are likely to be going during the 21st century.

Figure 8.2 "Cyclical Change Versus Growth" tells us why we use changes in potential output, rather than actual real GDP, as our measure of economic growth. Actual values of real GDP are affected not just by changes in the potential level of output, but also by the cyclical fluctuations about that level of output.

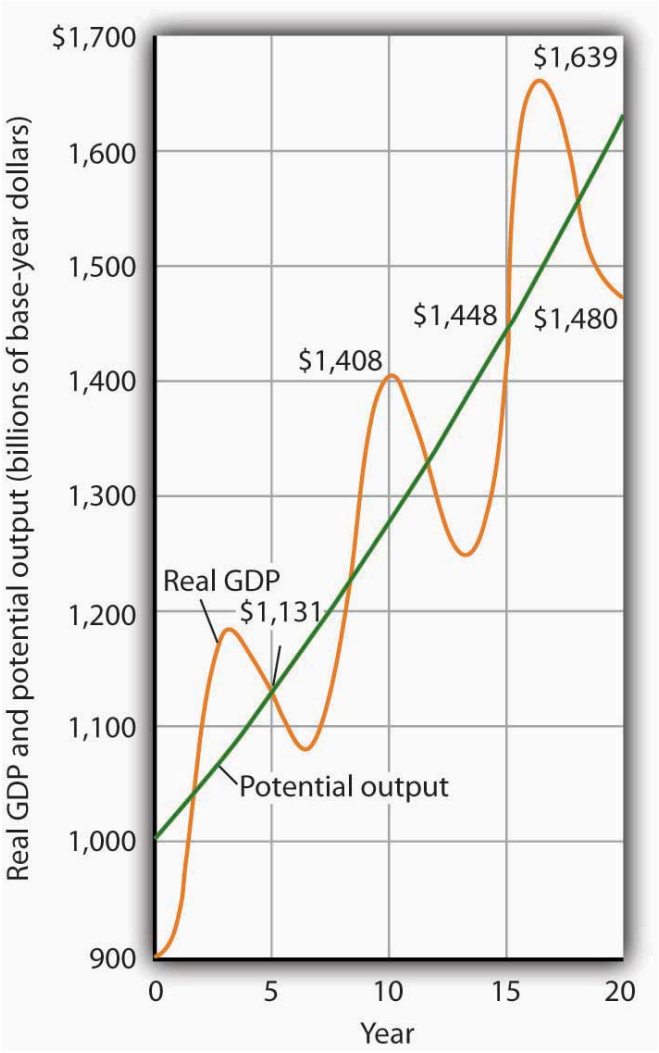


Figure 8.2. *Cyclical Change Versus Growth. The use of actual values of real GDP to measure growth can give misleading results. Here, an economy's potential output (shown in green) grows at a steady rate of 2.5% per year, with actual values of real GDP fluctuating about that trend. If we measure growth in the first 10 years as the annual rate of change between beginning and ending values of real GDP, we get a growth rate of 3.5%. The rate for the second decade is 0.5%. Growth estimates based on changes in real GDP are affected by cyclical changes that do not represent economic growth.*

Given our definition of economic growth, we would say that the hypothetical economy depicted in Figure 8.2 "Cyclical Change Versus Growth" grew at a 2.5% annual rate throughout the period. If we used actual values of real GDP, however, we would obtain quite different interpretations. Consider, for example, the first decade of this period: it began with a real GDP of $900 billion and a recessionary gap, and it ended in year 10 with a real GDP of $1,408 billion and an inflationary gap. If we record growth as the annual rate of change between these levels, we find an annual rate of growth of 4.6%—a rather impressive performance.

Now consider the second decade shown in Figure 8.2 "Cyclical Change Versus Growth." It began in year 10, and it ended in year 20 with a recessionary gap. If we measure the growth rate over that period by looking at beginning and ending values of actual real GDP, we compute an annual growth rate of 0.5%. Viewed in this way, performance in the first decade is spectacular while performance in the second is rather lackluster. But these figures depend on the starting and ending points we select; the growth rate of potential output was 2.5% throughout the period.

By measuring economic growth as the rate of increase in potential output, we avoid such problems. One way to do this is to select years in which the economy was operating at the natural level of employment and then to compute the annual rate of change between those years. The result is an estimate of the rate at which potential output increased over the period in question. For the economy shown in Figure 8.2 "Cyclical Change Versus Growth," for example, we see that real GDP equaled its potential in years 5 and 15. Real GDP in year 5 was $1,131, and real GDP in year 15 was $1,448. The annual rate of change between these two years was 2.5%. If we have estimates of potential output, of course, we can simply compute annual rates of change between any two years.

The Rule of 72 and Differences in Growth Rates

The U.S. growth rate began slowing in the 1970s, did not recover until the mid-1990s, only to slow down again in the 2000s. The question we address here is: does it matter? Does a percentage point drop in the growth rate make much difference? It does. To see why, let us investigate what happens when a variable grows at a particular percentage rate.

Suppose two economies with equal populations start out at the same level of real GDP but grow at different rates. Economy A grows at a rate of 3.5%, and Economy B grows at a rate of 2.4%. After a year, the difference in real GDP will hardly be noticeable. After a decade, however, real GDP in Economy A will be 11% greater than in Economy B. Over longer periods, the difference will be more dramatic. After 100 years, for example, income in Economy A will be nearly three times as great as in Economy B. If population growth in the two countries has been the same, the people of Economy A will have a far higher standard of living than those in Economy B. The difference in real GDP per person will be roughly equivalent to the difference that exists today between Great Britain and Mexico.

Over time, small differences in growth rates create large differences in incomes. An economy growing at a 3.5% rate increases by 3.5% of its initial value in the first year. In the second year, the economy increases by 3.5% of that new, higher value. In the third year, it increases by 3.5% of a still higher value. When a quantity grows at a given percentage rate, it experiences exponential growth. A variable that grows exponentially follows a path such as those shown for potential output in Figure 8.1 "A Century of Economic Growth" and Figure 8.2 "Cyclical Change Versus Growth." These curves become steeper over time because the growth rate is applied to an ever-larger base.

A variable growing at some exponential rate doubles over fixed intervals of time. The doubling time is given by the rule of 72, which states that a variable's approximate doubling time equals 72 divided

by the growth rate, stated as a whole number. If the level of income were increasing at a 9% rate, for example, its doubling time would be roughly 72/9, or 8 years. [1]

Let us apply this concept of a doubling time to the reduction in the U.S. growth rate. Had the U.S. economy continued to grow at a 3.5% rate after 1970, then its potential output would have doubled roughly every 20 years (72/3.5 = 20). That means potential output would have doubled by 1990, would double again by 2010, and would double again by 2030. Real GDP in 2030 would thus be eight times as great as its 1970 level. Growing at a 2.4% rate, however, potential output doubles only every 30 years (72/2.4 = 30). It would take until 2000 to double once from its 1970 level, and it would double once more by 2030. Potential output in 2030 would thus be four times its 1970 level if the economy grew at a 2.4% rate (versus eight times its 1970 level if it grew at a 3.5% rate). The 1.1% difference in growth rates produces a 100% difference in potential output by 2030. The different growth paths implied by these growth rates are illustrated in Figure 8.3 "Differences in Growth Rates."

1. Notice the use of the words *roughly* and *approximately*. The actual value of an income of $1,000 growing at rate r for a period of n years is $1,000 × $(1 + r)^n$. After 8 years of growth at a 9% rate, income would thus be $1,000 $(1 + 0.09)^8$ = $1,992.56. The rule of 72 predicts that its value will be $2,000. The rule of 72 gives an approximation, not an exact measure, of the impact of exponential growth.

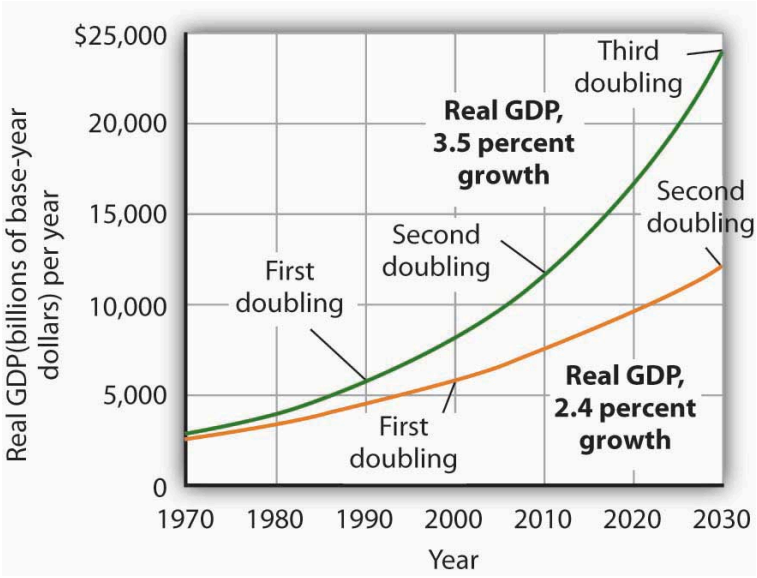


Figure 8.3. *Differences in Growth Rates. The chart suggests the significance in the long run of a small difference in the growth rate of real GDP. We begin in 1970, when real GDP equaled $2,873.9 billion. If real GDP grew at an annual rate of 3.5% from that year, it would double roughly every 20 years: in 1990, 2010, and 2030. Growth at a 2.4% rate, however, implies doubling every 30 years: in 2000 and 2030. By 2030, the 3.5% growth rate leaves real GDP at twice the level that would be achieved by 2.4% growth.*

Growth in Output per Capita

Of course, it is not just how fast potential output grows that determines how fast the average person's material standard of living rises. For that purpose, we examine economic growth on a per capita basis. An economy's output per capita equals real GDP per person. If we let N equal population, then [latex]\displaystyle\ text{Output per capita}=\frac{\text{real GDP}}{N}[/latex].

In the United States in the third quarter of 2008, for example, real GDP was $11,720 billion (annual rate). The U.S. population was 305.7 million. Real U.S. output per capita thus equaled $38,338.

We use output per capita as a gauge of an economy's material standard of living. If the economy's population is growing, then output must rise as rapidly as the population if output per capita is to remain unchanged. If, for example, population increases by 2%, then real GDP would have to rise by 2% to maintain the current level of output per capita. If real GDP rises by less than 2%, output per capita will fall. If real GDP rises by more than 2%, output per capita will rise. More generally, we can write:

$$\%\text{ rate of growth of output per capita} \cong \%\text{ rate of growth of output} - \%\text{ rate of growth of population}$$

For economic growth to translate into a higher standard of living on average, economic growth must exceed population growth. From 1970 to 2004, for example, Sierra Leone's population grew at an annual rate of 2.1% per year, while its real GDP grew at an annual rate of 1.4%; its output per capita thus fell at a rate of 0.7% per year. Over the same period, Singapore's population grew at an annual rate of 2.1% per year, while its real GDP grew 7.4% per year. The resultant 5.3% annual growth in output per capita transformed Singapore from a relatively poor country to a country with the one of the highest per capita incomes in the world.

Self Check: Defining Economic Growth

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the four Readings in this section.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

An interactive or media element has been excluded from this version of the text. You can view it online here: https://pressbooks.ccconline.org/accmacro/?p=382

284. Reading: Rule of Law and Economic Growth

Rule of Law and Economic Growth

Economic growth depends on many factors. Key among those factors is adherence to the *rule of law* and protection of *property rights* and *contractual rights* by a country's government so that markets can work effectively and efficiently. Laws must be clear, public, fair, enforced, and equally applicable to all members of society. Property rights are the rights of individuals and firms to own property and use it as they see fit. If you have $100, you have the right to use that money, whether you spend it, lend it, or keep it in a jar. It is your property. The definition of property includes physical property as well as the right to your training and experience, especially since your training is what determines your livelihood. The use of this property includes the right to enter into contracts with other parties with your property. Individuals or firms must own the property to enter into a contract.

Contractual rights, then, are based on property rights and they allow individuals to enter into agreements with others regarding the use of their property providing recourse through the legal system in the event of noncompliance. One example is the employment agreement: a skilled surgeon operates on an ill person and expects to get paid. Failure to pay would constitute a theft of property by the patient; that property being the services provided by the surgeon. In a society with strong property rights and contractual rights, the terms of the patient–surgeon contract will be fulfilled, because the surgeon would have recourse through the court system to extract payment from that individual. Without a legal system that enforces

contracts, people would not be likely to enter into contracts for current or future services because of the risk of non-payment. This would make it difficult to transact business and would slow economic growth.

The World Bank considers a country's legal system effective if it upholds property rights and contractual rights. The World Bank has developed a ranking system for countries' legal systems based on effective protection of property rights and rule-based governance using a scale from 1 to 6, with 1 being the lowest and 6 the highest rating. In 2012, the world average ranking was 2.9. The three countries with the lowest ranking of 1.5 were Afghanistan, the Central African Republic, and Zimbabwe; their GDP per capita was $1,000, $800, and $600 respectively. Afghanistan is cited by the World Bank as having a low standard of living, weak government structure, and lack of adherence to the rule of law, which has stymied its economic growth. The landlocked Central African Republic has poor economic resources as well as political instability and is a source of children used in human trafficking. Zimbabwe has had declining growth since 1998. Land redistribution and price controls have disrupted the economy, and corruption and violence have dominated the political process. Although global economic growth has increased, those countries lacking a clear system of property rights and an independent court system free from corruption have lagged far behind.

285. Reading: Labor Productivity and Economic Growth

Labor Productivity and Economic Growth

Sustained long-term economic growth comes from increases in worker productivity, which essentially means how well we do things. In other words, how efficient is your nation with its time and workers? *Labor productivity* is the value that each employed person creates per unit of his or her input. The easiest way to comprehend labor productivity is to imagine a Canadian worker who can make 10 loaves of bread in an hour versus a U.S. worker who in the same hour can make only two loaves of bread. In this fictional example, the Canadians are more productive. Being more productive essentially means you can do more in the same amount of time. This in turn frees up resources to be used elsewhere.

What determines how productive workers are? The answer is pretty intuitive. The first determinant of labor productivity is human capital. *Human capital* is the accumulated knowledge (from education and experience), skills, and expertise that the average worker in an economy possesses. Typically the higher the average level of education in an economy, the higher the accumulated human capital and the higher the labor productivity.

The second factor that determines labor productivity is technological change. *Technological change* is a combination of *invention*—advances in knowledge—and *innovation*, which is putting that advance to use in a new product or service. For example, the transistor was invented in 1947. It allowed us to miniaturize the footprint of electronic devices and use less power than the tube

technology that came before it. Innovations since then have produced smaller and better transistors that that are ubiquitous in products as varied as smart-phones, computers, and escalators. The development of the transistor has allowed workers to be anywhere with smaller devices. These devices can be used to communicate with other workers, measure product quality or do any other task in less time, improving worker productivity.

The third factor that determines labor productivity is economies of scale. Recall that economies of scale are the cost advantages that industries obtain due to size. (Read more about economies of scale in Cost and Industry Structure.) Consider again the case of the fictional Canadian worker who could produce 10 loaves of bread in an hour. If this difference in productivity was due only to economies of scale, it could be that Canadian workers had access to a large industrial-size oven while the U.S. worker was using a standard residential size oven.

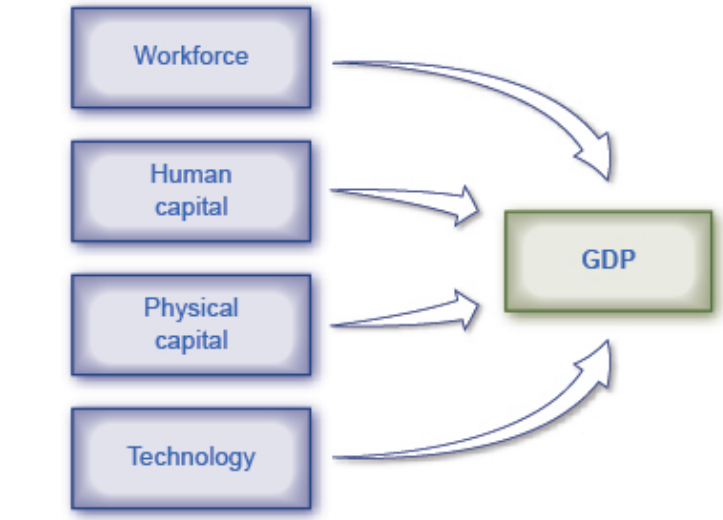
Now that we have explored the determinants of worker productivity, let's turn to how economists measure economic growth and productivity.

Sources of Economic Growth: The Aggregate Production Function

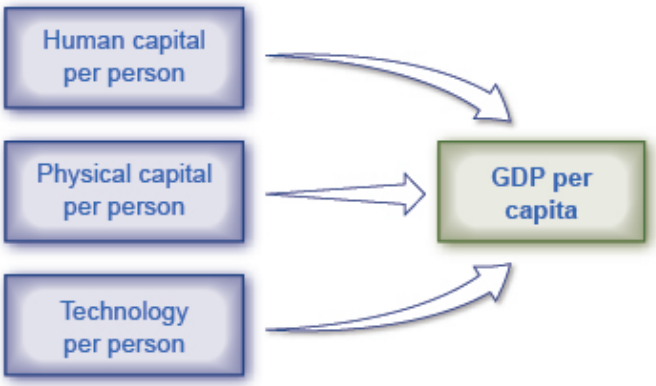
To analyze the sources of economic growth, it is useful to think about a *production function*, which is the process of turning economic inputs like labor, machinery, and raw materials into outputs like goods and services used by consumers. A microeconomic production function describes the inputs and outputs of a firm, or perhaps an industry. In macroeconomics, the connection from inputs to outputs for the entire economy is called an *aggregate production function*.

Components of the Aggregate Production Function

Economists construct different production functions depending on the focus of their studies. Figure 6.2 presents two examples of aggregate production functions. In the first production function, shown in Figure 6.2 (a), the output is GDP. The inputs in this example are workforce, human capital, physical capital, and technology. We discuss these inputs further in the module, Components of Economic Growth.



(a) Aggregate production function with GDP as its output



(b) Aggregate production function with GDP per capita as its output

Figure 6.2. *Aggregate Production Functions An aggregate production function shows what goes into producing the output for an overall economy. (a) This aggregate production function has GDP as its output. (b) This aggregate production function has GDP per capita as its output. Because it is calculated on a per-person basis, the labor input is already figured into the other factors and does not need to be listed separately.*

Measuring Productivity

An economy's rate of productivity growth is closely linked to the growth rate of its GDP per capita, although the two are not identical. For example, if the percentage of the population who holds jobs in an economy increases, GDP per capita will increase but the productivity of individual workers may not be affected. Over the long term, the only way that GDP per capita can grow continually is if the productivity of the average worker rises or if there are complementary increases in capital.

A common measure of U.S. productivity per worker is dollar value per hour the worker contributes to the employer's output. This measure excludes government workers, because their output is not sold in the market and so their productivity is hard to measure. It also excludes farming, which accounts for only a relatively small share of the U.S. economy. Figure 6.3 shows that the average amount produced by a U.S. worker in an hour averaged over $100 in 2011, more than twice the amount an average worker produced per hour in 1966.

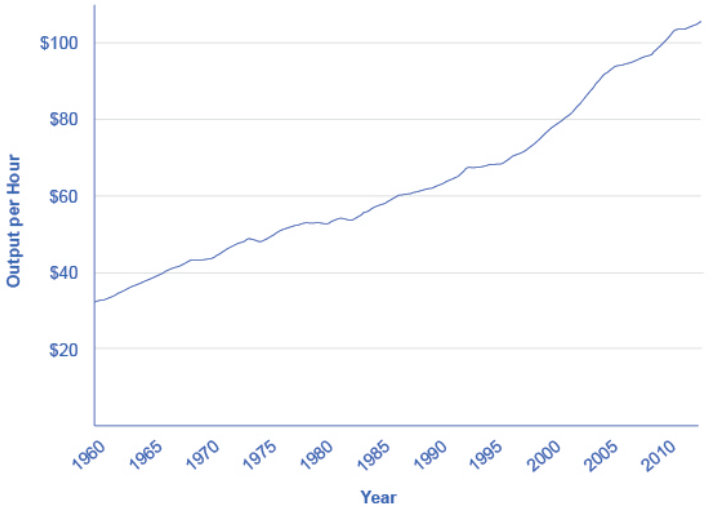


Figure 6.3. *Output per Hour Worked in the U.S. Economy, 1947–2011 Output per hour worked is a measure of worker productivity. In the U.S. economy, worker productivity rose more quickly in the 1960s and the mid-1990s compared with the 1970s and 1980s. However, these growth-rate differences are only a few percentage points per year. Look carefully to see them in the changing slope of the line. The average U.S. worker produced nearly $105 per hour in 2012. (Source: U.S. Department of Labor, Bureau of Labor Statistics.)*

According to the Department of Labor, U.S. productivity growth was fairly strong in the 1950s but then declined in the 1970s and 1980s before rising again in the second half of the 1990s and the first half of the 2000s. In fact, the rate of productivity measured by the change in output per hour worked averaged 3.2% per year from 1950 to 1970; dropped to 1.9% per year from 1970 to 1990; and then climbed back to over 2.3% from 1991 to the present, with another modest slowdown after 2001. Figure 6.4 shows average annual rates of productivity growth averaged over time since 1950.

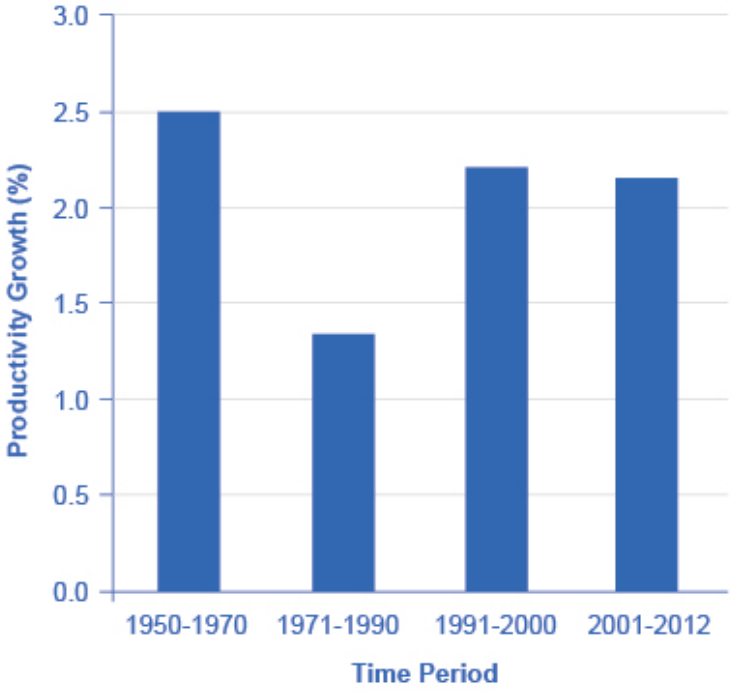


Figure 6.4. *Productivity Growth Since 1950 U.S. growth in worker productivity was very high between 1950 and 1970. It then declined to lower levels in the 1970s and the 1980s. The late 1990s and early 2000s saw productivity rebound, but then productivity sagged a bit in the 2000s. Some think the productivity rebound of the late 1990s and early 2000s marks the start of a "new economy" built on higher productivity growth, but this cannot be determined until more time has passed. (Source: U.S. Department of Labor, Bureau of Labor Statistics.)*

286. Reading: The "New Economy" Controversy

The "New Economy" Controversy

In recent years a controversy has been brewing among economists about the resurgence of U.S. productivity in the second half of the 1990s. One school of thought argues that the United States had developed a "new economy" based on the extraordinary advances in communications and information technology of the 1990s. The most optimistic proponents argue that it would generate higher average productivity growth for decades to come. The pessimists, on the other hand, argue that even five or ten years of stronger productivity growth does not prove that higher productivity will last for the long term. It is hard to infer anything about long-term productivity trends during the later part of the 2000s, because the steep recession of 2008–2009, with its sharp but not completely synchronized declines in output and employment, complicates any interpretation.

Productivity growth is also closely linked to the average level of wages. Over time, the amount that firms are willing to pay workers will depend on the value of the output those workers produce. If a few employers tried to pay their workers less than what those workers produced, then those workers would receive offers of higher wages from other profit-seeking employers. If a few employers mistakenly paid their workers more than what those workers produced, those employers would soon end up with losses. In the long run, productivity per hour is the most important determinant of the average wage level in any economy. To learn how to compare economies in this regard, follow the steps in the following example.

COMPARING THE ECONOMIES OF TWO COUNTRIES

The Organization for Economic Co-operation and Development (OECD) tracks data on the annual growth rate of real GDP per hour worked. You can find these data on the OECD data webpage "Labour productivity growth in the total economy" at this website.

Step 1. Visit the OECD website given above and select two countries to compare.

Step 2. On the drop-down menu "Variable," select "Real GDP, Annual Growth, in percent" and record the data for the countries you have chosen for the five most recent years.

Step 3. Go back to the drop-down menu and select "Real GDP per Hour Worked, Annual Growth Rate, in percent" and select data for the same years for which you selected GDP data.

Step 4. Compare real GDP growth for both countries. Table 6.2 provides an example of a comparison between Australia and Belgium.

Australia	**2008**	**2009**	**2010**	**2011**	**2012**
Real GDP Growth (%)	1.6%	2.1%	2.4%	3.3%	2.8%
Real GDP Growth/Hours Worked (%)	0.6%	2.1%	−0.2%	1.7%	2.4%
Belgium	**2008**	**2009**	**2010**	**2011**	**2012**
Real GDP Growth (%)	1	−2.8	2.4	1.8	−0.3
Real GDP Growth/Hours Worked (%)	−1.2	−1.5	1.6	−1.1	−0.3

Step 5. Consider the many factors can affect growth. For example, one factor that may have affected Australia is its isolation from Europe, which may have insulated the country from the effects of the global recession. In Belgium's case, the global recession seems to have had an impact on both GDP and real GDP per hours worked between 2008 and 2012.

The Power of Sustained Economic Growth

Nothing is more important for people's standard of living than sustained economic growth. Even small changes in the rate of growth, when sustained and compounded over long periods of time, make an enormous difference in the standard of living. Consider Table 6.3, in which the rows of the table show several different rates of growth in GDP per capita and the columns show different periods of time. Assume for simplicity that an economy starts with a GDP per capita of 100. The table then applies the following formula to calculate what GDP will be at the given growth rate in the future:

$$\text{GDP at starting date} \times (1 + \text{growth rate of GDP})^{\text{years}} = \text{GDP at end date}$$

For example, an economy that starts with a GDP of 100 and grows at 3% per year will reach a GDP of 209 after 25 years; that is, $100 (1.03)^{25} = 209$.

The slowest rate of GDP per capita growth in the table, just 1% per year, is similar to what the United States experienced during its weakest years of productivity growth. The second highest rate, 3% per year, is close to what the U.S. economy experienced during the strong economy of the late 1990s and into the 2000s. Higher rates of per capita growth, such as 5% or 8% per year, represent the experience of rapid growth in economies like Japan, Korea, and China.

Table 6.3 shows that even a few percentage points of difference in economic growth rates will have a profound effect if sustained and compounded over time. For example, an economy growing at a 1% annual rate over 50 years will see its GDP per capita rise by a total of 64%, from 100 to 164 in this example. However, a country growing at a 5% annual rate will see (almost) the same amount of growth—from 100 to 163—over just 10 years. Rapid rates of economic growth can bring profound transformation. (See the following feature on the relationship between compound growth rates and compound interest rates.) If the rate of growth is 8%,

young adults starting at age 20 will see the average standard of living in their country more than double by the time they reach age 30, and grow nearly sevenfold by the time they reach age 45.

Table 6.3. Growth of GDP over Different Time Horizons

Growth Rate	Value of an original 100 in 10 Years	Value of an original 100 in 25 Years	Value of an original 100 in 50 Years
1%	110	128	164
3%	134	209	438
5%	163	338	1,147
8%	216	685	4,690

HOW ARE COMPOUND GROWTH RATES AND COMPOUND INTEREST RATES RELATED?

The formula for growth rates of GDP over different periods of time, as shown above, is exactly the same as the formula for how a given amount of financial savings grows at a certain interest rate over time. Both formulas have the same ingredients: an original starting amount, in one case GDP and in the other case an amount of financial saving; a percentage increase over time, in one case the growth rate of GDP and in the other case an interest rate; and an amount of time over which this effect happens.

Recall that compound interest is interest that is earned on past interest. It causes the total amount of financial savings to grow dramatically over time. Similarly, compound rates of economic growth, or the *compound growth rate*, means that the rate of growth is being multiplied by a base that includes past GDP growth, with dramatic effects over time.

For example, in 2012, the World Fact Book, produced by the Central Intelligence Agency, reported that South Korea had a GDP

of $1.64 trillion with a growth rate of 2%. We can estimate that at that growth rate, South Korea's GDP will be $1.81 trillion in five years. If we apply the growth rate to each year's ending GDP for the next five years, we will calculate that at the end of year one, GDP is $1.67 trillion. In year two, we start with the end-of-year one value of $1.67 and increase it by 2%. Year three starts with the end-of-year two GDP, and we increase it by 2% and so on, as depicted in the Table 6.4.

Table 6.4 End-of-year Two GDP, 2012

Year	Starting GDP	Growth Rate 2%	Year-End Amount
1	$1.64 Trillion ×	(1+0.02)	$1.67 Trillion
2	$1.67 Trillion ×	(1+0.02)	$1.71 Trillion
3	$1.71 Trillion ×	(1+0.02)	$1.74 Trillion
4	$1.74 ×	(1+0.02)	$1.78 Trillion
5	$1.77 ×	(1+0.02)	$1.81 Trillion

Another way to calculate the growth rate is to apply the following formula:

$$\text{Future Value} = \text{Present Value} \times (1 + g)^n$$

Where "future value" is the value of GDP five years hence, "present value" is the starting GDP amount of $1.64 trillion, "g" is the growth rate of 2%, and "n" is the number of periods for which we are calculating growth.

$$\text{Future Value} = 1.64 \times (1+0.02)^5 = \$1.81 \text{ trillion}$$

Self Check: Productivity

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not**

count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the two Readings in this section.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

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287. Reading: Components of Economic Growth

Components of Economic Growth

Over decades and generations, seemingly small differences of a few percentage points in the annual rate of economic growth make an enormous difference in GDP per capita. In this module, we discuss some of the components of economic growth, including physical capital, human capital, and technology.

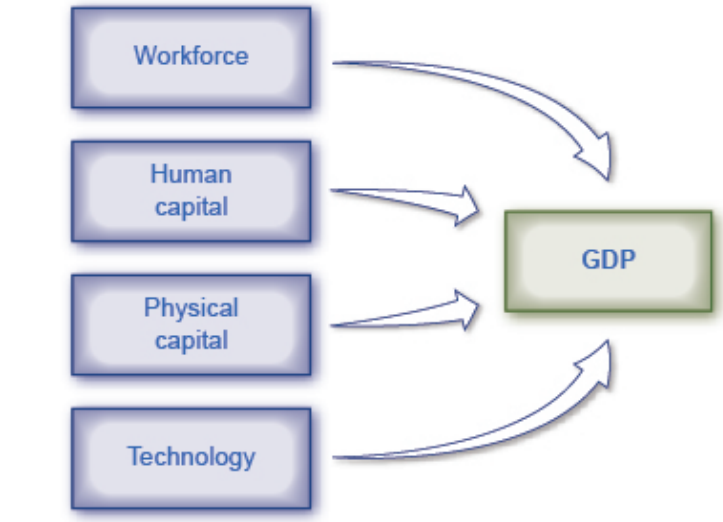
The category of *physical capital* includes the plant and equipment used by firms and also things like roads (also called *infrastructure*). Again, greater physical capital implies more output. Physical capital can affect productivity in two ways: (1) an increase in the *quantity* of physical capital (for example, more computers of the same quality); and (2) an increase in the *quality* of physical capital (same number of computers but the computers are faster, and so on). Human capital and physical capital accumulation are similar: In both cases, investment now pays off in longer-term productivity in the future.

The category of *technology* is the "joker in the deck." Earlier we described it as the combination of invention and innovation. When most people think of new technology, the invention of new products like the laser, the smartphone, or some new wonder drug come to mind. In food production, the development of more drought-resistant seeds is another example of technology. Technology, as economists use the term, however, includes still more. It includes new ways of organizing work, like the invention of the assembly line, new methods for ensuring better quality of output in factories, and innovative institutions that facilitate the process of converting inputs into output. In short, technology comprises all the advances that make the existing machines and other inputs produce more, and at higher quality, as well as altogether new products.

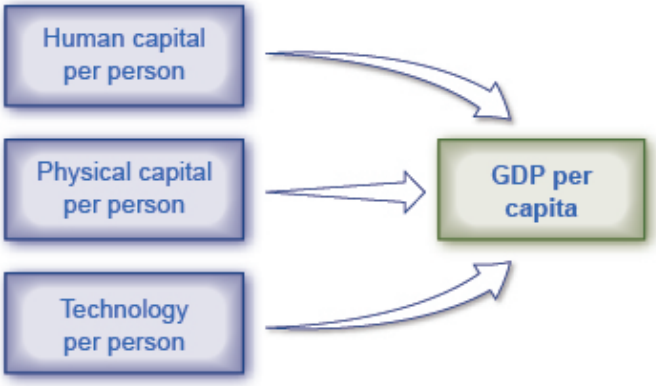
It may not make sense to compare the GDPs of China and say, Benin, simply because of the great difference in population size. To understand economic growth, which is really concerned with the growth in living standards of an average person, it is often useful to focus on *GDP per capita*. Using GDP per capita also makes it easier to compare countries with smaller numbers of people, like Belgium, Uruguay, or Zimbabwe, with countries that have larger populations, like the United States, the Russian Federation, or Nigeria.

To obtain a per capita production function, divide each input in Figure 6.2(a) by the population. This creates a second *aggregate production function* where the output is GDP per capita (that is, GDP divided by population). The inputs are the average level of human

capital per person, the average level of physical capital per person, and the level of technology per person—see Figure 6.2(b). The result of having population in the denominator is mathematically appealing. Increases in population lower per capita income. However, increasing population is important for the average person only if the rate of income growth exceeds population growth. A more important reason for constructing a per capita production function is to understand the contribution of human and physical capital.



(a) Aggregate production function with GDP as its output



(b) Aggregate production function with GDP per capita as its output

Figure 6.2. *An aggregate production function shows what goes into producing the output for an overall economy. (a) This aggregate production function has GDP as its output. (b) This aggregate production function has GDP per capita as its output. Because it is calculated on a per-person basis, the labor input is already figured into the other factors and does not need to be listed separately.*

Capital Deepening

When society increases the level of capital per person, the result is called *capital deepening*. The idea of capital deepening can apply both to additional human capital per worker and to additional physical capital per worker.

Recall that one way to measure human capital is to look at the average levels of education in an economy. Figure 6.5 illustrates the human capital deepening for U.S. workers by showing that the proportion of the U.S. population with a high school and a college degree is rising. As recently as 1970, for example, only about half of U.S. adults had at least a high school diploma; by the start of the twenty-first century, more than 80% of adults had graduated from high school. The idea of human capital deepening also applies to the years of experience that workers have, but the average experience level of U.S. workers has not changed much in recent decades. Thus, the key dimension for deepening human capital in the U.S. economy focuses more on additional education and training than on a higher average level of work experience.

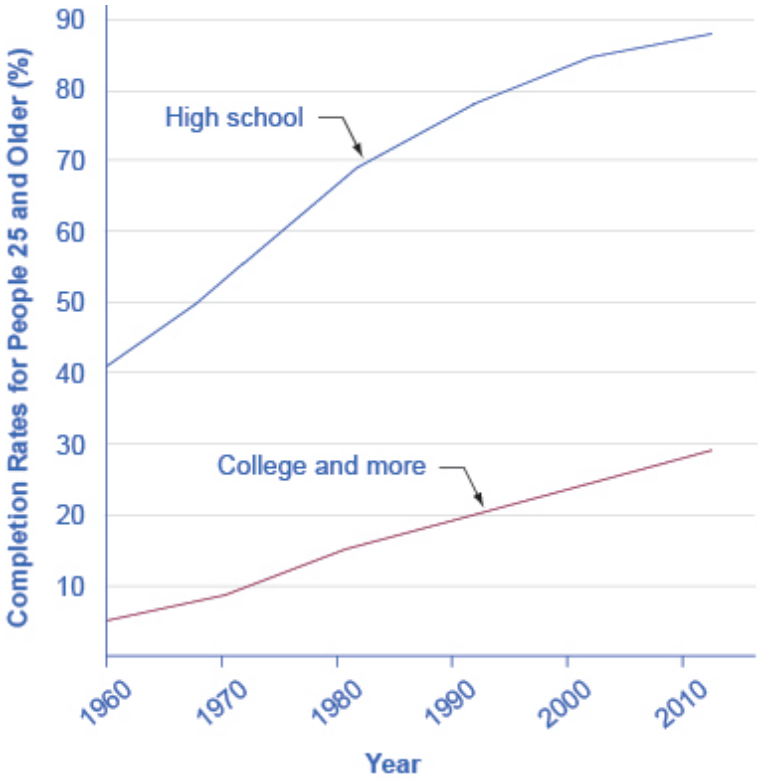


Figure 6.5. *Human Capital Deepening in the U.S. Rising levels of education for persons 25 and older show the deepening of human capital in the U.S. economy. Even today, relatively few U.S. adults have completed a four-year college degree. There is clearly room for additional deepening of human capital to occur. (Source: US Department of Education, National Center for Education Statistics).*

Physical capital deepening in the U.S. economy is shown in Figure 6.6. The average U.S. worker in the late 2000s was working with physical capital worth almost three times as much as that of the average worker of the early 1950s.

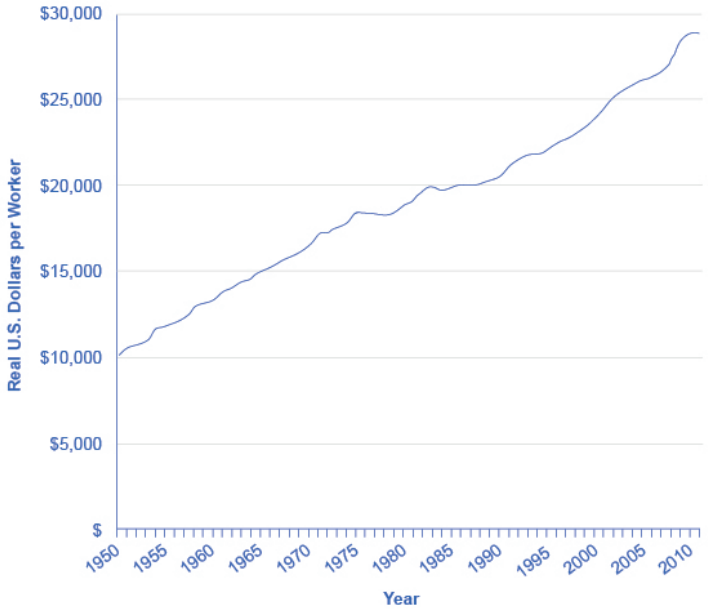


Figure 6.6. *Physical Capital per Worker in the United States. The value of the physical capital, measured by plant and equipment, used by the average worker in the U.S. economy has risen over the decades. The increase may have leveled off a bit in the 1970s and 1980s, which were not, coincidentally, times of slower-than-usual growth in worker productivity. We see a renewed increase in physical capital per worker in the late 1990s, followed by a flattening in the early 2000s. (Source: Center for International Comparisons of Production, Income and Prices, University of Pennsylvania).*

Not only does the current U.S. economy have better-educated workers with more and improved physical capital than it did several decades ago, but these workers have access to more advanced technologies. Growth in technology is impossible to measure with a simple line on a graph, but evidence that we live in an age of technological marvels is all around us—discoveries in genetics and in the structure of particles, the wireless Internet, and other inventions almost too numerous to count. The U.S. *Patent and*

Trademark Office typically has issued more than 150,000 patents annually in recent years.

This recipe for economic growth—investing in labor productivity, with investments in human capital and technology, as well as increasing physical capital—also applies to other economies. In South Korea, for example, universal enrollment in primary school (the equivalent of kindergarten through sixth grade in the United States) had already been achieved by 1965, when Korea's GDP per capita was still near its rock bottom low. By the late 1980s, Korea had achieved almost universal secondary school education (the equivalent of a high school education in the United States). With regard to physical capital, Korea's rates of investment had been about 15% of GDP at the start of the 1960s, but doubled to 30–35% of GDP by the late 1960s and early 1970s. With regard to technology, South Korean students went to universities and colleges around the world to get scientific and technical training, and South Korean firms reached out to study and form partnerships with firms that could offer them technological insights. These factors combined to foster South Korea's high rate of economic growth.

Growth Accounting Studies

Since the late 1950s, economists have conducted growth accounting studies to determine the extent to which physical and human capital deepening and technology have contributed to growth. The usual approach uses an aggregate production function to estimate how much of per capita economic growth can be attributed to growth in physical capital and human capital. These two inputs can be measured, at least roughly. The part of growth that is unexplained by measured inputs, called the residual, is then attributed to growth in technology. The exact numerical estimates differ from study to study and from country to country, depending on how researchers measured these three main factors over what

time horizons. For studies of the U.S. economy, three lessons commonly emerge from growth accounting studies.

First, technology is typically the most important contributor to U.S. economic growth. Growth in human capital and physical capital often explains only half or less than half of the economic growth that occurs. New ways of doing things are tremendously important.

Second, while investment in physical capital is essential to growth in labor productivity and GDP per capita, building human capital is at least as important. Economic growth is not just a matter of more machines and buildings. One vivid example of the power of human capital and technological knowledge occurred in Europe in the years after World War II (1939–1945). During the war, a large share of Europe's physical capital, such as factories, roads, and vehicles, was destroyed. Europe also lost an overwhelming amount of human capital in the form of millions of men, women, and children who died during the war. However, the powerful combination of skilled workers and technological knowledge, working within a market-oriented economic framework, rebuilt Europe's productive capacity to an even higher level within less than two decades.

A third lesson is that these three factors of human capital, physical capital, and technology work together. Workers with a higher level of education and skills are often better at coming up with new technological innovations. These technological innovations are often ideas that cannot increase production until they become a part of new investment in physical capital. New machines that embody technological innovations often require additional training, which builds worker skills further. If the recipe for economic growth is to succeed, an economy needs all the ingredients of the aggregate production function. See the following feature about girl's education in low-income countries for an example of how human capital, physical capital, and technology can combine to significantly impact lives.

HOW DO GIRLS' EDUCATION AND ECONOMIC GROWTH RELATE IN LOW-INCOME COUNTRIES?

In the early 2000s, according to the World Bank, about 110 million children between the ages of 6 and 11 were not in school—and about two-thirds of them were girls. In Bangladesh, for example, the illiteracy rate for those aged 15 to 24 was 78% for females, compared to 75% for males. In Egypt, for this age group, illiteracy was 84% for females and 91% for males. Cambodia had 86% illiteracy for females and 88% for males. Nigeria had 66% illiteracy for females in the 15 to 24 age bracket and 78% for males.

Whenever any child does not receive a basic education, it is both a human and an economic loss. In low-income countries, wages typically increase by an average of 10 to 20% with each additional year of education. There is, however, some intriguing evidence that helping girls in low-income countries to close the education gap with boys may be especially important, because of the social role that many of the girls will play as mothers and homemakers.

Girls in low-income countries who receive more education tend to grow up to have fewer, healthier, better-educated children. Their children are more likely to be better nourished and to receive basic health care like immunizations. Economic research on women in low-income economies backs up these findings. When 20 women get one additional year of schooling, as a group they will, on average, have one less child. When 1,000 women get one additional year of schooling, on average one to two fewer women from that group will die in childbirth. When a woman stays in school an additional year, that factor alone means that, on average, each of her children will spend an additional half-year in school. Education for girls is a good investment because it is an investment in economic growth with benefits beyond the current generation.

A Healthy Climate for Economic Growth

While physical and human capital deepening and better technology are important, equally important to a nation's well-being is the climate or system within which these inputs are cultivated. Both the type of market economy and a legal system that governs and sustains property rights and contractual rights are important contributors to a healthy economic climate.

A healthy economic climate usually involves some sort of market orientation at the microeconomic, individual, or firm decision-making level. Markets that allow personal and business rewards and incentives for increasing human and physical capital encourage overall macroeconomic growth. For example, when workers participate in a competitive and well-functioning labor market, they have an incentive to acquire additional human capital, because additional education and skills will pay off in higher wages. Firms have an incentive to invest in physical capital and in training workers, because they expect to earn higher profits for their shareholders. Both individuals and firms look for new technologies, because even small inventions can make work easier or lead to product improvement. Collectively, such individual and business decisions made within a market structure add up to macroeconomic growth. Much of the rapid growth since the late nineteenth century has come from harnessing the power of competitive markets to allocate resources. This market orientation typically reaches beyond national borders and includes openness to international trade.

A general orientation toward markets does not rule out important roles for government. There are times when markets fail to allocate capital or technology in a manner that provides the greatest benefit for society as a whole. The role of the government is to correct these failures. In addition, government can guide or influence markets toward certain outcomes. The following examples highlight some important areas that governments around the world have chosen to invest in to facilitate capital deepening and technology:

- **Education**. The Danish government requires all children under 16 to attend school. They can choose to attend a public school (*Folkeskole*) or a private school. Students do not pay tuition to attend *Folkeskole*. Thirteen percent of primary/secondary (elementary/high) school is private, and the government supplies vouchers to citizens who choose private school.
- **Savings and Investment**. In the United States, as in other countries, private investment is taxed. Low capital gains taxes encourage investment and so also economic growth.
- **Infrastructure**. The Japanese government in the mid-1990s undertook significant infrastructure projects to improve roads and public works. This in turn increased the stock of physical capital and ultimately economic growth.
- **Special Economic Zones**. The island of Mauritius is one of the few African nations to encourage international trade in government-supported *special economic zones* (SEZ). These are areas of the country, usually with access to a port where, among other benefits, the government does not tax trade. As a result of its SEZ, Mauritius has enjoyed above-average economic growth since the 1980s. Free trade does not have to occur in an SEZ however. Governments can encourage international trade across the board, or surrender to protectionism.
- **Scientific Research**. The European Union has strong programs to invest in scientific research. The researchers *Abraham García* and *Pierre Mohnen* demonstrate that firms which received support from the Austrian government actually increased their research intensity and had more sales. Governments can support scientific research and technical training that helps to create and spread new technologies. Governments can also provide a legal environment that protects the ability of inventors to profit from their inventions.

There are many more ways in which the government can play an active role in promoting economic growth; we explore them in

other chapters and in particular in Macroeconomic Policy Around the World. A healthy climate for growth in GDP per capita and labor productivity includes human capital deepening, physical capital deepening, and technological gains, operating in a market-oriented economy with supportive government policies.

288. Reading: Determinants of Economic Growth

The Sources of Economic Growth

In this section, we review the main determinants of economic growth. We also examine the reasons for the widening disparities in economic growth rates among countries in recent years.

As we have learned, there are two ways to model economic growth: (1) as an outward shift in an economy's production possibilities curve, and (2) as a shift to the right in its long-run aggregate supply curve. In drawing either one at a point in time, we assume that the economy's factors of production and its technology are unchanged. Changing these will shift both curves. Therefore, anything that increases the quantity or quality of factors of production or that improves the technology available to the economy contributes to economic growth.

The sources of growth for the U.S. economy in the 20th century were presented in the chapter on sources of production. There we learned that the main sources of growth for the United States from 1948 to 2002 were divided between increases in the quantities of labor and of physical capital (about 60%) and in improvements in the qualities of the factors of production and technology (about 40%). Since 1995, however, improvements in factor quality and technology have been the main drivers of economic growth in the United States.

In order to devote resources to increasing physical and human capital and to improving technology—activities that will enhance future production—society must forgo using them now to produce consumer goods. Even though the people in the economy would enjoy a higher standard of living today without this sacrifice, they

are willing to reduce present consumption in order to have more goods and services available for the future.

As a college student, you personally made such a choice. You decided to devote time to study that you could have spent earning income. With the higher income, you could enjoy greater consumption today. You made this choice because you expect to earn higher income in the future and thus to enjoy greater consumption in the future. Because many other people in the society also choose to acquire more education, society allocates resources to produce education. The education produced today will enhance the society's human capital and thus its economic growth.

All other things equal, higher saving allows more resources to be devoted to increases in physical and human capital and technological improvement. In other words, saving, which is income not spent on consumption, promotes economic growth by making available resources that can be channeled into growth-enhancing uses.

Explaining Recent Disparities in Growth Rates

Toward the end of the 20th century, it appeared that some of the world's more affluent countries were growing robustly while others were growing more slowly or even stagnating. This observation was confirmed in a major study by the Organization for Economic Co-operation and Development (OECD),[1] whose members are listed in Table 8.1 "Growing Disparities in Rates of Economic Growth." The table shows that for the OECD countries as a whole, economic

1. The material in this section is based on Organization for Economic Co-operation and Development, *The Sources of Economic Growth in OECD Countries*, 2003.

growth per capita fell from an average of 2.2% per year in the 1980s to an average of 1.9% per year in the 1990s. The higher standard deviation in the latter period confirms an increased disparity of growth rates in the more recent period. Moreover, the data on individual countries show that per capita growth in some countries (specifically, the United States, Canada, Ireland, Netherlands, Norway, and Spain) picked up, especially in the latter half of the 1990s, while it decelerated in most of the countries of continental Europe and Japan.

Table 8.1 Growing Disparities in Rates of Economic Growth

Trend Growth of GDP per Capita			
Country	**1980–1990**	**1990–2000**	**1996–2000**
United States	2.1	2.3	2.8
Japan	3.3	1.4	0.9
Germany	1.9	1.2	1.7
France	1.6	1.5	1.9
Italy	2.3	1.5	1.7
United Kingdom	2.2	2.1	2.3
Canada	1.4	1.7	2.6
Austria	2.1	1.9	2.3
Belgium	2.0	1.9	2.3
Denmark	1.9	1.9	2.3
Finland	2.2	2.1	3.9
Greece	0.5	1.8	2.7
Iceland	1.7	1.5	2.6
Ireland	3.0	6.4	7.9
Luxembourg	4.0	4.5	4.6
Netherlands	1.6	2.4	2.7
Portugal	3.1	2.8	2.7
Spain	2.3	2.7	3.2
Sweden	1.7	1.5	2.6
Switzerland	1.4	0.4	1.1
Turkey	2.1	2.1	1.9
Australia	1.6	2.4	2.8
New Zealand	1.4	1.2	1.8
Mexico	0.0	1.6	2.7
Korea	7.2	5.1	4.2
Hungary	–	2.3	3.5
Poland	–	4.2	4.8
Czech Republic	–	1.7	1.4

Trend Growth of GDP per Capita			
Country	**1980–1990**	**1990–2000**	**1996–2000**
OECD24[2]	2.2	1.9	2.2
Standard Deviation of OECD24	0.74	1.17	1.37

Source: Excerpted from Table 1.1 Organization for Economic Co-operation and Development,*Sources of Economic Growth in OECD Countries*, 2003: p. 32–33.

Variation in the growth in real GDP per capita has widened among the world's leading industrialized economies. The study goes on to try to explain the reasons for the divergent growth trends. The main findings were:

- In general, countries with accelerating per capita growth rates also experienced significant increases in employment, while those with stagnant or declining employment generally experienced reductions in per capita growth rates.
- Enhancements in human capital contributed to labor productivity and economic growth, but in slower growing countries such improvements were not enough to offset the impact of reduced or stagnant labor utilization.
- Information and communication technology has contributed to economic growth both through rapid technological progress within the information and communication technology industry itself as well as, more recently, through the use of information and communication technology equipment in other industries. This has made an important contribution to growth in several of the faster growing countries.
- Other factors associated with more growth include:

2. Excludes Czech Republic, Hungary, Korean, Mexico, Poland, and Slovak Republic

investments in physical and human capital, sound macroeconomic policies (especially low inflation), private sector research and development, trade exposure, and better developed financial markets. Results concerning the impact of the size of the government and of public sector research and development on growth were more difficult to interpret.

- With qualifications, the study found that strict regulation of product markets (for example, regulations that reduce competition) and strict employment protection legislation (for example, laws that make hiring and firing of workers more difficult) had negative effects on growth.
- All countries show a large number of firms entering and exiting markets. But, a key difference between the United States and Europe is that new firms in the United States start out smaller and less productive than those of Europe but grow faster when they are successful. The report hypothesizes that lower start-up costs and less strict labor market regulations may encourage U.S. entrepreneurs to enter a market and then to expand, if warranted. European entrepreneurs may be less willing to experiment in a market in the first place.

The general concern in the second half of the 1970s and the 1980s was that economic growth was slowing down and that it might not be possible to reverse this pattern. The 1990s and early 2000s, in which growth picked up in some countries but not in others, suggested that the problem was not universal and led to a search for the reasons for the disparities in growth rates that emerged. The OECD study described above gives some possible explanations. The findings of that study practically beg countries to examine closely their economic policies at a variety of levels and to consider changes that may add flexibility to their economies.

In closing, it is worth reiterating that economic freedom and higher incomes tend to go together. Countries could not have attained high levels of income if they had not maintained the economic freedom that contributed to high incomes in the first

place. Thus, it is also likely that rates of economic growth in the future will be related to the amount of economic freedom countries choose. We shall see in later chapters that monetary and fiscal policies that are used to stabilize the economy in the short run can also have an impact on long-run economic growth.

KEY TAKEAWAYS

- The main sources of growth for the United States from 1948 to 2002 were divided between increases in the quantities of labor and of physical capital (about 60%) and in improvements in the qualities of the factors of production and technology (about 40%). Since 1995, however, improvements in factor quality and technology have been the main drivers of economic growth in the United States.
- There has been a growing disparity in the rates of economic growth in industrialized countries in the last decade, which may reflect various differences in economic structures and policies.

Self Check: Sources of Economic Growth

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the two Readings in this section.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

An interactive or media element has been excluded from this version of the text. You can view it online here: https://pressbooks.ccconline.org/accmacro/?p=392

289. Self Check: Sources of Economic Growth

Check Your Understanding

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the two Readings in this section.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

An interactive or media element has been excluded from this version of the text. You can view it online here: https://pressbooks.ccconline.org/accmacro/?p=394

PART XV

LESSON 14: GLOBALIZATION, TRADE AND FINANCE

290. Why It Matters: Globalization, Trade and Finance

Why analyze the benefits and costs of international trade?

This module may be more important than you think. The topic is international trade and includes aspects of globalization and finance, but the theory explains every transaction we conduct. Why do people work for pay instead of growing their own food, building their own house and making their own clothes? Most people are capable of painting their own homes, yet professional painters continue to make a good living. How is international trade different from domestic trade? The answer is, "not very much, only in the details." People buy imported goods for the same reasons they buy domestic goods. And yet we often treat foreign and domestic trade as fundamentally different. A grocery chain from a nearby state has recently opened some stores in your neighborhood. How would you feel if the local government prohibited you from shopping at those new stores?

In this module, you will learn that just as buying from the local grocery store is better for most people than growing your own food, so international trade can add to your convenience and quality of life. And yet, most countries support some degree of protectionism, barriers to trade like tariffs, or quotas designed to "protect" domestic workers and companies.

As you proceed through this module, consider the following questions:

- What is comparative advantage?
- What are the gains from international trade?
- In what sense do barriers to trade protect American workers and companies?
- What are the costs of globalization? Are the costs worth it?
- What causes the foreign exchange value of a currency to increase or decrease?
- How does the balance of trade affect the macro economy?

An interactive or media element has been excluded from this version of the text. You can view it online here: https://pressbooks.ccconline.org/accmacro/?p=645

LEARNING OUTCOMES

- Define and calculate comparative and absolute advantage
- Explain how a nation's workers and consumers are affected by impact of international trade
- Understand the way government regulations (e.g. tariffs, quotas and non-tariff barriers) affect business, consumers and workers in the economy
- Differentiate between alternative international trade regimes and how they impact global trade
- Define currency exchange rates and explain how they influence trade balances
- Explain how the balance of trade (surplus or deficit) affects the domestic economy, and how the domestic economy affects the balance of trade
- Connect globalization, international trade, and international finance

291. Outcome: Comparative and Absolute Advantage

What you'll learn to do: define and calculate comparative and absolute advantage

In this section, you will learn about the basics behind international trade and why it is helpful for countries to specialize in production of particular goods or services.

LEARNING ACTIVITIES

The learning activities for this section include the following:

- Reading: Introduction to International Trade
- Reading: Absolute Advantage
- Reading: Absolute and Comparative Advantage
- Reading: Intra-Industry Trade
- Reading: Reducing Barriers to Trade
- Self Check: Comparative and Absolute Advantage

Take time to review and reflect on each of these activities in order to improve your performance on the assessment for this section.

292. Reading: Introduction to International Trade

Figure 19.1. *Apple or Samsung iPhone? While the iPhone is readily recognized as an Apple product, 26% of the component costs in it come from components made by rival phone-maker, Samsung. In international trade, there are often "conflicts" like this as each country or company focuses on what it does best. (Credit: modification of work by Yutaka Tsutano Creative Commons)*

JUST WHOSE IPHONE IS IT?

The iPhone is a global product. Apple does not manufacture the iPhone components, nor does it assemble them. The assembly is done by Foxconn Corporation, a Taiwanese company, at its factory in Sengzhen, China. But, Samsung, the electronics firm and competitor to Apple, actually supplies many of the parts that make up an iPhone—about 26%. That means, that Samsung is both the biggest supplier and biggest competitor for Apple. Why do these two firms work together to produce the iPhone? To understand the

economic logic behind international trade, you have to accept, as these firms do, that trade is about mutually beneficial exchange. Samsung is one of the world's largest electronics parts suppliers. Apple lets Samsung focus on making the best parts, which allows Apple to concentrate on its strength—designing elegant products that are easy to use. If each company (and by extension each country) focuses on what it does best, there will be gains for all through trade.

We live in a global marketplace. The food on your table might include fresh fruit from Chile, cheese from France, and bottled water from Scotland. Your wireless phone might have been made in Taiwan or Korea. The clothes you wear might be designed in Italy and manufactured in China. The toys you give to a child might have come from India. The car you drive might come from Japan, Germany, or Korea. The gasoline in the tank might be refined from crude oil from Saudi Arabia, Mexico, or Nigeria. As a worker, if your job is involved with farming, machinery, airplanes, cars, scientific instruments, or many other technology-related industries, the odds are good that a hearty proportion of the sales of your employer—and hence the money that pays your salary—comes from export sales. We are all linked by international trade, and the volume of that trade has grown dramatically in the last few decades.

Trade and exchange has been with us since the beginning of human civilization. For example, in the 3rd millennium BCE, southern Mesopotamian communities settled and began to cultivate grains. Agricultural surpluses led to expanded trade with neighboring regions for items not readily available in Mesopotamia such as hardwood, exotic foods and animals, semi-precious stones, hard stones, and metals. This trade transformed subsistence agricultural villages to urban centers and city-states. Scholars, using evidence from the Royal Cemetery at Ur in present day Iraq, suggest that southern Mesopotamian communities traded with other city-states as far as the Indus Valley and Anatolia. Another example of trade before the ascent of Western civilization can be found in China. Chinese maritime power reach its ascendency two centuries

before the Europeans during the eighth century. The Ming dynasty used sophisticated maritime equipment unknown in Europe to trade with city states in the far reaches of the Indian Ocean and into the African continent. Similar stories about trade can be told about the Ancient Roman Empire, the Mayans, and the Islamic or Ottoman Empire in 1300 AD.

Despite a long history of international exchange in goods and services, economists such as Paul Krugman argue that the first wave of (western) globalization started in the nineteenth century and and lasted up to the beginning of World War I. Over that time, global exports as a share of global GDP rose from less than 1% of GDP in 1820 to 9% of GDP in 1913. Transportation technology such as steamships and railroads facilitated trade in standardized commodities such as wheat and wool, that were fully global in their reach. When the first submarine telegraph cable was laid under the Atlantic Ocean in 1858, the global flow of information improved and by 1900 all of the world's major economic regions could effectively communicate instantaneously.

Over time the technologies that connect us have changed. They have allowed us to transcend distance faster and to transport goods and services between nations and individuals in different ways. Legal and financial institutions have also changed. With these changes in technologies and institutions, the nature and composition of trade and globalization has changed. Globalization has had positive and negative impacts as we will see in this module. One thing however remains constant: the human instinct to trade comes from a simple insight that trade is about "mutually beneficial exchange."

293. Reading: Absolute and Comparative Advantage

Absolute and Comparative Advantage

The American statesman Benjamin Franklin (1706–1790) once wrote: "No nation was ever ruined by trade." Many economists would express their attitudes toward international trade in an even more positive manner. The evidence that international trade confers overall benefits on economies is pretty strong. Trade has accompanied economic growth in the United States and around the world. Many of the national economies that have shown the most rapid growth in the last few decades—for example, Japan, South Korea, China, and India—have done so by dramatically orienting their economies toward international trade. There is no modern example of a country that has shut itself off from world trade and yet prospered. To understand the benefits of trade, or why we trade in the first place, we need to understand the concepts of comparative and absolute advantage.

In 1817, *David Ricardo*, a businessman, economist, and member of the British Parliament, wrote a treatise called *On the Principles of Political Economy and Taxation*. In this treatise, Ricardo argued that specialization and free trade benefit all trading partners, even those that may be relatively inefficient. To see what he meant, we must be able to distinguish between absolute and comparative advantage.

A country has an *absolute advantage* in producing a good over another country if it uses fewer resources to produce that good. Absolute advantage can be the result of a country's natural endowment. For example, extracting oil in Saudi Arabia is pretty much just a matter of "drilling a hole." Producing oil in other countries can require considerable exploration and costly

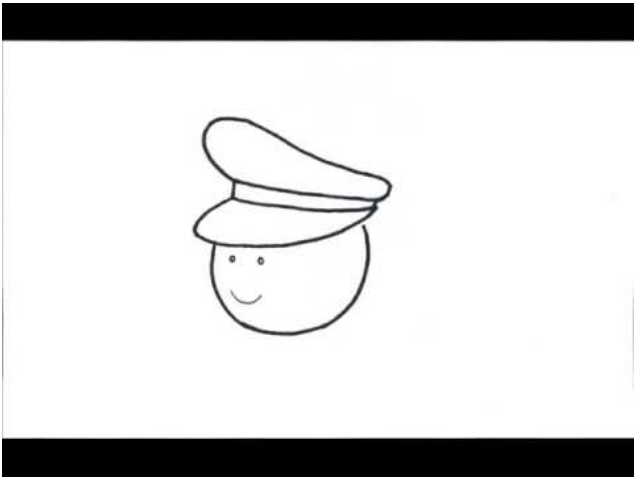
technologies for drilling and extraction—if indeed they have any oil at all. The United States has some of the richest farmland in the world, making it easier to grow corn and wheat than in many other countries. Guatemala and Colombia have climates especially suited for growing coffee. Chile and Zambia have some of the world's richest copper mines. As some have argued, "geography is destiny." Chile will provide copper and Guatemala will produce coffee, and they will trade. When each country has a product others need and it can be produced with fewer resources in one country over another, then it is easy to imagine all parties benefitting from trade. However, thinking about trade just in terms of geography and absolute advantage is incomplete. Trade really occurs because of comparative advantage.

A country has a *comparative advantage* when a good can be produced at a lower cost in terms of other goods. The question each country or company should be asking when it trades is this: "What do we give up to produce this good?" This should sound like the familiar concept of *opportunity cost* from Choice in a World of Scarcity. For example, if Zambia focuses its resources on producing copper, its labor, land and financial resources cannot be used to produce other goods such as corn. As a result, Zambia gives up the opportunity to produce corn. How do we quantify the cost in terms of other goods? Simplify the problem and assume that Zambia just needs labor to produce copper and corn. The companies that produce either copper or corn tell you that it takes 10 hours to mine a ton of copper and 20 hours to harvest a bushel of corn. This means the opportunity cost of producing a ton of copper is 2 bushels of corn. The next section develops absolute and comparative advantage in greater detail and relates them to trade.

Link It Up

Visit this website for a list of articles and podcasts pertaining to international trade topics.

Watch the following video to better understand why countries benefit from specialization.



A YouTube element has been excluded from this version of the text. You can view it online here:
https://pressbooks.ccconline.org/accmacro/?p=651

A Numerical Example of Absolute and Comparative Advantage

Consider a hypothetical world with two countries, Saudi Arabia and the United States, and two products, oil and corn. Further assume

that consumers in both countries desire both these goods. These goods are homogeneous, meaning that consumers/producers cannot differentiate between corn or oil from either country. There is only one resource available in both countries, labor hours. Saudi Arabia can produce oil with fewer resources, while the United States can produce corn with fewer resources. Table 19.1 illustrates the advantages of the two countries, expressed in terms of how many hours it takes to produce one unit of each good.

Table 19.1 How Many Hours It Takes to Produce Oil and Corn

Country	Oil (hours per barrel)	Corn (hours per bushel)
Saudi Arabia	1	4
United States	2	1

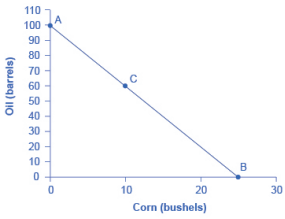
In Table 19.1, Saudi Arabia has an absolute advantage in the production of oil because it only takes an hour to produce a barrel of oil compared to two hours in the United States. The United States has an absolute advantage in the production of corn.

To simplify, let's say that Saudi Arabia and the United States each have 100 worker hours (see Table 19.2). We illustrate what each country is capable of producing on its own using a *production possibility frontier (PPF)* graph, shown in Figure 19.2. Recall from Choice in a World of Scarcity that the production possibilities frontier shows the maximum amount that each country can produce given its limited resources, in this case workers, and its level of technology.

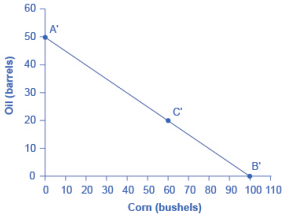
Corn Production using 100 worker hours (bushels)

Table 19.2 Production Possibilities before Trade

Country	Oil Production using 100 worker hours (barrels)		
Saudi Arabia	100	or	25
United States	50	or	100



(a) Saudi Arabia



(b) The United States

Figure 19.2. *Production Possibilities Frontiers (a) Saudi Arabia can produce 100 barrels of oil at maximum and zero corn (point A), or 25 bushels of corn and zero oil (point B). It can also produce other combinations of oil and corn if it wants to consume both goods, such as at point C. Here it chooses to produce/consume 60 barrels of oil, leaving 40 work hours that can be allocated to producing 10 bushels of corn, using the data in Table 19.1. (b) If the United States produces only oil, it can produce, at maximum, 50 barrels and zero corn (point A'), or at the other*

extreme, it can produce a maximum of 100 bushels of corn and no oil (point B'). Other combinations of both oil and corn are possible, such as point C'. All points above the frontiers are impossible to produce given the current level of resources and technology.

Arguably Saudi and U.S. consumers desire both oil and corn to live. Let's say that before trade occurs, both countries produce and consume at point C or C'. Thus, before trade, the Saudi Arabian economy will devote 60 worker hours to produce oil, as shown in Table 19.3. Given the information in Table 19.1, this choice implies that it produces/consumes 60 barrels of oil. With the remaining 40 worker hours, since it needs four hours to produce a bushel of corn, it can produce only 10 bushels. To be at point C', the U.S. economy devotes 40 worker hours to produce 20 barrels of oil and the remaining worker hours can be allocated to produce 60 bushels of corn.

Production before Trade

Country	**Oil Production (barrels)**	**Corn Production (bushels)**
Saudi Arabia (C)	60	10
United States (C')	20	60
Total World Production	**80**	**70**

The slope of the production possibility frontier illustrates the opportunity cost of producing oil in terms of corn. Using all its resources, the United States can produce 50 barrels of oil *or* 100 bushels of corn. So the opportunity cost of one barrel of oil is two bushels of corn—or the slope is 1/2. Thus, in the U.S. production possibility frontier graph, every increase in oil production of one barrel implies a decrease of two bushels of corn. Saudi Arabia can produce 100 barrels of oil *or* 25 bushels of corn. The opportunity cost of producing one barrel of oil is the loss of 1/4 of a bushel of corn that Saudi workers could otherwise have produced. In terms of

corn, notice that Saudi Arabia gives up the least to produce a barrel of oil. These calculations are summarized in Table 19.4.

Opportunity Cost and Comparative Advantage

Country	Opportunity cost of one unit – Oil (in terms of corn)	Opportunity cost of one unit – Corn (in terms of oil)
Saudi Arabia	¼	4
United States	2	½

Again recall that comparative advantage was defined as the opportunity cost of producing goods. Since Saudi Arabia gives up the least to produce a barrel of oil, (¼ < 2 in Table 19.4) it has a comparative advantage in oil production. The United States gives up the least to produce a bushel of corn, so it has a comparative advantage in corn production.

In this example, there is symmetry between absolute and comparative advantage. Saudi Arabia needs fewer worker hours to produce oil (absolute advantage, see Table 19.1), and also gives up the least in terms of other goods to produce oil (comparative advantage, see Table 19.4). Such symmetry is not always the case, as we will show after we have discussed gains from trade fully. But first, read the following feature to make sure you understand why the PPF line in the graphs is straight.

Can a production possibility frontier be straight?

When you first met the production possibility frontier (PPF) in the module on Choice in a World of Scarcity it was drawn with an outward-bending shape. This shape illustrated that as inputs were transferred from producing one good to another–like from education to health services–there were increasing opportunity costs. In the examples in this module, the PPFs are drawn as straight

lines, which means that opportunity costs are constant. When a marginal unit of labor is transferred away from growing corn and toward producing oil, the decline in the quantity of corn and the increase in the quantity of oil is always the same. In reality this is possible only if the contribution of additional workers to output did not change as the scale of production changed. The linear production possibilities frontier is a less realistic model, but a straight line simplifies calculations. It also illustrates economic themes like absolute and comparative advantage just as clearly.

294. Reading: Absolute Advantage

What Happens When a Country Has an Absolute Advantage in All Goods

What happens to the possibilities for trade if one country has an absolute advantage in everything? This is typical for high-income countries that often have well-educated workers, technologically advanced equipment, and the most up-to-date production processes. These high-income countries can produce all products with fewer resources than a low-income country. If the high-income country is more productive across the board, will there still be gains from trade? Good students of Ricardo understand that trade is about mutually beneficial exchange. Even when one country has an absolute advantage in all products, trade can still benefit both sides. This is because gains from trade come from specializing in one's comparative advantage.

Production Possibilities and Comparative Advantage

Consider the example of trade between the United States and Mexico described in Table 19.1. In this example, it takes four U.S. workers to produce 1,000 pairs of shoes, but it takes five Mexican workers to do so. It takes one U.S. worker to produce 1,000 refrigerators, but it takes four Mexican workers to do so. The United States has an absolute advantage in productivity with regard to both shoes and refrigerators; that is, it takes fewer workers in the United

States than in Mexico to produce both a given number of shoes and a given number of refrigerators.

Table 19.1. Resources Needed to Produce Shoes and Refrigerators

Country	Number of Workers needed to produce 1,000 units – Shoes	Number of Workers needed to produce 1,000 units – Refrigerators
United States	4 workers	1 worker
Mexico	5 workers	4 workers

Absolute advantage simply compares the *productivity* of a worker between countries. It answers the question, "How many inputs do I need to produce shoes in Mexico?" Comparative advantage asks this same question slightly differently. Instead of comparing how many workers it takes to produce a good, it asks, "How much am I giving up to produce this good in this country?" Another way of looking at this is that comparative advantage identifies the good for which the producer's absolute advantage is relatively larger, or where the producer's absolute productivity disadvantage is relatively smaller. The United States can produce 1,000 shoes with four-fifths as many workers as Mexico (four versus five), but it can produce 1,000 refrigerators with only one-quarter as many workers (one versus four). So, the comparative advantage of the United States, where its absolute productivity advantage is relatively greatest, lies with refrigerators, and Mexico's comparative advantage, where its absolute productivity disadvantage is least, is in the production of shoes.

Mutually Beneficial Trade with Comparative Advantage

When nations increase production in their area of comparative advantage and trade with each other, both countries can benefit.

Again, the production possibility frontier is a useful tool to visualize this benefit.

Consider a situation where the United States and Mexico each have 40 workers. For example, as Table 19.2 shows, if the United States divides its labor so that 40 workers are making shoes, then, since it takes four workers in the United States to make 1,000 shoes, a total of 10,000 shoes will be produced. (If four workers can make 1,000 shoes, then 40 workers will make 10,000 shoes). If the 40 workers in the United States are making refrigerators, and each worker can produce 1,000 refrigerators, then a total of 40,000 refrigerators will be produced.

Refrigerator Production – using 40 workers

Table 19.2. Production Possibilities before Trade with Complete Specialization

Country	**Shoe Production – using 40 workers**		
United States	10,000 shoes	or	40,000 refrigerators
Mexico	8,000 shoes	or	10,000 refrigerators

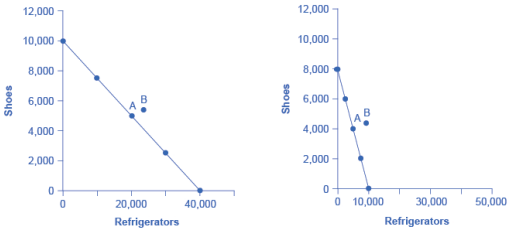


Figure 19.1. *Production Possibility Frontiers. (a) With 40 workers, the United States can produce either 10,000 shoes and zero refrigerators or 40,000 refrigerators and zero shoes. (b) With 40 workers, Mexico can produce a maximum of 8,000 shoes and zero refrigerators, or 10,000 refrigerators and zero shoes. All other points on the production possibility line are possible combination s of the two goods that can be produced given current resources. Point A on both graphs is where the countries start producing and consuming*

before trade. Point B is where they end up after trade.

As always, the slope of the production possibility frontier for each country is the opportunity costs as labor is transferred from shoe production to refrigerators, or vice versa (see Figure 19.1).

Let's say that, in the situation before trade, each nation prefers to produce a combination of shoes and refrigerators that is shown at point A. Table 19.3 shows the output of each good for each country and the total output for the two countries.

Table 19.3 Total Production at Point A before Trade

Country	Current Shoe Production	Current Refrigerator Production
United States	5,000	20,000
Mexico	4,000	5,000
Total	**9,000**	**25,000**

Continuing with this scenario, each country transfers some amount of labor toward its area of comparative advantage. For example, the United States transfers six workers away from shoes and toward producing refrigerators. As a result, U.S. production of shoes decreases by 1,500 units (6/4 × 1,000), while its production of refrigerators increases by 6,000 (that is, 6/1 × 1,000). Mexico also moves production toward its area of comparative advantage, transferring 10 workers away from refrigerators and toward production of shoes. As a result, production of refrigerators in Mexico falls by 2,500 (10/4 × 1,000), but production of shoes increases by 2,000 pairs (10/5 × 1,000). Notice that when both countries shift production toward each of their comparative advantages (what they are relatively better at), their combined production of both goods rises, as shown in Table 19.4. The reduction of shoe production by 1,500 pairs in the United States is more than offset by the gain of 2,000 pairs of shoes in Mexico, while the reduction of 2,500 refrigerators in Mexico is more than offset by the additional 6,000 refrigerators produced in the United States.

Table 19.4 Shifting Production Toward Comparative Advantage Raises Total Output

Country	Shoe Production	Refrigerator Production
United States	3,500	26,000
Mexico	6,000	2,500
Total	**9,500**	**28,500**

This numerical example illustrates the remarkable insight of comparative advantage: even when one country has an absolute advantage in all goods and another country has an absolute disadvantage in all goods, both countries can still benefit from trade. Even though the United States has an absolute advantage in producing both refrigerators and shoes, it makes economic sense for it to specialize in the good for which it has a comparative advantage. The United States will export refrigerators and in return import shoes.

How Opportunity Cost Sets the Boundaries of Trade

This example shows that both parties can benefit from specializing in their comparative advantages and trading. By using the opportunity costs in this example, it is possible to identify the range of possible trades that would benefit each country.

Mexico started out, before specialization and trade, producing 4,000 pairs of shoes and 5,000 refrigerators (see Figure 19.1 and Table 19.3). Then, in the numerical example given, Mexico shifted production toward its comparative advantage and produced 6,000 pairs of shoes but only 2,500 refrigerators. Thus, if Mexico can *export* no more than 2,000 pairs of shoes (giving up 2,000 pairs of shoes) in exchange for *imports* of at least 2,500 refrigerators (a gain of 2,500 refrigerators), it will be able to consume more of both goods than before trade. Mexico will be unambiguously better

off. Conversely, the United States started off, before specialization and trade, producing 5,000 pairs of shoes and 20,000 refrigerators. In the example, it then shifted production toward its comparative advantage, producing only 3,500 shoes but 26,000 refrigerators. If the United States can export no more than 6,000 refrigerators in exchange for imports of at least 1,500 pairs of shoes, it will be able to consume more of both goods and will be unambiguously better off.

The range of trades that can benefit both nations is shown in Table 19.5. For example, a trade where the U.S. exports 4,000 refrigerators to Mexico in exchange for 1,800 pairs of shoes would benefit both sides, in the sense that both countries would be able to consume more of both goods than in a world without trade.

Table 19.5. The Range of Trades That Benefit Both the United States and Mexico

The U.S. economy, after specialization, will benefit if it:	**The Mexican economy, after specialization, will benefit if it:**
Exports fewer than 6,000 refrigerators	*Imports* at least 2,500 refrigerators
Imports at least 1,500 pairs of shoes	*Exports* no more than 2,000 pairs of shoes

Trade allows each country to take advantage of lower opportunity costs in the other country. If Mexico wants to produce more refrigerators without trade, it must face its domestic opportunity costs and reduce shoe production. If Mexico, instead, produces more shoes and then trades for refrigerators made in the United States, where the *opportunity cost* of producing refrigerators is lower, Mexico can in effect take advantage of the lower opportunity cost of refrigerators in the United States. Conversely, when the United States specializes in its comparative advantage of refrigerator production and trades for shoes produced in Mexico, international trade allows the United States to take advantage of the lower opportunity cost of shoe production in Mexico.

The theory of comparative advantage explains why countries

trade: they have different comparative advantages. It shows that the gains from international trade result from pursuing comparative advantage and producing at a lower opportunity cost. The following feature shows how to calculate absolute and comparative advantage and the way to apply them to a country's production.

Calculating Absolute and Comparative Advantage

In Canada a worker can produce 20 barrels of oil or 40 tons of lumber. In Venezuela, a worker can produce 60 barrels of oil or 30 tons of lumber.

Lumber(tons)

Table 19.6

Country	Oil(barrels)		
Canada	20	or	40
Venezuela	60	or	30

1. Who has the absolute advantage in the production of oil or lumber? How can you tell?
2. Which country has a comparative advantage in the production of oil?
3. Which country has a comparative advantage in producing lumber?
4. In this example, is absolute advantage the same as comparative advantage, or not?
5. In what product should Canada specialize? In what product should Venezuela specialize?

Step 1. Make a table like Table 19.6.

Step 2. To calculate absolute advantage, look at the larger of

the numbers for each product. One worker in Canada can produce more lumber (40 tons versus 30 tons), so Canada has the absolute advantage in lumber. One worker in Venezuela can produce 60 barrels of oil compared to a worker in Canada who can produce only 20.

Step 3. To calculate comparative advantage, find the opportunity cost of producing one barrel of oil in both countries. The country with the lowest opportunity cost has the comparative advantage. With the same labor time, Canada can produce either 20 barrels of oil or 40 tons of lumber. So in effect, 20 barrels of oil is equivalent to 40 tons of lumber: 20 oil = 40 lumber. Divide both sides of the equation by 20 to calculate the opportunity cost of one barrel of oil in Canada. 20/20 oil = 40/20 lumber. 1 oil = 2 lumber. To produce one additional barrel of oil in Canada has an opportunity cost of 2 lumber. Calculate the same way for Venezuela: 60 oil = 30 lumber. Divide both sides of the equation by 60. One oil in Venezuela has an opportunity cost of 1/3 lumber. Because 1/3 lumber < 2 lumber, Venezuela has the comparative advantage in producing oil.

Step 4. Calculate the opportunity cost of one lumber by reversing the numbers, with lumber on the left side of the equation. In Canada, 40 lumber is equivalent in labor time to 20 barrels of oil: 40 lumber = 20 oil. Divide each side of the equation by 40. The opportunity cost of one lumber is 1/2 oil. In Venezuela, the equivalent labor time will produce 30 lumber or 60 oil: 30 lumber = 60 oil. Divide each side by 30. One lumber has an opportunity cost of two oil. Canada has the lower opportunity cost in producing lumber.

Step 5. In this example, absolute advantage is the same as comparative advantage. Canada has the absolute and comparative advantage in lumber; Venezuela has the absolute and comparative advantage in oil.

Step 6. Canada should specialize in what it has a relative lower opportunity cost, which is lumber, and Venezuela should specialize in oil. Canada will be exporting lumber and importing oil, and Venezuela will be exporting oil and importing lumber.

Comparative Advantage Goes Camping

To build an intuitive understanding of how comparative advantage can benefit all parties, set aside examples that involve national economies for a moment and consider the situation of a group of friends who decide to go camping together. The six friends have a wide range of skills and experiences, but one person in particular, Jethro, has done lots of camping before and is also a great athlete. Jethro has an absolute advantage in all aspects of camping: he is faster at carrying a backpack, gathering firewood, paddling a canoe, setting up tents, making a meal, and washing up. So here is the question: Because Jethro has an absolute productivity advantage in everything, should he do all the work?

Of course not! Even if Jethro is willing to work like a mule while everyone else sits around, he, like most mortals, only has 24 hours in a day. If everyone sits around and waits for Jethro to do everything, not only will Jethro be an unhappy camper, but there will not be much output for his group of six friends to consume. The theory of comparative advantage suggests that everyone will benefit if they figure out their areas of comparative advantage—that is, the area of camping where their productivity disadvantage is least, compared to Jethro. For example, it may be that Jethro is 80% faster at building fires and cooking meals than anyone else, but only 20% faster at gathering firewood and 10% faster at setting up tents. In that case, Jethro should focus on building fires and making meals, and others should attend to the other tasks, each according to where their productivity disadvantage is smallest. If the campers coordinate their efforts according to comparative advantage, they can all gain.

295. Reading: Intra-Industry Trade

The Prevalence of Intra-industry Trade between Similar Economies

Absolute and comparative advantages explain a great deal about patterns of global trade. For example, they help to explain the patterns noted at the start of this module, like why you may be eating fresh fruit from Chile or Mexico, or why lower productivity regions like Africa and Latin America are able to sell a substantial proportion of their exports to higher productivity regions like the European Union and North America. Comparative advantage, however, at least at first glance, does not seem especially well-suited to explain other common patterns of international trade.

The theory of comparative advantage suggests that trade should happen between economies with large differences in opportunity costs of production. Roughly half of all world trade involves shipping goods between the fairly similar high-income economies of the United States, Canada, the European Union, Japan, Mexico, and China (see Table 19.7).

Table 19.7. Where U.S. Exports Go and U.S. Imports Originate (2013)

Country	U.S. Exports Go to . . .	U.S. Imports Come from . . .
European Union	17.0%	16.0%
Canada	19.0%	14.0%
Japan	5.0%	6.0%
Mexico	14.0%	12.0%
China	7.0%	18.0%

Source: http://www.census.gov/foreign-trade/statistics/highlights/toppartners.html

Moreover, the theory of comparative advantage suggests that each economy should specialize to a degree in certain products, and then exchange those products. A high proportion of trade, however, is *intra-industry trade*—that is, trade of goods within the same industry from one country to another. For example, the United States produces and exports autos and imports autos. Table 19.8 shows some of the largest categories of U.S. exports and imports. In all of these categories, the United States is both a substantial exporter and a substantial importer of goods from the same industry. In 2012, according to the Bureau of Economic Analysis, the United States exported $146 billion worth of autos, and imported $298 billion worth of autos. About 60% of U.S. trade and 60% of European trade is intra-industry trade.

Table 19.8 Some Intra-Industry U.S. Exports and Imports in 2012

Some U.S. Exports	Quantity of Exports ($ billions)	Quantity of Imports ($ billions)
Autos	$146	$298
Food and beverages	$133	$110
Capital goods	$527	$549
Consumer goods	$182	$516
Passenger fares	$39	$35
Other transportation	$45	$55

Source: http://bea.gov/newsreleases/international/trade/2013/pdf/trad1212.pdf

Why do similar high-income economies engage in intra-industry trade? What can be the economic benefit of having workers of fairly similar skills making cars, computers, machinery and other products which are then shipped across the oceans to and from the United States, the European Union, and Japan? There are two reasons: (1) The *division of labor* leads to learning, innovation, and unique skills; and (2) economies of scale.

Gains from Specialization and Learning

Consider the category of machinery, where the U.S. economy has considerable intra-industry trade. Machinery comes in many varieties, so the United States may be exporting machinery for manufacturing with wood, but importing machinery for photographic processing. The underlying reason why a country like the United States, Japan, or Germany produces one kind of machinery rather than another is usually not related to U.S., German, or Japanese firms and workers having generally higher or lower skills. It is just that, in working on very specific and particular

products, firms in certain countries develop unique and different skills.

Specialization in the world economy can be very finely split. In fact, recent years have seen a trend in international trade called *splitting up the value chain*. The *value chain* describes how a good is produced in stages. As indicated in the beginning of the module, the production of the iPhone involves the design and engineering of the phone in the United States, parts supplied from Korea, the assembly of the parts in China, and the advertising and marketing done in the United States. Thanks in large part to improvements in communication technology, sharing information, and transportation, it has become easier to split up the value chain.

Instead of production in a single large factory, all of these steps can be split up among different firms operating in different places and even different countries. Because firms split up the value chain, international trade often does not involve whole finished products like automobiles or refrigerators being traded between nations. Instead, it involves shipping more specialized goods like, say, automobile dashboards or the shelving that fits inside refrigerators. Intra-industry trade between similar countries produces economic gains because it allows workers and firms to learn and innovate on particular products—and often to focus on very particular parts of the value chain.

Link It Up

Visit this website for some interesting information about the assembly of the iPhone.

Economies of Scale, Competition, Variety

A second broad reason that intra-industry trade between similar nations produces economic gains involves economies of scale. The concept of *economies of scale* means that as the scale of output goes up, average costs of production decline—at least up to a point. Figure 19.2 illustrates economies of scale for a plant producing toaster ovens. The horizontal axis of the figure shows the quantity of production by a certain firm or at a certain manufacturing plant. The vertical axis measures the average cost of production. Production plant S produces a small level of output at 30 units and has an average cost of production of $30 per toaster oven. Plant M produces at a medium level of output at 50 units, and has an average cost of production of $20 per toaster oven. Plant L produces 150 units of output with an average cost of production of only $10 per toaster oven. Although plant V can produce 200 units of output, it still has the same unit cost as Plant L.

In this example, a small or medium plant, like S or M, will not be able to compete in the market with a large or a very large plant like L or V, because the firm that operates L or V will be able to produce and sell their output at a lower price. In this example, economies of scale operate up to point L, but beyond point L to V, the additional scale of production does not continue to reduce average costs of production.

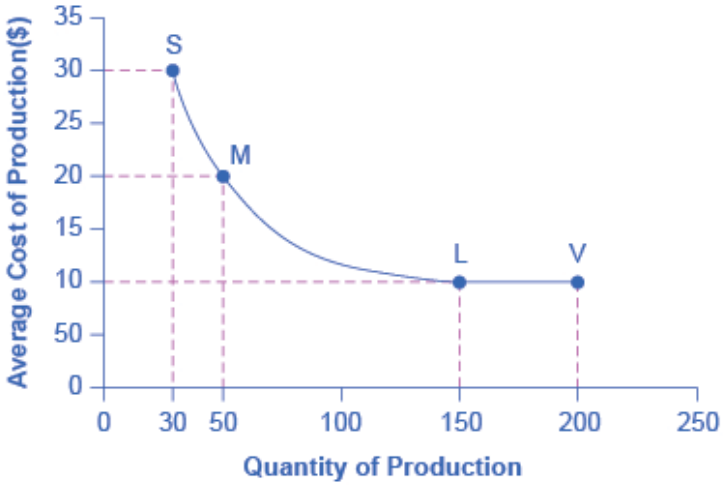


Figure 19.2 *Economies of Scale Production. Plant S, has an average cost of production of $30 per toaster oven. Production plant M has an average cost of production of $20 per toaster oven. Production plant L has an average cost of production of only $10 per toaster oven. Production plant V would still have an average cost of production of $10 per toaster oven. Thus, production plant M can produce toaster ovens more cheaply than plant S because of economies of scale, and plants L or V can produce more cheaply than S or M because of economies of scale. However, the economies of scale end at an output level of 150. Plant V, despite being larger, cannot produce more cheaply on average than plant L.*

The concept of economies of scale becomes especially relevant to international trade when it enables one or two large producers to supply the entire country. For example, a single large automobile factory could probably supply all the cars purchased in a smaller economy like the United Kingdom or Belgium in a given year. However, if a country has only one or two large factories producing cars, and no *international trade*, then consumers in that country would have relatively little choice between kinds of cars (other than the color of the paint and other nonessential options). Little or no competition will exist between different car manufacturers.

International trade provides a way to combine the lower average

production costs that come from economies of scale and still have competition and variety for consumers. Large automobile factories in different countries can make and sell their products around the world. If the U.S. automobile market was made up of only General Motors, Ford, and Chrysler, the level of competition and consumer choice would be quite a lot lower than when U.S. carmakers must face competition from Toyota, Honda, Suzuki, Fiat, Mitsubishi, Nissan, Volkswagen, Kia, Hyundai, BMW, Subaru, and others. Greater competition brings with it innovation and responsiveness to what consumers want. America's car producers make far better cars now than they did several decades ago, and much of the reason is competitive pressure, especially from East Asian and European carmakers.

Dynamic Comparative Advantage

The sources of gains from intra-industry trade between similar economies—namely, the learning that comes from a high degree of specialization and splitting up the value chain and from economies of scale—do not contradict the earlier theory of comparative advantage. Instead, they help to broaden the concept.

In intra-industry trade, the level of worker productivity is not determined by climate or geography. It is not even determined by the general level of education or skill. Instead, the level of worker productivity is determined by how firms engage in specific learning about specialized products, including taking advantage of economies of scale. In this vision, comparative advantage can be dynamic—that is, it can evolve and change over time as new skills are developed and as the value chain is split up in new ways. This line of thinking also suggests that countries are not destined to have the same comparative advantage forever, but must instead be flexible in response to ongoing changes in comparative advantage.

296. Reading: Reducing Barriers to Trade

Reducing Barriers to Trade

Tariffs are taxes that governments place on imported goods for a variety of reasons. Some of these reasons include protecting sensitive industries, for humanitarian reasons, and protecting against *dumping*. Traditionally, tariffs were used simply as a political tool to protect certain vested economic, social, and cultural interests. The *World Trade Organization* (WTO) is committed to lowering barriers to trade. The world's nations meet through the WTO to negotiate how they can reduce barriers to trade, such as tariffs. WTO negotiations happen in "rounds," where all countries negotiate one agreement to encourage trade, take a year or two off, and then start negotiating a new agreement. The current round of negotiations is called the Doha Round because it was officially launched in Doha, the capital city of Qatar, in November 2001. In 2009, economists from the World Bank summarized recent research and found that the Doha round of negotiations would increase the size of the world economy by $160 billion to $385 billion per year, depending on the precise deal that ended up being negotiated.

In the context of a global economy that currently produces more than $30 trillion of goods and services each year, this amount is not huge: it is an increase of 1% or less. But before dismissing the gains from trade too quickly, it is worth remembering two points.

- First, a gain of a few hundred billion dollars is enough money to deserve attention! Moreover, remember that this increase is not a one-time event; it would persist each year into the future.

- Second, the estimate of gains may be on the low side because some of the gains from trade are not measured especially well in economic statistics. For example, it is difficult to measure the potential advantages to consumers of having a variety of products available and a greater degree of competition among producers. Perhaps the most important unmeasured factor is that trade between countries, especially when firms are splitting up the value chain of production, often involves a transfer of knowledge that can involve skills in production, technology, management, finance, and law.

Low-income countries benefit more from trade than high-income countries do. In some ways, the giant U.S. economy has less need for international trade, because it can already take advantage of internal trade within its economy. However, many smaller national economies around the world, in regions like Latin America, Africa, the Middle East, and Asia, have much more limited possibilities for trade inside their countries or their immediate regions. Without international trade, they may have little ability to benefit from comparative advantage, slicing up the value chain, or economies of scale. Moreover, smaller economies often have fewer competitive firms making goods within their economy, and thus firms have less pressure from other firms to provide the goods and prices that consumers want.

The economic gains from expanding international trade are measured in hundreds of billions of dollars, and the gains from international trade as a whole probably reach well into the trillions of dollars. The potential for gains from trade may be especially high among the smaller and lower-income countries of the world.

Link It Up

Visit this website for a list of some benefits of trade.

From Interpersonal to International Trade

Most people find it easy to believe that they, personally, would not be better off if they tried to grow and process all of their own food, to make all of their own clothes, to build their own cars and houses from scratch, and so on. Instead, we all benefit from living in economies where people and firms can specialize and trade with each other.

The benefits of trade do not stop at national boundaries, either. Earlier we explained that the division of labor could increase output for three reasons: (1) workers with different characteristics can specialize in the types of production where they have a comparative advantage; (2) firms and workers who specialize in a certain product become more productive with learning and practice; and (3) economies of scale. These three reasons apply from the individual and community level right up to the international level. If it makes sense to you that interpersonal, intercommunity, and interstate trade offer economic gains, it should make sense that international trade offers gains, too.

International trade currently involves about $20 trillion worth of goods and services moving around the globe. Any economic force of that size, even if it confers overall benefits, is certain to cause disruption and controversy. This module has only made the case that trade brings economic benefits. Other modules discuss, in detail, the public policy arguments over whether to restrict international trade.

It is Apple's (Global) iPhone

Apple Corporation uses a global platform to produce the iPhone. Now that you understand the concept of comparative advantage, you can see why the engineering and design of the iPhone is done

in the United States. The United States has built up a comparative advantage over the years in designing and marketing products, and sacrifices fewer resources to design high-tech devices relative to other countries. China has a comparative advantage in assembling the phone due to its large skilled labor force. Korea has a comparative advantage in producing components. Korea focuses its production by increasing its scale, learning better ways to produce screens and computer chips, and uses innovation to lower average costs of production. Apple, in turn, benefits because it can purchase these quality products at lower prices. Put the global assembly line together and you have the device with which we are all so familiar.

Self Check: Comparative and Absolute Advantage

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the five Readings in this section.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

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297. Outcome: Impact of International Trade

What you'll learn to do: explain how a nation's workers and consumers are affected by impact of international trade

In this section, you will examine international trade using the standard supply and demand framework.

LEARNING ACTIVITIES

The learning activities for this section include the following:

- Reading: Demand and Supply Analysis of International Trade
- Self Check: Impact of International Trade

Take time to review and reflect on each of these activities in order to improve your performance on the assessment for this section.

298. Reading: Demand and Supply Analysis of International Trade

Demand and Supply Analysis of International Trade

The theories of comparative advantage and absolute advantage show us that there are overall gains from trade. Trade does have distributional impacts however. These distributional impacts are easier to see if one was to represent free trade in a standard demand and supply framework.

Consider two countries, Brazil and the United States, who produce sugar. Each country has a domestic supply and demand for sugar, as detailed in Table 1 and illustrated in Figure 2. In Brazil, without trade, the equilibrium price of sugar is 12 cents per pound and the equilibrium output is 30 tons. When there is no trade in the United States, the equilibrium price of sugar is 24 cents per pound and the equilibrium quantity is 80 tons. These equilibrium points are labeled with the point E. Notice that in this set-up, Brazil is the low-cost provider of sugar and has the cost-advantage.

Table 1. The Sugar Trade between Brazil and the United States

Price	Brazil: Quantity Supplied (tons)	Brazil: Quantity Demanded (tons)	U.S.: Quantity Supplied (tons)	U.S.: Quantity Demanded (tons)
8 cents	20	35	60	100
12 cents	30	30	66	93
14 cents	35	28	69	90
16 cents	40	25	72	87
20 cents	45	21	76	83
24 cents	50	18	80	80
28 cents	55	15	82	78

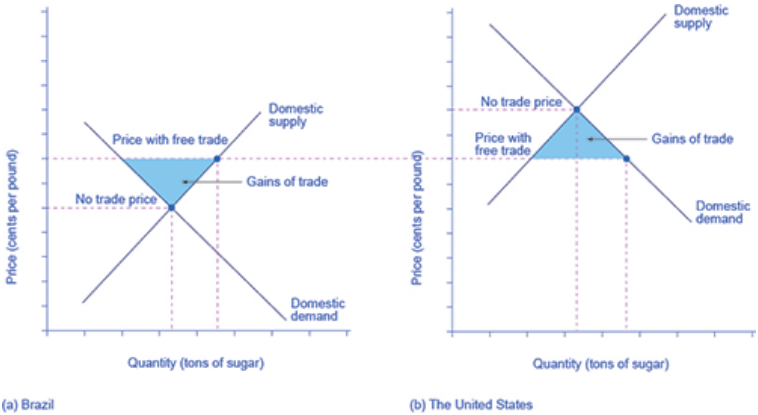

Figure 2. Free trade results in gains from trade. Total surplus increases in both countries. However, there are clear income distribution effects.

If international trade between Brazil and the United States now becomes possible, profit-seeking firms will spot an opportunity: buy sugar cheaply in Brazil, and sell it at a higher price in the United States. As sugar is shipped from Brazil to the United States, the quantity of sugar produced in Brazil will be greater than Brazilian consumption (with the extra production being exported), and the amount produced in the United States will be less than the amount

of U.S. consumption (with the extra consumption being imported). Exports to the United States will reduce the supply of sugar in Brazil, raising its price. Imports into the United States will increase the supply of sugar, lowering its price. When the price of sugar is the same in both countries, there is no incentive to trade further. As Figure 34.2 shows, the equilibrium with trade occurs at a price of 16 cents per pound. At that price, the sugar farmers of Brazil supply a quantity of 40 tons, while the consumers of Brazil buy only 25 tons.

The extra 15 tons of sugar production, shown by the horizontal gap between the demand curve and the supply curve in Brazil, is exported to the United States. In the United States, at a price of 16 cents, the farmers produce a quantity of 72 tons and consumers demand a quantity of 87 tons. The excess demand of 15 tons by American consumers, shown by the horizontal gap between demand and domestic supply at the price of 16 cents, is supplied by imported sugar.

Free trade typically results in income distribution effects, but the key is to recognize the overall gains from trade, as shown in Figure 34.3. Building on the concepts outlined in Demand and Supply and Demand, Supply, and Efficiency (http://cnx.org/content/m48832/latest/) in terms of consumer and producer surplus, Figure 34.3 (a) shows that producers in Brazil gain by selling more sugar at a higher price, while Figure 34.3 (b) shows consumers in the United States benefit from the lower price and greater availability of sugar. Consumers in Brazil are worse off (compare their no- trade consumer surplus with the free-trade consumer surplus) and U.S. producers of sugar are worse off. There are gains from trade—an increase in social surplus in each country. That is, both the United States and Brazil are better off than they would be without trade.

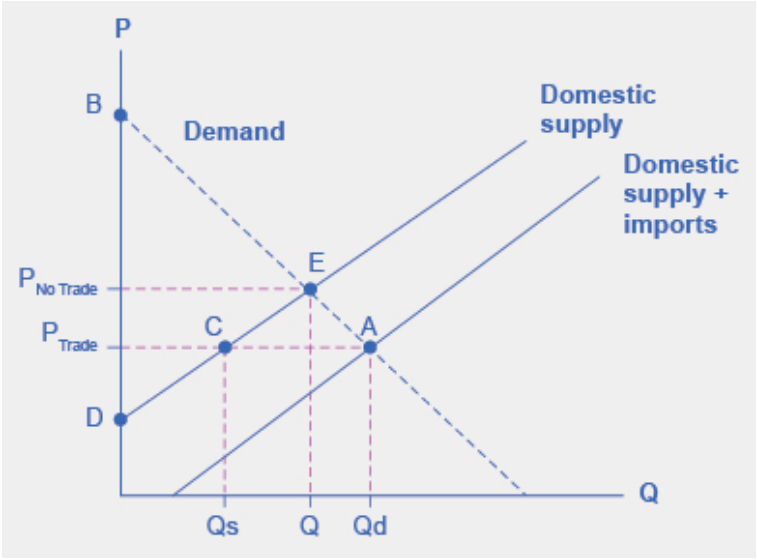

Figure 3. When there is free trade, the equilibrium is at point A. When there is no trade, the equilibrium is at point E.

The fact that there are distributional consequences to trade is exactly the reason why workers and business lobby government for trade restrictions and protectionist regulations.

Self Check: Impact of International Trade

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the Reading in this section.

Use this quiz to check your understanding and decide whether

to (1) study the previous section further or (2) move on to the next section.

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299. Outcome: Impact of Government Regulations

What you'll learn to do: understand the way government regulations (like tariffs, quotas and non-tariff barriers) affect businesses, consumers and workers in the economy

In this section, you will analyze the ripple effects of government regulations on the economy.

LEARNING ACTIVITIES

The learning activities for this section include the following:

- Reading: Restrictions on International Trade
- Video: Why Do Countries Restrict Trade?
- Reading: Justifications for Trade Restriction
- Video: Types of Trade Restrictions
- Case in Point: Outsourcing, Insourcing, and Employment
- Reading: The Tradeoffs of Trade Policy
- Self Check: Impacts of Government Regulations

Take time to review and reflect on each of these activities in order to improve your performance on the assessment for this section.

300. Reading: Restrictions on International Trade

Restrictions on International Trade

In spite of the strong theoretical case that can be made for free international trade, every country in the world has erected at least some barriers to trade. Trade restrictions are typically undertaken in an effort to protect companies and workers in the home economy from competition by foreign firms. A protectionist policy is one in which a country restricts the importation of goods and services produced in foreign countries. The slowdown in the U.S. economy late in 2007 and in 2008 has produced a new round of protectionist sentiment—one that became a factor in the 2008 U.S. presidential campaign.

The United States, for example, uses protectionist policies to limit the quantity of foreign-produced sugar coming into the United States. The effect of this policy is to reduce the supply of sugar in the U.S. market and increase the price of sugar in the United States. The 2008 U.S. Farm Bill sweetened things for sugar growers even more. It raised the price they are guaranteed to receive and limited imports of foreign sugar so that American growers will always have at least 85% of the domestic market. The bill for the first time set an income limit—only growers whose incomes fall below $1.5 million per year (for couples) or $750,000 for individuals will receive direct subsidies ([1]

The U.S. price of sugar is almost triple the world price of sugar,

1. "Who Wants to Be a Millionaire?" *The Wall Street Journal*, May 14, 2008, p. A20).

thus reducing the quantity consumed in the United States. The program benefits growers of sugar beets and sugar cane at the expense of consumers.

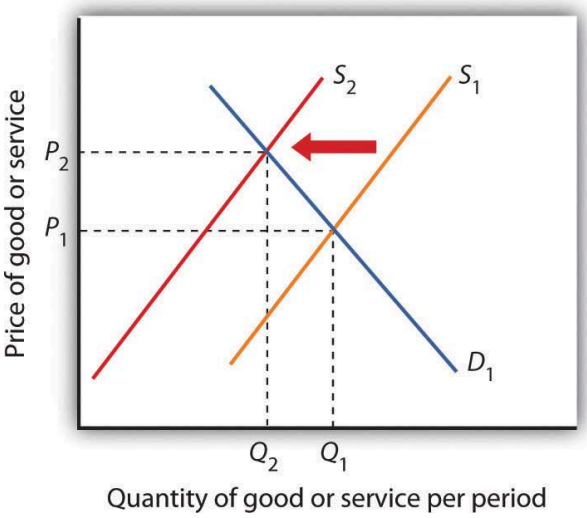


Figure 17.7. *The Impact of Protectionist Policies. Protectionist policies reduce the quantities of foreign goods and services supplied to the country that imposes the restriction. As a result, such policies shift the supply curve to the left for the good or service whose imports are restricted. In the case shown, the supply curve shifts to S2, the equilibrium price rises to P2, and the equilibrium quantity falls to Q2.*

In general, protectionist policies imposed for a particular good always reduce its supply, raise its price, and reduce the equilibrium quantity, as shown in Figure 17.7 "The Impact of Protectionist

Policies". Protection often takes the form of an import tax or a limit on the amount that can be imported, but it can also come in the form of voluntary export restrictions and other barriers.

Tariffs

A tariff is a tax on imported goods and services. The average tariff on dutiable imports in the United States (that is, those imports on which a tariff is imposed) is about 4%. Some imports have much higher tariffs. For example, the U.S. tariff on imported frozen orange juice is 35 cents per gallon (which amounts to about 40% of value). The tariff on imported canned tuna is 35%, and the tariff on imported shoes ranges between 2% and 48%.

A tariff raises the cost of selling imported goods. It thus shifts the supply curve for goods to the left, as in Figure 17.7 "The Impact of Protectionist Policies." The price of the protected good rises and the quantity available to consumers falls.

Antidumping Proceedings

One of the most common protectionist measures now in use is the antidumping proceeding. A domestic firm, faced with competition by a foreign competitor, files charges with its government that the foreign firm is dumping, or charging an "unfair" price. Under rules spelled out in international negotiations that preceded approval of the World Trade Organization, an unfair price was defined as a price below production cost or below the price the foreign firm charges for the same good in its own country. While these definitions may seem straightforward enough, they have proven to be quite troublesome. The definition of "production cost" is a thoroughly arbitrary procedure. In defining cost, the government agency

invariably includes a specification of a "normal" profit. That normal profit can be absurdly high. The United States Department of Justice, which is the U.S. agency in charge of determining whether a foreign firm has charged an unfair price, has sometimes defined normal profit rates as exceeding production cost by well over 50%, a rate far higher than exists in most U.S. industry.

The practice of a foreign firm charging a price in the United States that is below the price it charges in its home country is common. The U.S. market may be more competitive, or the foreign firm may simply be trying to make its product attractive to U.S. buyers that are not yet accustomed to its product. In any event, such price discrimination behavior is not unusual and is not necessarily "unfair."

In the United States, once the Department of Justice has determined that a foreign firm is guilty of charging an unfair price, the U.S. International Trade Commission must determine that the foreign firm has done material harm to the U.S. firm. If a U.S. firm has suffered a reduction in sales and thus in employment it will typically be found to have suffered material harm, and punitive duties will be imposed.

Quotas

A quota is a direct restriction on the total quantity of a good or service that may be imported during a specified period. Quotas restrict total supply and therefore increase the domestic price of the good or service on which they are imposed. Quotas generally specify that an exporting country's share of a domestic market may not exceed a certain limit.

In some cases, quotas are set to raise the domestic price to a particular level. Congress requires the Department of Agriculture, for example, to impose quotas on imported sugar to keep the

wholesale price in the United States above 22 cents per pound. The world price is typically less than 10 cents per pound.

A quota restricting the quantity of a particular good imported into an economy shifts the supply curve to the left, as in Figure 17.7 "The Impact of Protectionist Policies." It raises price and reduces quantity.

An important distinction between quotas and tariffs is that quotas do not increase costs to foreign producers; tariffs do. In the short run, a tariff will reduce the profits of foreign exporters of a good or service. A quota, however, raises price but not costs of production and thus may increase profits. Because the quota imposes a limit on quantity, any profits it creates in other countries will not induce the entry of new firms that ordinarily eliminates profits in perfect competition. By definition, entry of new foreign firms to earn the profits available in the United States is blocked by the quota.

Voluntary Export Restrictions

Voluntary export restrictions are a form of trade barrier by which foreign firms agree to limit the quantity of goods exported to a particular country. They became prominent in the United States in the 1980s, when the U.S. government persuaded foreign exporters of automobiles and steel to agree to limit their exports to the United States.

Although such restrictions are called voluntary, they typically are agreed to only after pressure is applied by the country whose industries they protect. The United States, for example, has succeeded in pressuring many other countries to accept quotas limiting their exports of goods ranging from sweaters to steel.

A voluntary export restriction works precisely like an ordinary quota. It raises prices for the domestic product and reduces the quantity consumed of the good or service affected by the quota. It

can also increase the profits of the firms that agree to the quota because it raises the price they receive for their products.

Other Barriers

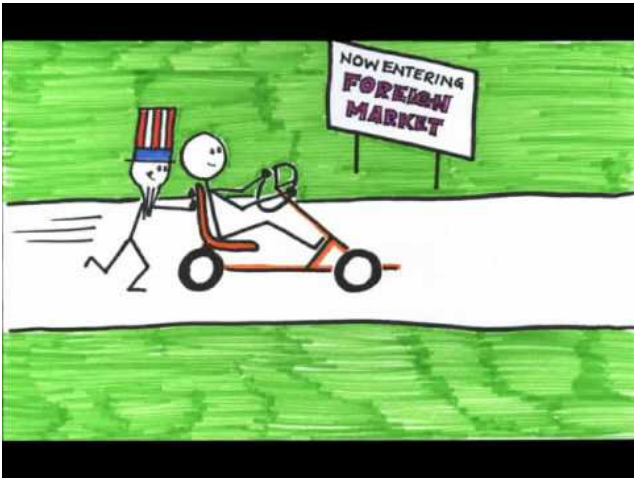
In addition to tariffs and quotas, measures such as safety standards, labeling requirements, pollution controls, and quality restrictions all may have the effect of restricting imports.

Many restrictions aimed at protecting consumers in the domestic market create barriers as a purely unintended, and probably desirable, side effect. For example, limitations on insecticide levels in foods are often more stringent in the United States than in other countries. These standards tend to discourage the import of foreign goods, but their primary purpose appears to be to protect consumers from harmful chemicals, not to restrict trade. But other nontariff barriers seem to serve no purpose other than to keep foreign goods out. Tomatoes produced in Mexico, for example, compete with those produced in the United States. But Mexican tomatoes tend to be smaller than U.S. tomatoes. The United States once imposed size restrictions to "protect" U.S. consumers from small tomatoes. The result was a highly effective trade barrier that protected U.S. producers and raised U.S. tomato prices. Those restrictions were abolished under terms of the North American Free Trade Agreement, which has led to a large increase in U.S. imports of Mexican tomatoes and a reduction in U.S. tomato production.

Trade Restrictions

Why do countries restrict trade? Watch this video to learn about the major arguments in favor of trade restrictions, including: protecting domestic jobs, leveling the playing field, providing government

revenue, supporting national defense, protecting national interests, protecting infant industries, and promoting exports.



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301. Reading: Justifications for Trade Restriction

Justifications for Trade Restriction: An Evaluation

The conceptual justification for free trade is one of the oldest arguments in economics; there is no disputing the logic of the argument that free trade increases global production, worldwide consumption, and international efficiency. But critics stress that the argument is a theoretical one. In the real world, they say, there are several arguments that can be made to justify protectionist measures.

Infant Industries

One argument for trade barriers is that they serve as a kind of buffer to protect fledgling domestic industries. Initially, firms in a new industry may be too small to achieve significant economies of scale and could be clobbered by established firms in other countries. A new domestic industry with potential economies of scale is called an infant industry.

Consider the situation in which firms in a country are attempting to enter a new industry in which many large firms already exist in the international arena. The foreign firms have taken advantage of economies of scale and have therefore achieved relatively low levels of production costs. New firms, facing low levels of output and higher average costs, may find it difficult to compete. The infant industry argument suggests that by offering protection during an

industry's formative years, a tariff or quota may allow the new industry to develop and prosper.

The infant industry argument played a major role in tariff policy in the early years of U.S. development. The high tariffs of the early nineteenth century were typically justified as being necessary to allow U.S. firms to gain a competitive foothold in the world economy. As domestic industries became established, tariff rates fell. Subsequent increases in tariffs were a response in part to internal crises: the Civil War and the Great Depression. Tariff rates have fallen dramatically since 1930.

Critics of the infant industry argument say that once protection is in place, it may be very difficult to remove. Inefficient firms, they contend, may be able to survive for long periods under the umbrella of infant industry protection.

Strategic Trade Policy

A new version of the infant industry argument has been used in the past few years as technological developments have spawned whole new industries and transformed existing ones. The new version of the infant industry argument assumes an imperfectly competitive market.

Suppose technological change has given rise to a new industry. Given the economies of scale in this industry, only a few firms are likely to dominate it worldwide—it will likely emerge as an oligopoly. The firms that dominate the industry are likely to earn economic profits that will persist. Furthermore, because there will be only a few firms, they will be located in only a few countries. Their governments could conceivably impose taxes on these firms' profits that would enhance economic well-being within the country. The potential for such gains may justify government efforts to assist firms seeking to acquire a dominant position in the new industry.

Government aid could take the form of protectionist trade

policies aimed at allowing these firms to expand in the face of foreign competition, assistance with research and development efforts, programs to provide workers with special skills needed by the industry, or subsidies in the form of direct payments or special tax treatment. Any such policy aimed at promoting the development of key industries that may increase a country's domestic well-being through trade with the rest of the world is known as a strategic trade policy.

Although strategic trade policy suggests a conceptually positive role for government in international trade, proponents of the approach note that it has dangers. Firms might use the strategic trade argument even if their development were unlikely to offer the gains specified in the theory. The successful application of the approach requires that the government correctly identify industries in which a country can, in fact, gain dominance—something that may not be possible. Various European governments provided subsidies to firms that were involved in the production of Airbus, which is now a major competitor in the airplane industry. On the other hand, Britain and France subsidized the development of the supersonic plane called the Concorde. After only a few Concordes had been produced, it became obvious that the aircraft was a financially losing proposition and production was halted. The airline has now gone out of business.

Finally, those firms whose success strategic trade policy promotes might have sufficient political clout to block the taxes that would redistribute the gains of the policies to the population in general. Thus, the promise of strategic trade policy is unlikely to be fulfilled.

National Security And the National Interest Argument

Some argue that a nation should not depend too heavily on other

countries for supplies of certain key products, such as oil, or for special materials or technologies that might have national security applications. On closer consideration, this argument for protectionism proves rather weak.

As an example, in the United States, oil provides about 40% of all the energy and about 40% of the oil used in the United States economy is imported. Several times in the last few decades, when disruptions in the Middle East have shifted the supply curve of oil back to the left and sharply raised the price, the effects have been felt across the United States economy. This is not, however, a very convincing argument for restricting imports of oil. If the United States needs to be protected from a possible cutoff of foreign oil, then a more reasonable strategy would be to import 100% of the petroleum supply now, and save U.S. domestic oil resources for when or if the foreign supply is cut off. It might also be useful to import extra oil and put it into a stockpile for use in an emergency, as the United States government did by starting a Strategic Petroleum Reserve in 1977. Moreover, it may be necessary to discourage people from using oil, and to start a high-powered program to seek out alternatives to oil. A straightforward way to do this would be to raise taxes on oil. What's more, it makes no sense to argue that because oil is highly important to the United States economy, then the United States should shut out oil imports and use up its domestic supplies of oil more quickly.

Whether or not to limit certain kinds of imports of key technologies or materials that might be important to national security and weapons systems is a slightly different issue. If weapons' builders are not confident that they can continue to obtain a key product in wartime, they might decide to avoid designing weapons that use this key product, or they can go ahead and design the weapons and stockpile enough of the key high-tech components or materials to last through an armed conflict. Indeed, there is a U.S. Defense National Stockpile Center that has built up reserves of many materials, from aluminum oxides, antimony, and bauxite to tungsten, vegetable tannin extracts, and zinc (although

many of these stockpiles have been reduced and sold in recent years).

One final reason why economists often treat the *national interest argument* skeptically is that almost any product can be touted by lobbyists and politicians as vital to national security. In 1954, the United States became worried that it was importing half of the wool required for military uniforms, so it declared wool and mohair to be "strategic materials" and began to give subsidies to wool and mohair farmers. Although wool was removed from the official list of "strategic" materials in 1960, the subsidies for mohair continued for almost 40 years until they were repealed in 1993, and then were reinstated in 2002. All too often, the national interest argument has become an excuse for handing out the indirect subsidy of protectionism to certain industries or companies. After all, decisions about what constitutes a key strategic material are made by politicians, not nonpartisan analysts.

Job Protection

The desire to maintain existing jobs threatened by foreign competition is probably the single most important source of today's protectionist policies. Some industries that at one time had a comparative advantage are no longer among the world's lowest-cost producers; they struggle to stay afloat. Cost cutting leads to layoffs, and layoffs lead to demands for protection.

The model of international trade in perfect competition suggests that trade will threaten some industries. As countries specialize in activities in which they have a comparative advantage, sectors in which they do not have this advantage will shrink. Maintaining those sectors through trade barriers blocks a nation from enjoying the gains possible from free trade.

A further difficulty with the use of trade barriers to shore up employment in a particular sector is that it can be an enormously

expensive strategy. Suppose enough of a foreign good is kept out of the United States to save one U.S. job. That shifts the supply curve slightly to the left, raising prices for U.S. consumers and reducing their consumer surplus. The loss to consumers is the cost per job saved. Estimates of the cost of saving *one* job in the steel industry through restrictions on steel imports, for example, go as high as $800,000 per year.

Cheap Foreign Labor and Outsourcing

One reason often given for the perceived need to protect American workers against free international trade is that workers must be protected against cheap foreign labor. This is an extension of the job protection argument in the previous section. From a theoretical point of view, of course, if foreign countries can produce a good at lower cost than we can, it is in our collective interest to obtain it from them. But workers counter by saying that the low wages of foreign workers means that foreign workers are exploited. To compete with foreign workers, American workers would have to submit themselves to similar exploitation. This objection, however, fails to recognize that differences in wage rates generally reflect differences in worker productivity.

Consider the following example: Suppose U.S. workers in the tool industry earn $20 per hour while Indonesian workers in the tool industry earn only $2 per hour. If we assume that the tool industry is competitive, then the wages in both countries are based on the marginal revenue product of the workers. The higher wage of U.S. workers must mean that they have a higher marginal product—they are more productive. The higher wage of U.S. workers need not mean that labor costs are higher in the United States than in Indonesia.

Further, we have seen that what matters for trade is comparative advantage, not comparative labor costs. When each nation

specializes in goods and services in which it has a comparative advantage—measured in the amounts of other goods and services given up to produce them—then world production, and therefore world consumption, rises. By definition, each nation will have a comparative advantage in *something*.

A particularly controversial issue in industrialized economies is outsourcing, in which firms in a developed country transfer some of their activities abroad in order to take advantage of lower labor costs in other countries. Generally speaking, the practice of outsourcing tends to reduce costs for the firms that do it. These firms often expand production and increase domestic employment, as is discussed in the accompanying Case in Point essay.

Differences in Environmental Standards

Another justification for protectionist measures is that free trade is unfair if it pits domestic firms against foreign rivals who do not have to adhere to the same regulatory standards. In the debate over NAFTA, for example, critics warned that Mexican firms, facing relatively lax pollution control standards, would have an unfair advantage over U.S. firms if restraints on trade between the two countries were removed.

Economic theory suggests, however, that differences in pollution-control policies can be an important source of comparative advantage. In general, the demand for environmental quality is positively related to income. People in higher-income countries demand higher environmental quality than do people in lower-income countries. That means that pollution has a lower cost in poorer than in richer countries. If an industry generates a great deal of pollution, it may be more efficient to locate it in a poor country than in a rich country. In effect, a poor country's lower demand for environmental quality gives it a comparative advantage in production of goods that generate a great deal of pollution.

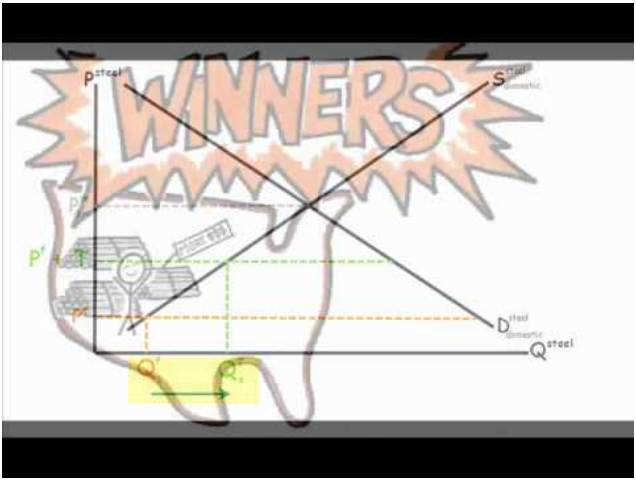
Provided the benefits of pollution exceed the costs in the poor country, with the costs computed based on the preferences and incomes of people in that country, it makes sense for more of the good to be produced in the poor country and less in the rich country. Such an allocation leaves people in both countries better off than they would be otherwise. Then, as freer trade leads to higher incomes in the poorer countries, people there will also demand improvements in environmental quality.

Do economists support *any* restriction on free international trade? Nearly all economists would say no. The gains from trade are so large, and the cost of restraining it so high, that it is hard to find any satisfactory reason to limit trade.

302. Video: Types of Trade Restrictions

Trade Restrictions

This video details the ways a country might restrict trade and explains the impact of these restrictions.



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303. Case in Point: Outsourcing, Insourcing, and Employment

Outsourcing, Insourcing, and Employment

The phenomenon of outsourcing has become common as the Internet and other innovations in communication have made it easier for firms to transfer aspects of their production overseas. At the same time, countries such as India and China have invested heavily in education and have produced a sizable workforce of professional people capable of filling relatively high level positions for firms in more developed countries.

The very idea of outsourcing rankles politicians on the left and on the right. In the United States, there have been numerous congressional hearings on outsourcing and proposals to block firms that engage in the practice from getting government contracts.

By outsourcing, firms are able to reduce their production costs. As we have seen, a reduction in production costs translates into increased output and falling prices. From a consumer's point of view, then, outsourcing should be a very good thing. The worry many commentators express, however, is that outsourcing will decimate employment in the United States, particularly among high-level professionals. Matthew J. Slaughter, an economist at Dartmouth University, examined employment trends from 1991 to 2001 among multinational U.S. firms that had outsourced jobs. Those firms outsourced 2.8 million jobs during the period.

Were the 2.8 million jobs simply lost? Mr. Slaughter points out that there are three reasons to expect that the firms that reduced production costs by outsourcing would actually increase their

domestic employment. First, by lowering cost, firms are likely to expand the quantity they produce. The foreign workers who were hired, who Mr. Slaughter refers to as "affiliate workers," appeared to be complements to American workers rather than substitutes. If they are complements rather than substitutes, then outsourcing could lead to increased employment in the country that does the outsourcing.

A second reason outsourcing could increase employment is that by lowering production cost, firms that increase the *scale* of their operations through outsourcing need more domestic workers to sell the increased output, to coordinate its distribution, and to develop the infrastructure to handle all those goods.

Finally, firms that engage in outsourcing are also likely to increase the *scope* of their operations. They will need to hire additional people to explore other product development, to engage in research, and to seek out new markets for the firm's output.

Thus, Mr. Slaughter argues that outsourcing may lead to increased employment because domestic workers are complements to foreign workers, because outsourcing expands the scale of a firm's operations, and because it expands the scope of operations. What did the evidence show? Remember the 2.8 million jobs that multinational firms based in the United States outsourced between 1991 and 2001? Employment at those same U.S. firms *increased* by 5.5 million jobs during the period. Thus, with the phenomena of complementarity, increases in scale, and increases of scope, each job outsourced led to almost two *additional* jobs in the United States.

The experience of two quite dissimilar firms illustrates the phenomenon. Walmart began expanding its operations internationally in about 1990. Today, it manages its global operations from its headquarters in Bentonville, Arkansas where it employs 15,000 people. Roughly 1,500 of these people coordinate the flow of goods among Walmart's stores throughout the world. Those 1,500 jobs would not exist were it not for globalization. Xilinx, the high technology research and development firm, generates sales of

about $1.5 billion per year. Sixty-five percent of its sales are generated outside the United States. But 80% of its employees are in the United States.

Outsourcing, then, generates jobs. It does not destroy them. Mr. Slaughter concludes: "Instead of lamenting ongoing foreign expansion of U.S. multinationals, if history is our guide then we should be encouraging it."

Mr. Slaughter and co-researcher Robert Kimmitt make a similar case for insourcing, production, and jobs generated by multinationals based outside the United States that build plants inside the United States. In 2007, these companies employed almost 2 million Americans with average compensation of nearly $80,000. Contrary to popular belief, the unionization rates of the United States affiliates of these companies were about 50% higher than for the rest of the U.S. private sector.

Think every country is pro-trade? How about the U.S.? The following reading might surprise you.

HOW DOES THE UNITED STATES REALLY FEEL ABOUT EXPANDING TRADE?

How do people around the world feel about expanding trade between nations? In summer 2007, the Pew Foundation surveyed 45,000 people in 47 countries. One of the questions asked about opinions on growing trade ties between countries. Table 20.3 shows the percentages who answered either "very good" or "somewhat good" for some of countries surveyed.

For those who think of the United States as the world's leading supporter of expanding trade, the survey results may be perplexing. When adding up the shares of those who say that growing trade ties between countries is "very good" or "somewhat good," Americans had the least favorable attitude toward increasing globalization, while the Chinese and South Africans ranked highest. In fact, among

the 47 countries surveyed, the United States ranked by far the lowest on this measure, followed by Egypt, Italy, and Argentina.

Country	Very Good	Somewhat Good	Total
China	38%	53%	91%
South Africa	42%	43%	87%
South Korea	24%	62%	86%
Germany	30%	55%	85%
Canada	29%	53%	82%
United Kingdom	28%	50%	78%
Mexico	22%	55%	77%
Brazil	13%	59%	72%
Japan	17%	55%	72%
United States	14%	45%	59%

Table 20.3. The Status of Growing Trade Ties between Countries (Source: http://www.pewglobal.org/files/pdf/258.pdf)

304. Outcome: Trade Policy and Agreements

What you'll learn to do: differentiate between alternative international trade regimes and how they impact global trade

In this outcome, you will examine the World Trade Organization and regional trade associations to see how they impact global trade relations.

LEARNING ACTIVITIES

The learning activities for this section include the following:

- Reading: How Trade Policy is Enacted
- Video: Trade Agreements
- Video: South Korea Free Trade Agreement
- Self Check: Trade Policy and Agreements

Take time to review and reflect on each of these activities in order to improve your performance on the assessment for this section.

305. Reading: The Tradeoffs of Trade Policy

The Tradeoffs of Trade Policy

Economists readily acknowledge that international trade is not all sunshine, roses, and happy endings. Over time, the average person gains from international trade, both as a worker who has greater productivity and higher wages because of the benefits of specialization and comparative advantage, and as a consumer who can benefit from shopping all over the world for a greater variety of quality products at attractive prices. The "average person," however, is hypothetical, not real—representing a mix of those who have done very well, those who have done all right, and those who have done poorly. It is a legitimate concern of public policy to focus not just on the average or on the success stories, but also on those have not been so fortunate. Workers in other countries, the environment, and prospects for new industries and materials that might be of key importance to the national economy are also all legitimate issues.

The common belief among economists is that it is better to embrace the gains from trade, and then deal with the costs and tradeoffs with other policy tools, than it is to cut off trade to avoid the costs and tradeoffs.

To gain a better intuitive understanding for this argument, consider a hypothetical American company called Technotron. Technotron invents a new scientific technology that allows the firm to increase the output and quality of its goods with a smaller number of workers at a lower cost. As a result of this technology, other U.S. firms in this industry will lose money and will also have to lay off workers—and some of the competing firms will even go bankrupt. Should the United States government protect the existing

firms and their employees by making it illegal for Technotron to use its new technology? Most people who live in market-oriented economies would oppose trying to block better products that lower the cost of services. Certainly, there is a case for society providing temporary support and assistance for those who find themselves without work. Many would argue for government support of programs that encourage retraining and acquiring additional skills. Government might also support research and development efforts, so that other firms may find ways of outdoing Technotron. Blocking the new technology altogether, however, seems like a mistake. After all, few people would advocate giving up electricity because it caused so much disruption to the kerosene and candle business. Few would suggest holding back on improvements in medical technology because they might cause companies selling leeches and snake oil to lose money. In short, most people view disruptions due to technological change as a necessary cost that is worth bearing.

Now, imagine that Technotron's new "technology" is as simple as this: the company imports what it sells from another country. In other words, think of foreign trade as a type of innovative technology. The objective situation is now exactly the same as before. Because of Technotron's new technology—which in this case is importing goods from another county—other firms in this industry will lose money and lay off workers. Just as it would have been inappropriate and ultimately foolish to respond to the disruptions of new scientific technology by trying to shut it down, it would be inappropriate and ultimately foolish to respond to the disruptions of *international trade* by trying to restrict trade.

Some workers and firms will suffer because of international trade. In a living, breathing market-oriented economy, some workers and firms will always be experiencing disruptions, for a wide variety of reasons. Corporate management can be better or worse. Workers for a certain firm can be more productive or less. Tough domestic competitors can create just as much disruption as tough foreign competitors. Sometimes a new product is a hit with consumers; sometimes it is a flop. Sometimes a company is blessed by a run

of good luck or stricken with a run of bad luck. For some firms, international trade will offer great opportunities for expanding productivity and jobs; for other firms, trade will impose stress and pain. The disruption caused by international trade is not fundamentally different from all the other disruptions caused by the other workings of a market economy.

In other words, the economic analysis of free trade does not rely on a belief that foreign trade is not disruptive or does not pose tradeoffs; indeed, the story of Technotron begins with a particular *disruptive market change*—a new technology—that causes real tradeoffs. In thinking about the disruptions of foreign trade, or any of the other possible costs and tradeoffs of foreign trade discussed in this module, the best public policy solutions typically do not involve protectionism, but instead involve finding ways for public policy to address the particular issues, while still allowing the benefits of international trade to occur.

WHAT'S THE DOWNSIDE OF PROTECTION?

Flat-panel displays, the displays for laptop computers, tablets, and flat screen televisions, are an example of such an enduring principle. In the early 1990s, the vast majority of flat-panel displays used in U.S.-manufactured laptops were imported, primarily from Japan. The small but politically powerful U.S. flat-panel-display industry filed a dumping complaint with the Commerce Department. They argued that Japanese firms were selling displays at "less than fair value," which made it difficult for U.S. firms to compete. After a preliminary determination by the Commerce Department that the Japanese firms were dumping, the U.S. International Trade Commission imposed a 63% dumping margin (or tax) on the import of flat-panel displays. Was this a successful exercise of U.S. trade policy?

Flat-panel displays make up a significant portion of the cost of

producing laptop computers—as much as 50%. Therefore, the antidumping tax would substantially increase the cost, and thus the price, of U.S.-manufactured laptops. As a result of the ITC's decision, Apple moved its domestic manufacturing plant for Macintosh computers to Ireland (where it had an existing plant). Toshiba shut down its U.S. manufacturing plant for laptops. And IBM cancelled plans to open a laptop manufacturing plant in North Carolina, instead deciding to expand production at its plant in Japan. In this case, rather than having the desired effect of protecting U.S. interests and giving domestic manufacturing an advantage over items manufactured elsewhere, it had the unintended effect of driving the manufacturing completely out of the country. Many people lost their jobs and most flat-panel display production now occurs in countries other than the United States.

Self Check: Impact of Government Regulations

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the four Readings in this section.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

An interactive or media element has been excluded from this version of the text. You can view it online here: https://pressbooks.ccconline.org/accmacro/?p=675

306. Reading: How Trade Policy Is Enacted

How Trade Policy Is Enacted: Globally, Regionally, and Nationally

These public policy arguments about how nations should react to globalization and trade are fought out at several levels: at the global level through the World Trade Organization and through regional trade agreements between pairs or groups of countries.

The World Trade Organization

The *World Trade Organization* (WTO) was officially born in 1995, but its history is much longer. In the years after the Great Depression and World War II, there was a worldwide push to build institutions that would tie the nations of the world together. The United Nations officially came into existence in 1945. The World Bank, which assists the poorest people in the world, and the International Monetary Fund, which addresses issues raised by international financial transactions, were both created in 1946. The third planned organization was to be an International Trade Organization, which would manage international trade. The United Nations was unable to agree to this. Instead, the *General Agreement on Tariffs and Trade* (GATT), was established in 1947 to provide a forum in which nations could come together to negotiate reductions in tariffs and other barriers to trade. In 1995, the GATT was transformed into the WTO.

The GATT process was to negotiate an agreement to reduce barriers to trade, sign that agreement, pause for a while, and then

start negotiating the next agreement. The rounds of talks in the GATT, and now the WTO, are shown in Table 20.1. Notice that the early rounds of GATT talks took a relatively short time, included a small number of countries, and focused almost entirely on reducing tariffs. Since the 1970s, however, rounds of trade talks have taken years, included a large number of countries, and an ever-broadening range of issues.

Table 20.1 The Negotiating Rounds of GATT and the World Trade Organization

Year	Place or Name of Round	Main Subjects	Number of Countries Involved
1947	Geneva	Tariff reduction	23
1949	Annecy	Tariff reduction	13
1951	Torquay	Tariff reduction	38
1956	Geneva	Tariff reduction	26
1960–61	Dillon round	Tariff reduction	26
1964–67	Kennedy round	Tariffs, anti-dumping measures	62
1973–79	Tokyo round	Tariffs, nontariff barriers	102
1986–94	Uruguay round	Tariffs, nontariff barriers, services, intellectual property, dispute settlement, textiles, agriculture, creation of WTO	123
2001–	Doha round	Agriculture, services, intellectual property, competition, investment, environment, dispute settlement	147

The sluggish pace of GATT negotiations led to an old joke that GATT really stood for Gentleman's Agreement to Talk and Talk. The slow pace of international trade talks, however, is understandable, even sensible. Having dozens of nations agree to any treaty is a lengthy process. GATT often set up separate trading rules for certain industries, like agriculture, and separate trading rules for certain

countries, like the low-income countries. There were rules, exceptions to rules, opportunities to opt out of rules, and precise wording to be fought over in every case. Like the GATT before it, the WTO is not a world government, with power to impose its decisions on others. The total staff of the WTO in 2013 is 629 people and its annual budget (as of 2012) is $196 million, which makes it smaller in size than many large universities.

Regional Trading Agreements

There are different types of economic integration across the globe, ranging from *free trade agreements*, in which participants allow each other's imports without tariffs or quotas, to *common markets*, in which participants have a common external trade policy as well as free trade within the group, to full *economic unions*, in which, in addition to a common market, monetary and fiscal policies are coordinated. Many nations belong both to the World Trade Organization and to regional trading agreements.

The best known of these regional trading agreements is the *European Union*. In the years after World War II, leaders of several European nations reasoned that if they could tie their economies together more closely, they might be more likely to avoid another devastating war. Their efforts began with a free trade association, evolved into a common market, and then transformed into what is now a full economic union, known as the European Union. The EU, as it is often called, has a number of goals. For example, in the early 2000s it introduced a common currency for Europe, the euro, and phased out most of the former national forms of money like the German mark and the French franc, though a few have retained their own currency. Another key element of the union is to eliminate barriers to the mobility of goods, labor, and capital across Europe.

For the United States, perhaps the best-known regional trading agreement is the *North American Free Trade Agreement* (NAFTA).

The United States also participates in some less-prominent regional trading agreements, like the Caribbean Basin Initiative, which offers reduced tariffs for imports from these countries, and a free trade agreement with Israel.

The world has seen a flood of regional trading agreements in recent years. About 100 such agreements are now in place. A few of the more prominent ones are listed in Table 20.2. Some are just agreements to continue talking; others set specific goals for reducing tariffs, import quotas, and nontariff barriers. One economist described the current trade treaties as a "spaghetti bowl," which is what a map with lines connecting all the countries with trade treaties looks like.

There is concern among economists who favor free trade that some of these regional agreements may promise free trade, but actually act as a way for the countries within the regional agreement to try to limit trade from anywhere else. In some cases, the regional trade agreements may even conflict with the broader agreements of the World Trade Organization.

Table 20.2. Some Regional Trade Agreements

Trade Agreements	Participating Countries
Asia Pacific Economic Cooperation (APEC)	Australia, Brunei, Canada, Chile, People's Republic of China, Hong Kong, China, Indonesia, Japan, Republic of Korea, Malaysia, Mexico, New Zealand, Papua New Guinea, Peru, Philippines, Russia, Singapore, Chinese Taipei, Thailand, United States, Vietnam
European Union (EU)	Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, United Kingdom
North America Free Trade Agreement (NAFTA)	Canada, Mexico, United States
Latin American Integration Association (LAIA)	Argentina, Bolivia, Brazil, Chile, Columbia, Ecuador, Mexico, Paraguay, Peru, Uruguay, Venezuela
Association of Southeast Asian Nations (ASEAN)	Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, Vietnam
Southern African Development Community (SADC)	Angola, Botswana, Congo, Lesotho, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, Tanzania, Zambia, Zimbabwe

Yet another dimension of trade policy, along with international and regional trade agreements, happens at the national level. The United States, for example, imposes import quotas on sugar, because of a fear that such imports would drive down the price of sugar and thus injure domestic sugar producers. One of the jobs of the United States Department of Commerce is to determine if imports from other countries are being dumped. The United States International Trade Commission—a government agency—determines whether domestic industries have been substantially injured by the dumping,

and if so, the president can impose tariffs that are intended to offset the unfairly low price.

In the arena of trade policy, the battle often seems to be between national laws that increase protectionism and international agreements that try to reduce protectionism, like the WTO. Why would a country pass laws or negotiate agreements to shut out certain foreign products, like sugar or textiles, while simultaneously negotiating to reduce trade barriers in general? One plausible answer is that international trade agreements offer a method for countries to restrain their own special interests. A member of Congress can say to an industry lobbying for tariffs or quotas on imports: "Sure would like to help you, but that pesky WTO agreement just won't let me."

Link It Up

If consumers are the biggest losers from trade, why do they not fight back? The quick answer is because it is easier to organize a small group of people around a narrow interest versus a large group that has diffuse interests. This is a question about trade policy theory. Visit this website and read the article by Jonathan Rauch.

Long-Term Trends in Barriers to Trade

In newspaper headlines, trade policy appears mostly as disputes and acrimony. Countries are almost constantly threatening to challenge the "unfair" trading practices of other nations. Cases are brought to the dispute settlement procedures of the WTO, the European Union, NAFTA, and other regional trading agreements. Politicians in national legislatures, goaded on by lobbyists, often threaten to pass bills that will "establish a fair playing field" or "prevent unfair

trade"—although most such bills seek to accomplish these high-sounding goals by placing more restrictions on trade. Protesters in the streets may object to specific trade rules or to the entire practice of international trade.

Through all the controversy, the general trend in the last 60 years is clearly toward lower barriers to trade. The average level of tariffs on imported products charged by industrialized countries was 40% in 1946. By 1990, after decades of GATT negotiations, it was down to less than 5%. Indeed, one of the reasons that GATT negotiations shifted from focusing on tariff reduction in the early rounds to a broader agenda was that tariffs had been reduced so dramatically there was not much more to do in that area. U.S. tariffs have followed this general pattern: After rising sharply during the Great Depression, tariffs dropped off to less than 2% by the end of the century. Although measures of import quotas and nontariff barriers are less exact than those for tariffs, they generally appear to be at lower levels, too.

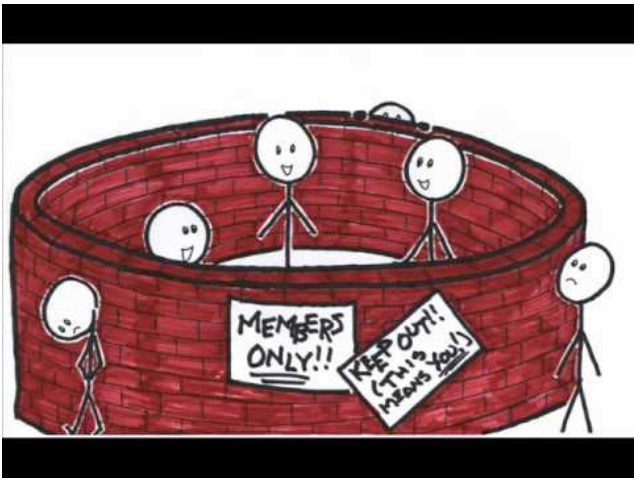
Thus, the last half-century has seen both a dramatic reduction in government-created barriers to trade, such as tariffs, import quotas, and nontariff barriers, and also a number of technological developments that have made international trade easier, like advances in transportation, communication, and information management. The result has been the powerful surge of international trade.

307. Videos: Trade Agreements

Trade Agreements

Watch these videos about trade agreements and bloc to better understand trade relationships between nations.

A YouTube element has been excluded from this version of the text. You can view it online here: https://pressbooks.ccconline.org/accmacro/?p=679



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South Korea Free Trade Agreement

Watch this video to learn about U.S.-Korea Free Trade Agreement signed in 2012.

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308. Self Check: Trade Policy and Agreements

Check Your Understanding

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the Reading in this section.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

An interactive or media element has been excluded from this version of the text. You can view it online here: https://pressbooks.ccconline.org/accmacro/?p=681

309. Outcome: Exchange Rates and International Finance

What you'll learn to do: define currency exchange rates and explain how they influence trade balances

In this section, you will take a look at the foreign exchange market and analyze how different currencies necessitate some degree of consistency for purposes of international trade.

LEARNING ACTIVITIES

The learning activities for this section include the following:

- Reading: Exchange Rates and International Capital Flows
- Reading: The Foreign Exchange Market
- Reading: Strengthening and Weakening Currency
- Reading: Demand and Supply Shifts in Foreign Exchange Markets
- Self Check: Exchange Rates and International Finance

Take time to review and reflect on each of these activities in order to improve your performance on the assessment for this section.

310. Reading: Exchange Rates and International Capital Flows

Figure 15.1. *Trade Around the World. Is a trade deficit between the United States and the European Union good or bad for the U.S. economy? (Credit: modification of work by Milad Mosapoor/ Wikimedia Commons)*

IS A STRONGER DOLLAR GOOD FOR THE U.S. ECONOMY?

From 2002 to 2008, the U.S. dollar lost more than a quarter of its value in foreign currency markets. On January 1, 2002, one dollar was worth 1.11 euros. On April 24, 2008 it hit its lowest point with a dollar being worth 0.64 euros. During this period, the trade deficit between the United States and the European Union grew from a yearly total of approximately −85.7 billion dollars in 2002 to 95.8

billion dollars in 2008. Was this a good thing or a bad thing for the U.S. economy?

We live in a global world. U.S. consumers buy trillions of dollars worth of imported goods and services each year, not just from the European Union, but from all over the world. U.S. businesses sell trillions of dollars' worth of exports. U.S. citizens, businesses, and governments invest trillions of dollars abroad every year. Foreign investors, businesses, and governments invest trillions of dollars in the United States each year. Indeed, foreigners are a major buyer of U.S. federal debt.

Many people feel that a weaker dollar is bad for America, that it's an indication of a weak economy. But is it? This module will help answer that question.

The world has over 150 different currencies, from the Afghanistan afghani and the Albanian lek all the way through the alphabet to the Zambian kwacha and the Zimbabwean dollar. For international economic transactions, households or firms will wish to exchange one currency for another. Perhaps the need for exchanging currencies will come from a German firm that exports products to Russia, but then wishes to exchange the Russian rubles it has earned for euros, so that the firm can pay its workers and suppliers in Germany. Perhaps it will be a South African firm that wishes to purchase a mining operation in Angola, but to make the purchase it must convert South African rand to Angolan kwanza. Perhaps it will be an American tourist visiting China, who wishes to convert U.S. dollars to Chinese yuan to pay the hotel bill.

Exchange rates can sometimes change very swiftly. For example, in the United Kingdom the pound was worth $2 in U.S. currency in spring 2008, but was worth only $1.40 in U.S. currency six months later. For firms engaged in international buying, selling, lending, and borrowing, these swings in exchange rates can have an enormous effect on profits.

This module discusses the international dimension of money, which involves conversions from one currency to another at an exchange rate. An *exchange rate* is nothing more than a price—that

is, the price of one currency in terms of another currency—and so they can be analyzed with the tools of *supply* and *demand*. The first section of this module begins with an overview of foreign exchange markets: their size, their main participants, and the vocabulary for discussing movements of exchange rates. The following module uses demand and supply graphs to analyze some of the main factors that cause shifts in exchange rates. A final module then brings the central bank and monetary policy back into the picture. Each country must decide whether to allow its exchange rate to be determined in the market, or have the central bank intervene in the exchange rate market. All the choices for exchange rate policy involve distinctive tradeoffs and risks.

311. Reading: The Foreign Exchange Market

The Foreign Exchange Market

Most countries have different currencies, but not all. Sometimes small economies use the currency of an economically larger neighbor. For example, Ecuador, El Salvador, and Panama have decided to *dollarize* – that is, to use the U.S. dollar as their currency. Sometimes nations share a common currency. A large-scale example of a common currency is the decision by 17 European nations–including some very large economies such as France, Germany, and Italy–to replace their former currencies with the euro. With these exceptions duly noted, most of the international economy takes place in a situation of multiple national currencies in which both people and firms need to convert from one currency to another when selling, buying, hiring, borrowing, traveling, or investing across national borders. The market in which people or firms use one currency to purchase another currency is called the *foreign exchange market*.

You have encountered the basic concept of exchange rates in earlier modules. In The International Trade and Capital Flows, for example, we discussed how exchange rates are used to compare GDP statistics from countries where GDP is measured in different currencies. These earlier examples, however, took the actual exchange rate as given, as if it were a fact of nature. In reality, the exchange rate is a price–the price of one currency expressed in terms of units of another currency. The key framework for analyzing prices, whether in this course, any other economics course, in public policy, or business examples, is the operation of supply and demand in markets.

LINK IT UP

Visit this website for an exchange rate calculator.

The Extraordinary Size of the Foreign Exchange Markets

The quantities traded in foreign exchange markets are breathtaking. A survey done in April, 2013 by the Bank of International Settlements, an international organization for banks and the financial industry, found that $5.3 trillion *per day* was traded on foreign exchange markets, which makes the foreign exchange market the largest market in the world economy. In contrast, 2013 U.S. real GDP was $15.8 trillion *per year*.

Table 15.1 shows the currencies most commonly traded on foreign exchange markets. The foreign exchange market is dominated by the U.S. dollar, the currencies used by nations in Western Europe (the euro, the British pound, and the Australian dollar), and the Japanese yen.

Currency	% Daily Share
U.S. dollar	87.0%
Euro	33.4%
Japanese yen	23.0%
British pound	11.8%
Australian dollar	8.6%
Swiss franc	5.2%
Canadian dollar	4.6%
Mexican peso	2.5%
Chinese yuan	2.2%

Table 15.1. Currencies Traded Most on Foreign Exchange Markets as of April, 2013 (Source: http://www.bis.org/publ/rpfx13fx.pdf)

Demanders and Suppliers of Currency in Foreign Exchange Markets

In foreign exchange markets, demand and supply become closely interrelated, because a person or firm who demands one currency must at the same time supply another currency—and vice versa. To get a sense of this, it is useful to consider four groups of people or firms who participate in the market: (1) *firms* that are involved in international trade of goods and services; (2) tourists visiting other countries; (3) international investors buying ownership (or part-ownership) of a foreign firm; (4) international investors making financial investments that do not involve ownership. Let's consider these categories in turn.

Firms that buy and sell on international markets find that their costs for workers, suppliers, and investors are measured in the currency of the nation where their production occurs, but their revenues from sales are measured in the currency of the different nation where their sales happened. So, a Chinese firm exporting

abroad will earn some other currency—say, U.S. dollars—but will need Chinese yuan to pay the workers, suppliers, and investors who are based in China. In the foreign exchange markets, this firm will be a supplier of U.S. dollars and a demander of Chinese yuan.

International tourists will supply their home currency to receive the currency of the country they are visiting. For example, an American tourist who is visiting China will supply U.S. dollars into the foreign exchange market and demand Chinese yuan.

Financial investments that cross international boundaries, and require exchanging currency, are often divided into two categories. *Foreign direct investment* (*FDI*) refers to purchasing a firm (at least ten percent) in another country or starting up a new enterprise in a foreign country. For example, in 2008 the Belgian beer-brewing company InBev bought the U.S. beer-maker Anheuser-Busch for $52 billion. To make this purchase of a U.S. firm, InBev would have to supply euros (the currency of Belgium) to the foreign exchange market and demand U.S. dollars.

The other kind of international financial investment, *portfolio investment*, involves a purely financial investment that does not entail any management responsibility. An example would be a U.S. financial investor who purchased bonds issued by the government of the United Kingdom, or deposited money in a British bank. To make such investments, the American investor would supply U.S. dollars in the foreign exchange market and demand British pounds.

Portfolio investment is often linked to expectations about how exchange rates will shift. Look at a U.S. financial investor who is considering purchasing bonds issued in the United Kingdom. For simplicity, ignore any interest paid by the bond (which will be small in the short run anyway) and focus on exchange rates. Say that a British pound is currently worth $1.50 in U.S. currency. However, the investor believes that in a month, the British pound will be worth $1.60 in U.S. currency. Thus, as Figure 15.2 (a) shows, this investor would change $24,000 for 16,000 British pounds. In a month, if the pound is indeed worth $1.60, then the portfolio investor can trade back to U.S. dollars at the new exchange rate, and have $25,600—a

nice profit. A portfolio investor who believes that the foreign exchange rate for the pound will work in the opposite direction can also invest accordingly. Say that an investor expects that the pound, now worth $1.50 in U.S. currency, will decline to $1.40. Then, as shown in Figure 15.2 (b), that investor could start off with £20,000 in British currency (borrowing the money if necessary), convert it to $30,000 in U.S. currency, wait a month, and then convert back to approximately £21,429 in British currency—again making a nice profit. Of course, this kind of investing comes without guarantees, and an investor will suffer losses if the exchange rates do not move as predicted.

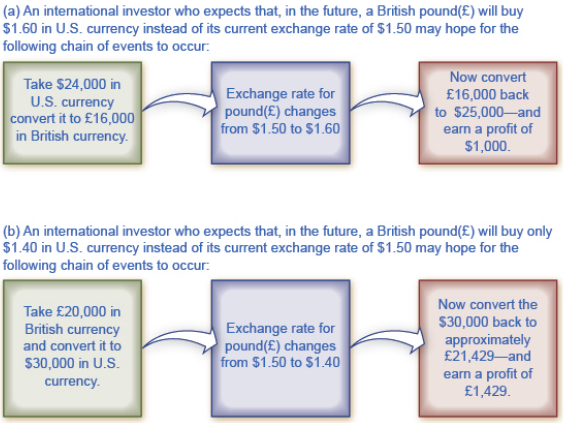

Figure 15.2. *A Portfolio Investor Trying to Benefit from Exchange Rate Movements. Expectations of the future value of a currency can drive demand and supply of that currency in foreign exchange markets.*

Many portfolio investment decisions are not as simple as betting that the value of the currency will change in one direction or the other. Instead, they involve firms trying to protect themselves from movements in exchange rates. Imagine you are running a U.S. firm that is exporting to France. You have signed a contract to deliver certain products and will receive 1 million euros a year from now. But you do not know how much this contract will be worth in U.S.

dollars, because the dollar/euro exchange rate can fluctuate in the next year. Let's say you want to know for sure what the contract will be worth, and not take a risk that the euro will be worth less in U.S. dollars than it currently is. You can *hedge*, which means using a financial transaction to protect yourself against currency risk. Specifically, you can sign a financial contract and pay a fee that guarantees you a certain exchange rate one year from now—regardless of what the market exchange rate is at that time. Now, it is possible that the euro will be worth more in dollars a year from now, so your hedging contract will be unnecessary, and you will have paid a fee for nothing. But if the value of the euro in dollars declines, then you are protected by the hedge. Financial contracts like hedging, where parties wish to be protected against exchange rate movements, also commonly lead to a series of portfolio investments by the firm that is receiving a fee to provide the hedge.

Both foreign direct investment and portfolio investment involve an investor who supplies domestic currency and demands a foreign currency. With portfolio investment less than ten percent of a company is purchased. As such, portfolio investment is often made with a short term focus. With foreign direct investment more than ten percent of a company is purchased and the investor typically assumes some managerial responsibility; thus foreign direct investment tends to have a more long-run focus. As a practical matter, portfolio investments can be withdrawn from a country much more quickly than foreign direct investments. A U.S. portfolio investor who wants to buy or sell bonds issued by the government of the United Kingdom can do so with a phone call or a few clicks of a computer key. However, a U.S. firm that wants to buy or sell a company, such as one that manufactures automobile parts in the United Kingdom, will find that planning and carrying out the transaction takes a few weeks, even months. Table 15.2 summarizes the main categories of demanders and suppliers of currency.

Table 15.2 The Demand and Supply Line-ups in Foreign Exchange Markets

Demand for the U.S. Dollar Comes from…	Supply of the U.S. Dollar Comes from…
A U.S. exporting firm that earned foreign currency and is trying to pay U.S.-based expenses	A foreign firm that has sold imported goods in the United States, earned U.S. dollars, and is trying to pay expenses incurred in its home country
Foreign tourists visiting the United States	U.S. tourists leaving to visit other countries
Foreign investors who wish to make direct investments in the U.S. economy	U.S. investors who want to make foreign direct investments in other countries
Foreign investors who wish to make portfolio investments in the U.S. economy	U.S. investors who want to make portfolio investments in other countries

Participants in the Exchange Rate Market

The foreign exchange market does not involve the ultimate suppliers and demanders of foreign exchange literally seeking each other out. If Martina decides to leave her home in Venezuela and take a trip in the United States, she does not need to find a U.S. citizen who is planning to take a vacation in Venezuela and arrange a person-to-person currency trade. Instead, the foreign exchange market works through financial institutions, and it operates on several levels.

Most people and firms who are exchanging a substantial quantity of currency go to a bank, and most banks provide foreign exchange as a service to customers. These banks (and a few other firms), known as *dealers*, then trade the foreign exchange. This is called the *interbank market*.

In the world economy, roughly 2,000 firms are foreign exchange dealers. The U.S. economy has less than 100 foreign exchange dealers, but the largest 12 or so dealers carry out more than half

the total transactions. The foreign exchange market has no central location, but the major dealers keep a close watch on each other at all times.

The foreign exchange market is huge not because of the demands of tourists, firms, or even foreign direct investment, but instead because of portfolio investment and the actions of interlocking foreign exchange dealers. International tourism is a very large industry, involving about $1 trillion per year. Global exports are about 23% of global GDP; which is about $18 trillion per year. Foreign direct investment totaled about $1.4 trillion in 2012. These quantities are dwarfed, however, by the $5.3 trillion *per day* being traded in foreign exchange markets. Most transactions in the foreign exchange market are for portfolio investment—relatively short-term movements of financial capital between currencies—and because of the actions of the large foreign exchange dealers as they constantly buy and sell with each other.

312. Reading: Strengthening and Weakening Currency

Strengthening and Weakening Currency

When the prices of most goods and services change, the price is said to "rise" or "fall." For exchange rates, the terminology is different. When the exchange rate for a currency rises, so that the currency exchanges for more of other currencies, it is referred to as *appreciating* or "strengthening." When the exchange rate for a currency falls, so that a currency trades for less of other currencies, it is referred to as *depreciating* or "weakening."

To illustrate the use of these terms, consider the exchange rate between the U.S. dollar and the Canadian dollar since 1980, shown in Figure 15.3 (a). The vertical axis in Figure 15.3 (a) shows the price of $1 in U.S. currency, measured in terms of Canadian currency. Clearly, exchange rates can move up and down substantially. A U.S. dollar traded for $1.17 Canadian in 1980. The U.S. dollar appreciated or strengthened to $1.39 Canadian in 1986, depreciated or weakened to $1.15 Canadian in 1991, and then appreciated or strengthened to $1.60 Canadian by early in 2002, fell to roughly $1.20 Canadian in 2009, and then had a sharp spike up and decline in 2009 and 2010. The units in which exchange rates are measured can be confusing, because the exchange rate of the U.S. dollar is being measured using a different currency—the Canadian dollar. But exchange rates always measure the price of one unit of currency by using a different currency.

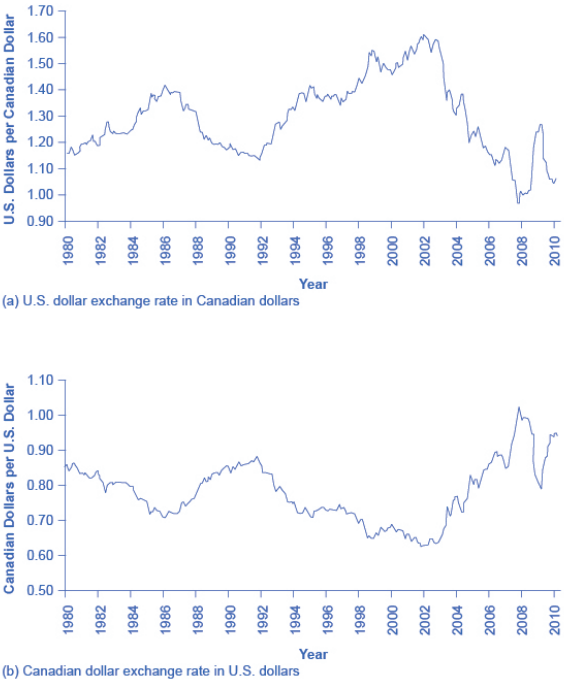

Figure 15.3. *Strengthen or Appreciate vs. Weaken or Depreciate. Exchange rates move up and down substantially, even between close neighbors like the United States and Canada. The values in (a) are a mirror image of (b); that is, any appreciation of one currency must mean depreciation of the other currency, and vice versa. (Source: http://research.stlouisfed.org/fred2/series/FXRATE...)*

In looking at the exchange rate between two currencies, the appreciation or strengthening of one currency must mean the depreciation or weakening of the other. Figure 15.3 (b) shows the exchange rate for the Canadian dollar, measured in terms of U.S. dollars. The exchange rate of the U.S. dollar measured in Canadian dollars, shown in Figure 15.3 (a), is a perfect mirror image with

the exchange rate of the Canadian dollar measured in U.S. dollars, shown in Figure 15.3 (b). A fall in the Canada $/U.S. $ ratio means a rise in the U.S. $/Canada $ ratio, and vice versa.

With the price of a typical good or service, it is clear that higher prices benefit sellers and hurt buyers, while lower prices benefit buyers and hurt sellers. In the case of exchange rates, where the buyers and sellers are not always intuitively obvious, it is useful to trace through how different participants in the market will be affected by a stronger or weaker currency. Consider, for example, the impact of a stronger U.S. dollar on six different groups of economic actors, as shown in Figure 15.4: (1) U.S. exporters selling abroad; (2) foreign exporters (that is, firms selling imports in the U.S. economy); (3) U.S. tourists abroad; (4) foreign tourists visiting the United States; (5) U.S. investors (either foreign direct investment or portfolio investment) considering opportunities in other countries; (6) and foreign investors considering opportunities in the U.S. economy.

Figure 15.4. *How Do Exchange Rate Movements Affect Each Group? Exchange rate movements affect exporters, tourists, and international investors in different ways.*

For a U.S. firm selling abroad, a stronger U.S. dollar is a curse. A strong U.S. dollar means that foreign currencies are correspondingly weak. When this exporting firm earns foreign

currencies through its export sales, and then converts them back to U.S. dollars to pay workers, suppliers, and investors, the stronger dollar means that the foreign currency buys fewer U.S. dollars than if the currency had not strengthened, and that the firm's profits (as measured in dollars) fall. As a result, the firm may choose to reduce its exports, or it may raise its selling price, which will also tend to reduce its exports. In this way, a stronger currency reduces a country's exports.

Conversely, for a foreign firm selling in the U.S. economy, a stronger dollar is a blessing. Each dollar earned through export sales, when traded back into the home currency of the exporting firm, will now buy more of the home currency than expected before the dollar had strengthened. As a result, the stronger dollar means that the importing firm will earn higher profits than expected. The firm will seek to expand its sales in the U.S. economy, or it may reduce prices, which will also lead to expanded sales. In this way, a stronger U.S. dollar means that consumers will purchase more from foreign producers, expanding the country's level of imports.

For a U.S. tourist abroad, who is exchanging U.S. dollars for foreign currency as necessary, a stronger U.S. dollar is a benefit. The tourist receives more foreign currency for each U.S. dollar, and consequently the cost of the trip in U.S. dollars is lower. When a country's currency is strong, it is a good time for citizens of that country to tour abroad. Imagine a U.S. tourist who has saved up $5,000 for a trip to South Africa. In January 2008, $1 bought 7 South African rand, so the tourist had 35,000 rand to spend. In January 2009, $1 bought 10 rand, so the tourist had 50,000 rand to spend. By January 2010, $1 bought only 7.5 rand. Clearly, 2009 was the year for U.S. tourists to visit South Africa. For foreign visitors to the United States, the opposite pattern holds true. A relatively stronger U.S. dollar means that their own currencies are relatively weaker, so that as they shift from their own currency to U.S. dollars, they have fewer U.S. dollars than previously. When a country's currency is strong, it is not an especially good time for foreign tourists to visit.

A stronger dollar injures the prospects of a U.S. financial investor

who has already invested money in another country. A U.S. financial investor abroad must first convert U.S. dollars to a foreign currency, invest in a foreign country, and then later convert that foreign currency back to U.S. dollars. If in the meantime the U.S. dollar becomes stronger and the foreign currency becomes weaker, then when the investor converts back to U.S. dollars, the rate of return on that investment will be less than originally expected at the time it was made.

However, a stronger U.S. dollar boosts the returns of a foreign investor putting money into a U.S. investment. That foreign investor converts from the home currency to U.S. dollars and seeks a U.S. investment, while later planning to switch back to the home currency. If, in the meantime, the dollar grows stronger, then when the time comes to convert from U.S. dollars back to the foreign currency, the investor will receive more foreign currency than expected at the time the original investment was made.

The preceding paragraphs all focus on the case where the U.S. dollar becomes stronger. The corresponding happy or unhappy economic reactions are illustrated in the first column of Figure 15.4. The following feature centers the analysis on the opposite: a weaker dollar.

EFFECTS OF A WEAKER DOLLAR

Let's work through the effects of a weaker dollar on a U.S. exporter, a foreign exporter into the United States, a U.S. tourist going abroad, a foreign tourist coming to the United States, a U.S. investor abroad, and a foreign investor in the United States.

Step 1. Note that the demand for U.S. exports is a function of the price of those exports, which depends on the dollar price of those goods and the exchange rate of the dollar in terms of foreign currency. For example, a Ford pickup truck costs $25,000 in the United States. When it is sold in the United Kingdom, the price is

$25,000 / $1.50 per British pound, or £16,667. The dollar affects the price faced by foreigners who may purchase U.S. exports.

Step 2. Consider that, if the dollar weakens, the pound rises in value. If the pound rises to $2.00 per pound, then the price of a Ford pickup is now $25,000 / $2.00 = £12,500. A weaker dollar means the foreign currency buys more dollars, which means that U.S. exports appear less expensive.

Step 3. Summarize that a weaker U.S. dollar leads to an increase in U.S. exports. For a foreign exporter, the outcome is just the opposite.

Step 4. Suppose a brewery in England is interested in selling its Bass Ale to a grocery store in the United States. If the price of a six pack of Bass Ale is £6.00 and the exchange rate is $1.50 per British pound, the price for the grocery store is 6.00 × $1.50 = $9.00 per six pack. If the dollar weakens to $2.00 per pound, the price of Bass Ale is now 6.00 × $2.00 = $12.

Step 5. Summarize that, from the perspective of U.S. purchasers, a weaker dollar means that foreign currency is more expensive, which means that foreign goods are more expensive also. This leads to a decrease in U.S. imports, which is bad for the foreign exporter.

Step 6. Consider U.S. tourists going abroad. They face the same situation as a U.S. importer—they are purchasing a foreign trip. A weaker dollar means that their trip will cost more, since a given expenditure of foreign currency (e.g., hotel bill) will take more dollars. The result is that the tourist may not stay as long abroad, and some may choose not to travel at all.

Step 7. Consider that, for the foreign tourist to the United States, a weaker dollar is a boon. It means their currency goes further, so the cost of a trip to the United States will be less. Foreigners may choose to take longer trips to the United States, and more foreign tourists may decide to take U.S. trips.

Step 8. Note that a U.S. investor abroad faces the same situation as a U.S. importer—they are purchasing a foreign asset. A U.S. investor will see a weaker dollar as an increase in the "price" of investment, since the same number of dollars will buy less foreign

currency and thus less foreign assets. This should decrease the amount of U.S. investment abroad.

Step 9. Note also that foreign investors in the Unites States will have the opposite experience. Since foreign currency buys more dollars, they will likely invest in more U.S. assets.

At this point, you should have a good sense of the major players in the foreign exchange market: firms involved in international trade, tourists, international financial investors, banks, and foreign exchange dealers. The next module shows how the tools of demand and supply can be used in foreign exchange markets to explain the underlying causes of stronger and weaker currencies.

WHY IS A STRONGER CURRENCY NOT NECESSARILY BETTER?

One common misunderstanding about exchange rates is that a "stronger" or "appreciating" currency must be better than a "weaker" or "depreciating" currency. After all, is it not obvious that "strong" is better than "weak"? But do not let the terminology confuse you. When a currency becomes stronger, so that it purchases more of other currencies, it benefits some in the economy and injures others. Stronger currency is not necessarily better, it is just different.

313. Reading: Demand and Supply Shifts in Foreign Exchange Markets

Demand and Supply Shifts in Foreign Exchange Markets

The foreign exchange market involves firms, households, and investors who demand and supply currencies coming together through their banks and the key foreign exchange dealers. Figure 15.5 (a) offers an example for the exchange rate between the U.S. dollar and the Mexican peso. The vertical axis shows the exchange rate for U.S. dollars, which in this case is measured in pesos. The horizontal axis shows the quantity of U.S. dollars being traded in the foreign exchange market each day. The demand curve (D) for U.S. dollars intersects with the supply curve (S) of U.S. dollars at the equilibrium point (E), which is an exchange rate of 10 pesos per dollar and a total volume of $8.5 billion.

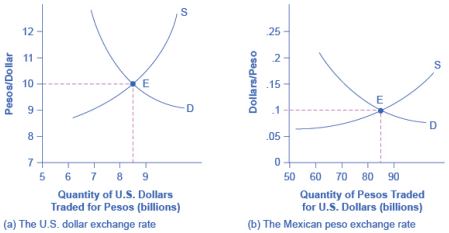

Figure 15.5. *Demand and Supply for the U.S. Dollar and Mexican Peso Exchange Rate. (a) The quantity measured on the horizontal axis is in U.S. dollars, and the exchange rate on the vertical axis is the price of U.S. dollars measured in Mexican pesos. (b) The quantity measured on the horizontal axis is in Mexican pesos, while the price on the vertical axis is the price of pesos measured in U.S. dollars. In both graphs, the equilibrium exchange rate occurs at point E, at the intersection of the demand curve (D) and the*

supply curve (S).

Figure 15.5 (b) presents the same demand and supply information from the perspective of the Mexican peso. The vertical axis shows the exchange rate for Mexican pesos, which is measured in U.S. dollars. The horizontal axis shows the quantity of Mexican pesos traded in the foreign exchange market. The *demand curve* (D) for Mexican pesos intersects with the *supply curve* (S) of Mexican pesos at the equilibrium point (E), which is an exchange rate of 10 cents in U.S. currency for each Mexican peso and a total volume of 85 billion pesos. Note that the two exchange rates are inverses: 10 pesos per dollar is the same as 10 cents per peso (or $0.10 per peso). In the actual foreign exchange market, almost all of the trading for Mexican pesos is done for U.S. dollars. What factors would cause the demand or supply to shift, thus leading to a change in the *equilibrium exchange rate*? The answer to this question is discussed in the following section.

Expectations about Future Exchange Rates

One reason to demand a currency on the foreign exchange market is the belief that the value of the currency is about to increase. One reason to supply a currency—that is, sell it on the foreign exchange market—is the expectation that the value of the currency is about to decline. For example, imagine that a leading business newspaper, like the *Wall Street Journal* or the *Financial Times*, runs an article predicting that the Mexican peso will appreciate in value. The likely effects of such an article are illustrated in Figure 15.6. Demand for the Mexican peso shifts to the right, from D0 to D1, as investors become eager to purchase pesos. Conversely, the supply of pesos shifts to the left, from S0 to S1, because investors will be less willing to give them up. The result is that the equilibrium exchange rate rises from 10 cents/peso to 12 cents/peso and the equilibrium exchange rate rises from 85 billion to 90 billion pesos as the equilibrium moves from E0 to E1.

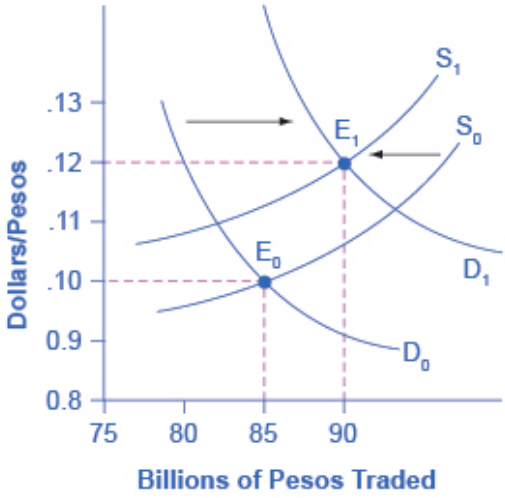

Figure 15.6. *Exchange Rate Market for Mexican Peso Reacts to Expectations about Future Exchange Rates. An announcement that the peso exchange rate is likely to strengthen in the future will lead to greater demand for the peso in the present from investors who wish to benefit from the appreciation. Similarly, it will make investors less likely to supply pesos to the foreign exchange market. Both the shift of demand to the right and the shift of supply to the left cause an immediate appreciation in the exchange rate.*

Figure 15.6 also illustrates some peculiar traits of supply and demand diagrams in the foreign exchange market. In contrast to all the other cases of supply and demand you have considered, in the *foreign exchange market*, supply and demand typically both move at the same time. Groups of participants in the foreign exchange market like firms and investors include some who are buyers and some who are sellers. An expectation of a future shift in the exchange rate affects both buyers and sellers—that is, it affects both demand and supply for a currency.

The shifts in demand and supply curves both cause the exchange rate to shift in the same direction; in this example, they both make the peso exchange rate stronger. However, the shifts in demand and supply work in opposing directions on the quantity traded. In this

example, the rising demand for pesos is causing the quantity to rise while the falling supply of pesos is causing quantity to fall. In this specific example, the result is a higher quantity. But in other cases, the result could be that quantity remains unchanged or declines.

This example also helps to explain why exchange rates often move quite substantially in a short period of a few weeks or months. When investors expect a country's currency to strengthen in the future, they buy the currency and cause it to appreciate immediately. The appreciation of the currency can lead other investors to believe that future appreciation is likely—and thus lead to even further appreciation. Similarly, a fear that a currency *might* weaken quickly leads to an *actual* weakening of the currency, which often reinforces the belief that the currency is going to weaken further. Thus, beliefs about the future path of exchange rates can be self-reinforcing, at least for a time, and a large share of the trading in foreign exchange markets involves dealers trying to outguess each other on what direction exchange rates will move next.

Differences across Countries in Rates of Return

The motivation for investment, whether domestic or foreign, is to earn a return. If rates of return in a country look relatively high, then that country will tend to attract funds from abroad. Conversely, if rates of return in a country look relatively low, then funds will tend to flee to other economies. Changes in the expected rate of return will shift demand and supply for a currency. For example, imagine that interest rates rise in the United States as compared with Mexico. Thus, financial investments in the United States promise a higher return than they previously did. As a result, more investors will demand U.S. dollars so that they can buy interest-bearing assets and fewer investors will be willing to supply U.S. dollars to foreign exchange markets. Demand for the U.S. dollar will shift to the right, from D0 to D1, and supply will shift to the

left, from S0 to S1, as shown in Figure 15.7. The new equilibrium (E1), will occur at an exchange rate of nine pesos/dollar and the same quantity of $8.5 billion. Thus, a higher interest rate or rate of return relative to other countries leads a nation's currency to appreciate or strengthen, and a lower interest rate relative to other countries leads a nation's currency to depreciate or weaken. Since a nation's central bank can use monetary policy to affect its interest rates, a central bank can also cause changes in exchange rates—a connection that will be discussed in more detail later in this module.

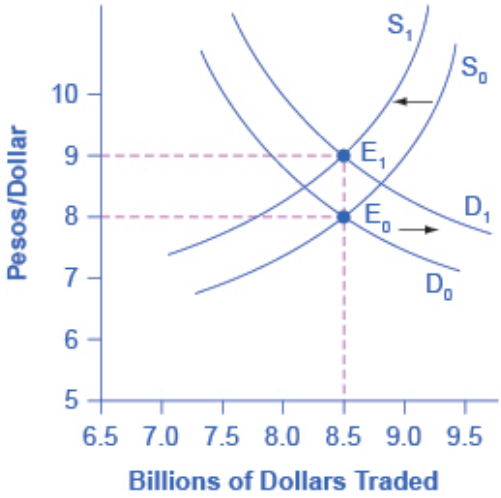

Figure 15.7. *Exchange Rate Market for U.S. Dollars Reacts to Higher Interest Rates. A higher rate of return for U.S. dollars makes holding dollars more attractive. Thus, the demand for dollars in the foreign exchange market shifts to the right, from D0 to D1, while the supply of dollars shifts to the left, from S0 to S1. The new equilibrium (E1) has a stronger exchange rate than the original equilibrium (E0), but in this example, the equilibrium quantity traded does not change.*

Relative Inflation

If a country experiences a relatively high inflation rate compared

with other economies, then the buying power of its currency is eroding, which will tend to discourage anyone from wanting to acquire or to hold the currency. Figure 15.8 shows an example based on an actual episode concerning the Mexican peso. In 1986–87, Mexico experienced an inflation rate of over 200%. Not surprisingly, as inflation dramatically decreased the purchasing power of the peso in Mexico, the exchange rate value of the peso declined as well. As shown in Figure 15.8, demand for the peso on foreign exchange markets decreased from D0 to D1, while supply of the peso increased from S0 to S1. The equilibrium exchange rate fell from $2.50 per peso at the original equilibrium (E0) to $0.50 per peso at the new equilibrium (E1). In this example, the quantity of pesos traded on foreign exchange markets remained the same, even as the exchange rate shifted.

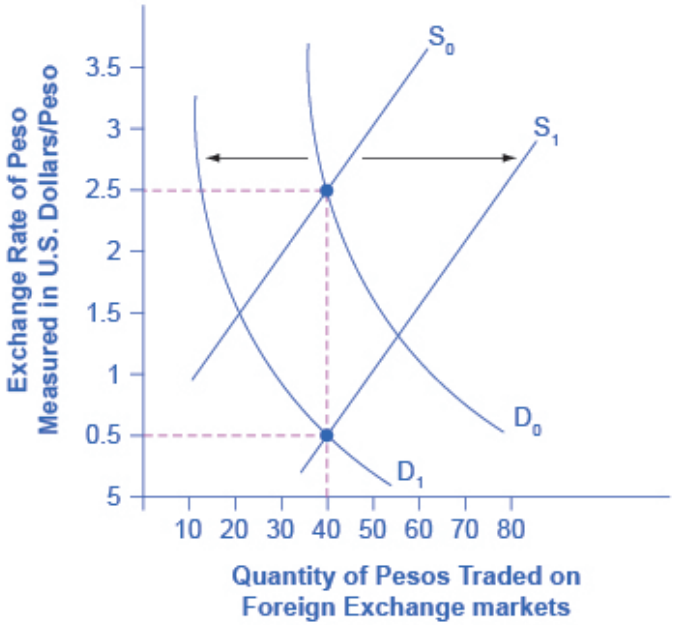

Figure 15.8. *Exchange Rate Markets React to Higher Inflation. If a currency is experiencing relatively high inflation, then its buying power is decreasing and international investors will be less eager to hold it. Thus, a rise in inflation in the Mexican peso would lead demand to shift from D0 to D1, and supply to increase from S0 to S1. Both movements in demand and supply would cause the currency to depreciate. The effect on the quantity traded is drawn here as a decrease, but in truth it could be an increase or no change, depending on the actual movements of demand and supply.*

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Purchasing Power Parity

Over the long term, exchange rates must bear some relationship to the buying power of the currency in terms of goods that are internationally traded. If at a certain exchange rate it was much cheaper to buy internationally traded goods—such as oil, steel, computers, and cars—in one country than in another country, businesses would start buying in the cheap country, selling in other countries, and pocketing the profits.

For example, if a U.S. dollar is worth $1.60 in Canadian currency, then a car that sells for $20,000 in the United States should sell for $32,000 in Canada. If the price of cars in Canada was much lower than $32,000, then at least some U.S. car-buyers would convert their U.S. dollars to Canadian dollars and buy their cars in Canada. If the price of cars was much higher than $32,000 in this example, then at least some Canadian buyers would convert their Canadian dollars to U.S. dollars and go to the United States to purchase their cars. This is known as *arbitrage*, the process of buying and selling goods or currencies across international borders at a profit. It may occur slowly, but over time, it will force prices and exchange rates to align so that the price of internationally traded goods is similar in all countries.

The exchange rate that equalizes the prices of internationally traded goods across countries is called the *purchasing power parity* (PPP) exchange rate. A group of economists at the International Comparison Program, run by the World Bank, have calculated the PPP exchange rate for all countries, based on detailed studies of the prices and quantities of internationally tradable goods.

The purchasing power parity exchange rate has two functions. First, PPP exchange rates are often used for international comparison of GDP and other economic statistics. Imagine that you are preparing a table showing the size of GDP in many countries in several recent years, and for ease of comparison, you are converting all the values into U.S. dollars. When you insert the value for Japan,

you need to use a yen/dollar exchange rate. But should you use the market exchange rate or the PPP exchange rate? Market exchange rates bounce around. In summer 2008, the exchange rate was 108 yen/dollar, but in late 2009 the U.S. dollar exchange rate versus the yen was 90 yen/dollar. For simplicity, say that Japan's GDP was ¥500 trillion in both 2008 and 2009. If you use the market exchange rates, then Japan's GDP will be $4.6 trillion in 2008 (that is, ¥500 trillion /(¥108/dollar)) and $5.5 trillion in 2009 (that is, ¥500 trillion /(¥90/dollar)).

Of course, it is not true that Japan's economy increased enormously in 2009—in fact, Japan had a recession like much of the rest of the world. The misleading appearance of a booming Japanese economy occurs only because we used the market exchange rate, which often has short-run rises and falls. However, PPP exchange rates stay fairly constant and change only modestly, if at all, from year to year.

The second function of PPP is that exchanges rates will often get closer and closer to it as time passes. It is true that in the short run and medium run, as exchange rates adjust to relative inflation rates, rates of return, and to expectations about how interest rates and inflation will shift, the exchange rates will often move away from the PPP exchange rate for a time. But, knowing the PPP will allow you to track and predict exchange rate relationships.

Self Check: Exchange Rates and International Finance

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the four Readings in this section.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

An interactive or media element has been excluded from this version of the text. You can view it online here: https://pressbooks.ccconline.org/accmacro/?p=691

314. Outcome: The Balance of Trade

What you'll learn to do: explain how the balance of trade (surplus or deficit) affects the domestic economy

In this section, you will learn about how international trade is affected by fluctuations in exchange rates.

LEARNING ACTIVITIES

The learning activities for this section include the following:

- Reading: Macroeconomic Effects of Exchange Rates
- Reading: Exchange-Rate Policies
- Self Check: The Balance of Trade

Take time to review and reflect on each of these activities in order to improve your performance on the assessment for this section.

315. Reading: Macroeconomic Effects of Exchange Rates

Exchange Rates, Aggregate Demand, and Aggregate Supply

A *central bank* will be concerned about the exchange rate for three reasons: (1) Movements in the exchange rate will affect the quantity of aggregate demand in an economy; (2) frequent substantial fluctuations in the exchange rate can disrupt international trade and cause problems in a nation's banking system; (3) the exchange rate may contribute to an unsustainable balance of trade and large inflows of international financial capital, which can set the economy up for a deep recession if international investors decide to move their money to another country. Let's discuss these scenarios in turn.

Foreign trade in goods and services typically involves incurring the costs of production in one currency while receiving revenues from sales in another currency. As a result, movements in exchange rates can have a powerful effect on incentives to export and import, and thus on *aggregate demand* in the economy as a whole.

For example, in 1999, when the euro first became a currency, its value measured in U.S. currency was $1.06/euro. By the end of 2013, the euro had risen (and the U.S. dollar had correspondingly weakened) to $1.37/euro. Consider the situation of a French firm that each year incurs €10 million in costs, and sells its products in the United States for $10 million. In 1999, when this firm converted $10 million back to euros at the exchange rate of $1.06/euro (that is, $10 million × [€1/$1.06]), it received €9.4 million, and suffered a loss. In 2013, when this same firm converted $10 million back to euros at the exchange rate of $1.37/euro (that is, $10 million ×

[€1 euro/$1.37]), it received approximately €7.3 million and an even larger loss. This example shows how a stronger euro discourages exports by the French firm, because it makes the costs of production in the domestic currency higher relative to the sales revenues earned in another country. From the point of view of the U.S. economy, the example also shows how a weaker U.S. dollar encourages *exports*.

Since an increase in exports results in more dollars flowing into the economy, and an increase in imports means more dollars are flowing out, it is easy to conclude that exports are "good" for the economy and imports are "bad," but this overlooks the role of exchange rates. If an American consumer buys a Japanese car for $20,000 instead of an American car for $30,000, it may be tempting to argue that the American economy has lost out. However, the Japanese company will have to convert those dollars to yen to pay its workers and operate its factories. Whoever buys those dollars will have to use them to purchase American goods and services, so the money comes right back into the American economy. At the same time, the consumer saves money by buying a less expensive import, and can use the extra money for other purposes.

Fluctuations in Exchange Rates

Exchange rates can fluctuate a great deal in the short run. As yet one more example, the Indian rupee moved from 39 rupees/dollar in February 2008 to 51 rupees/dollar in March 2009, a decline of more than one-fourth in the value of the rupee on foreign exchange markets. Figure 15.9 earlier showed that even two economically developed neighboring economies like the United States and Canada can see significant movements in exchange rates over a few years. For firms that depend on export sales, or firms that rely on imported inputs to production, or even purely domestic firms that compete with firms tied into international trade—which

in many countries adds up to half or more of a nation's GDP—sharp movements in exchange rates can lead to dramatic changes in profits and losses. So, a central bank may desire to keep exchange rates from moving too much as part of providing a stable business climate, where firms can focus on productivity and innovation, not on reacting to exchange rate fluctuations.

One of the most economically destructive effects of exchange rate fluctuations can happen through the banking system. Most international loans are measured in a few large currencies, like U.S. dollars, European euros, and Japanese yen. In countries that do not use these currencies, banks often borrow funds in the currencies of other countries, like U.S. dollars, but then lend in their own domestic currency. The left-hand chain of events in Figure 15.9 shows how this pattern of international borrowing can work. A bank in Thailand borrows one million in U.S. dollars. Then the bank converts the dollars to its domestic currency—in the case of Thailand, the currency is the baht—at a rate of 40 baht/dollar. The bank then lends the baht to a firm in Thailand. The business repays the loan in baht, and the bank converts it back to U.S. dollars to pay off its original U.S. dollar loan.

Figure 15.9. *International Borrowing. The scenario of international borrowing that ends on the left is a success story, but the scenario that ends on the right shows what happens when the exchange rate weakens.*

This process of borrowing in a foreign currency and lending in a domestic currency can work just fine, as long as the exchange rate does not shift. In the scenario outlined, if the dollar strengthens and the baht weakens, a problem arises. The right-hand chain of events in Figure 15.9 illustrates what happens when the baht unexpectedly weakens from 40 baht/dollar to 50 baht/dollar. The Thai firm still repays the loan in full to the bank. But because of the shift in the exchange rate, the bank cannot repay its loan in U.S. dollars. (Of

course, if the exchange rate had changed in the other direction, making the Thai currency stronger, the bank could have realized an unexpectedly large profit.)

In 1997–1998, countries across eastern Asia, like Thailand, Korea, Malaysia, and Indonesia, experienced a sharp depreciation of their currencies, in some cases 50% or more. These countries had been experiencing substantial inflows of *foreign investment capital*, with bank lending increasing by 20% to 30% per year through the mid-1990s. When their exchange rates depreciated, the banking systems in these countries were bankrupt. Argentina experienced a similar chain of events in 2002. When the Argentine peso depreciated, Argentina's banks found themselves unable to pay back what they had borrowed in U.S. dollars.

Banks play a vital role in any economy in facilitating transactions and in making loans to firms and consumers. When most of a country's largest banks become *bankrupt* simultaneously, a sharp decline in aggregate demand and a deep recession results. Since the main responsibilities of a central bank are to control the money supply and to ensure that the banking system is stable, a central bank must be concerned about whether large and unexpected exchange rate depreciation will drive most of the country's existing banks into bankruptcy.

Summing Up Public Policy and Exchange Rates

Every nation would prefer a stable exchange rate to facilitate *international trade* and reduce the degree of risk and uncertainty in the economy. However, a nation may sometimes want a weaker exchange rate to stimulate aggregate demand and reduce a recession, or a stronger exchange rate to fight inflation. The country must also be concerned that rapid movements from a weak to a strong exchange rate may cripple its export industries, while rapid movements from a strong to a weak exchange rate can cripple

its banking sector. In short, every choice of an exchange rate—whether it should be stronger or weaker, or fixed or changing—represents potential tradeoffs.

316. Reading: Exchange-Rate Policies

Exchange-Rate Policies

Exchange rate policies come in a range of different forms listed in Figure 15.10: let the foreign exchange market determine the exchange rate; let the market set the value of the exchange rate most of the time, but have the central bank sometimes intervene to prevent fluctuations that seem too large; have the central bank guarantee a specific exchange rate; or share a currency with other countries. Let's discuss each type of exchange rate policy and its tradeoffs.

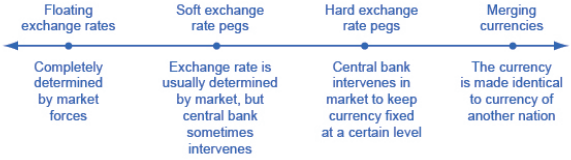

Figure 15.10. *A Spectrum of Exchange Rate Policies. A nation may adopt one of a variety of exchange rate regimes, from floating rates in which the foreign exchange market determines the rates to pegged rates where governments intervene to manage the value of the exchange rate, to a common currency where the nation adopts the currency of another country or group of countries.*

Floating Exchange Rates

A policy which allows the foreign exchange market to set exchange rates is referred to as a *floating exchange rate*. The U.S. dollar is a floating exchange rate, as are the currencies of about 40% of the countries in the world economy. The major concern with this policy is that exchange rates can move a great deal in a short time.

Consider the U.S. exchange rate expressed in terms of another fairly stable currency, the Japanese yen, as shown in Figure 15.11. On January 1, 2002, the exchange rate was 133 yen/dollar. On January 1, 2005, it was 103 yen/dollar. On June 1, 2007, it was 122 yen/dollar, and on January 1, 2009, it was 90 yen/dollar. As investor sentiment swings back and forth, driving exchange rates up and down, exporters, importers, and banks involved in international lending are all affected. At worst, large movements in exchange rates can drive companies into bankruptcy or trigger a nationwide banking collapse. But even in the moderate case of the yen/dollar exchange rate, these movements of roughly 30 percent back and forth impose stress on both economies as firms must alter their export and import plans to take the new exchange rates into account. Especially in smaller countries where international trade is a relatively large share of GDP, exchange rate movements can rattle their economies.

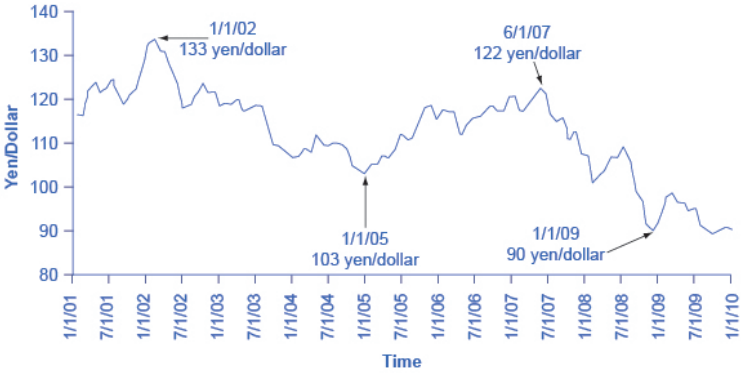

Figure 15.11. *U.S. Dollar Exchange Rate in Japanese Yen. Even relatively stable exchange rates can vary a fair amount. The exchange rate for the U.S. dollar, measured in Japanese yen, fell about 30% from the start of 2002 to the start of 2005, rose back by mid-2007, and then dropped again by early 2009. (Source: http://research.stlouisfed.org/fred2/series/EXJPUS)*

However, movements of floating exchange rates have advantages, too. After all, prices of goods and services rise and fall throughout

a market economy, as demand and supply shift. If an economy experiences strong inflows or outflows of international financial capital, or has relatively high inflation, or if it experiences strong productivity growth so that purchasing power changes relative to other economies, then it makes economic sense for the exchange rate to shift as well.

Floating exchange rate advocates often argue that if government policies were more predictable and stable, then inflation rates and interest rates would be more predictable and stable. Exchange rates would bounce around less, too. The great economist *Milton Friedman* (1912–2006), for example, wrote a defense of floating exchange rates in 1962 in his book *Capitalism and Freedom*:

> Being in favor of floating exchange rates does not mean being in favor of unstable exchange rates. When we support a free price system [for goods and services] at home, this does not imply that we favor a system in which prices fluctuate wildly up and down. What we want is a system in which prices are free to fluctuate but in which the forces determining them are sufficiently stable so that in fact prices move within moderate ranges. This is equally true in a system of floating exchange rates. The ultimate objective is a world in which exchange rates, while free to vary, are, in fact, highly stable because basic economic policies and conditions are stable.

Advocates of floating exchange rates admit that, yes, exchange rates may sometimes fluctuate. They point out, however, that if a central bank focuses on preventing either high inflation or deep recession, with low and reasonably steady interest rates, then exchange rates will have less reason to vary.

Using Soft Pegs and Hard Pegs

When a government intervenes in the foreign exchange market so that the exchange rate of its currency is different from what the market would have produced, it is said to have established a "peg" for its currency. A *soft peg* is the name for an exchange rate policy where the government usually allows the exchange rate to be set by the market, but in some cases, especially if the exchange rate seems to be moving rapidly in one direction, the central bank will intervene in the market. With a *hard peg* exchange rate policy, the central bank sets a fixed and unchanging value for the exchange rate. A central bank can implement soft peg and hard peg policies.

Suppose the market exchange rate for the Brazilian currency, the real, would be 35 cents/real with a daily quantity of 15 billion real traded in the market, as shown at the equilibrium E0 in Figure 15.12 (a) and Figure 15.12 (b). However, the government of Brazil decides that the exchange rate should be 30 cents/real, as shown in Figure 15.12 (a). Perhaps Brazil sets this lower exchange rate to benefit its export industries. Perhaps it is an attempt to stimulate aggregate demand by stimulating exports. Perhaps Brazil believes that the current market exchange rate is higher than the long-term purchasing power parity value of the real, so it is minimizing fluctuations in the real by keeping it at this lower rate. Perhaps the target exchange rate was set sometime in the past, and is now being maintained for the sake of stability. Whatever the reason, if Brazil's central bank wishes to keep the exchange rate below the market level, it must face the reality that at this weaker exchange rate of 30 cents/real, the quantity demanded of its currency at 17 billion reals is greater than the quantity supplied of 13 billion reals in the foreign exchange market.

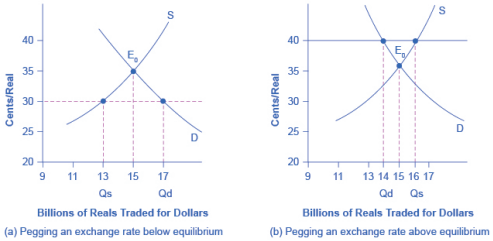

Figure 15.12. *Pegging an Exchange Rate. (a) If an exchange rate is pegged below what would otherwise be the equilibrium, then the quantity demanded of the currency will exceed the quantity supplied. (b) If an exchange rate is pegged above what would otherwise be the equilibrium, then the quantity supplied of the currency exceeds the quantity demanded.*

The Brazilian central bank could weaken its exchange rate in two ways. One approach is to use an *expansionary monetary policy* that leads to lower interest rates. In foreign exchange markets, the lower interest rates will reduce demand and increase supply of the real and lead to depreciation. This technique is not often used because lowering interest rates to weaken the currency may be in conflict with the country's monetary policy goals. Alternatively, Brazil's central bank could trade directly in the foreign exchange market. The central bank can expand the money supply by creating reals,

use the reals to purchase foreign currencies, and avoid selling any of its own currency. In this way, it can fill the gap between *quantity demanded* and *quantity supplied* of its currency.

Figure 15.12 (b) shows the opposite situation. Here, the Brazilian government desires a stronger exchange rate of 40 cents/real than the market rate of 35 cents/real. Perhaps Brazil desires the stronger currency to reduce aggregate demand and to fight inflation, or perhaps Brazil believes that that current market exchange rate is temporarily lower than the long-term rate. Whatever the reason, at the higher desired exchange rate, the quantity supplied of 16 billion reals exceeds the quantity demanded of 14 billion reals.

Brazil's central bank can use a *contractionary monetary policy* to raise interest rates, which will increase demand and reduce supply of the currency on foreign exchange markets, and lead to an appreciation. Alternatively, Brazil's central bank can trade directly in the foreign exchange market. In this case, with an excess supply of its own currency in foreign exchange markets, the central bank must use reserves of foreign currency, like U.S. dollars, to demand its own currency and thus cause an appreciation of its exchange rate.

Both a soft peg and a hard peg policy require that the central bank intervene in the foreign exchange market. However, a hard peg policy attempts to preserve a fixed exchange rate at all times. A soft peg policy typically allows the exchange rate to move up and down by relatively small amounts in the short run of several months or a year, and to move by larger amounts over time, but seeks to avoid extreme short-term fluctuations.

Tradeoffs of Soft Pegs and Hard Pegs

When a country decides to alter the market exchange rate, it faces a number of tradeoffs. If it uses *monetary policy* to alter the exchange rate, it then cannot at the same time use monetary policy to address

issues of inflation or recession. If it uses direct purchases and sales of foreign currencies in exchange rates, then it must face the issue of how it will handle its reserves of foreign currency. Finally, a pegged exchange rate can even create additional movements of the exchange rate; for example, even the possibility of government intervention in exchange rate markets will lead to rumors about whether and when the government will intervene, and dealers in the foreign exchange market will react to those rumors. Let's consider these issues in turn.

One concern with pegged exchange rate policies is that they imply a country's monetary policy is no longer focused on controlling inflation or shortening recessions, but now must also take the exchange rate into account. For example, when a country pegs its exchange rate, it will sometimes face economic situations where it would like to have an expansionary monetary policy to fight recession—but it cannot do so because that policy would depreciate its exchange rate and break its hard peg. With a soft peg exchange rate policy, the *central bank* can sometimes ignore the exchange rate and focus on domestic inflation or recession—but in other cases the central bank may ignore inflation or recession and instead focus on its soft peg exchange rate. With a hard peg policy, domestic monetary policy is effectively no longer determined by domestic inflation or unemployment, but only by what monetary policy is needed to keep the exchange rate at the hard peg.

Another issue arises when a central bank intervenes directly in the exchange rate market. If a central bank ends up in a situation where it is perpetually creating and selling its own currency on foreign exchange markets, it will be buying the currency of other countries, like U.S. dollars or euros, to hold as *reserves*. Holding large reserves of other currencies has an *opportunity cost*, and central banks will not wish to boost such reserves without limit.

In addition, a central bank that causes a large increase in the supply of money is also risking an inflationary surge in aggregate demand. Conversely, when a central bank wishes to buy its own currency, it can do so by using its reserves of international currency

like the U.S. dollar or the euro. But if the central bank runs out of such reserves, it can no longer use this method to strengthen its currency. Thus, buying foreign currencies in exchange rate markets can be expensive and inflationary, while selling foreign currencies can work only until a central bank runs out of reserves.

Yet another issue is that when a government pegs its exchange rate, it may unintentionally create another reason for additional fluctuation. With a soft peg policy, foreign exchange dealers and international investors react to every rumor about how or when the central bank is likely to intervene to influence the exchange rate, and as they react to rumors the exchange rate will shift up and down. Thus, even though the goal of a soft peg policy is to reduce short-term fluctuations of the exchange rate, the existence of the policy—when anticipated in the foreign exchange market—may sometimes increase short-term fluctuations as international investors try to anticipate how and when the central bank will act. The following section discusses the effects of *international capital flows*—capital that flows across national boundaries as either portfolio investment or direct investment.

HOW DO TOBIN TAXES CONTROL THE FLOW OF CAPITAL?

Some countries like Chile and Malaysia have sought to reduce movements in exchange rates by limiting inflows and outflows of international financial capital. This policy can be enacted either through targeted taxes or by regulations.

Taxes on international capital flows are sometimes known as *Tobin taxes*, named after *James Tobin*, the 1981 Nobel laureate in economics who proposed such a tax in a 1972 lecture. For example, a government might tax all foreign exchange transactions, or attempt to tax short-term *portfolio investment* while exempting long-term foreign *direct investment*. Countries can also use regulation to

forbid certain kinds of foreign investment in the first place or to make it difficult for international financial investors to withdraw their funds from a country.

The goal of such policies is to reduce international capital flows, especially short-term portfolio flows, in the hope that doing so will reduce the chance of large movements in exchange rates that can bring macroeconomic disaster.

But proposals to limit *international financial flows* have severe practical difficulties. Taxes are imposed by national governments, not international ones. If one government imposes a Tobin tax on exchange rate transactions carried out within its territory, the exchange rate market might easily be operated by a firm based someplace like the Grand Caymans, an island nation in the Caribbean well-known for allowing some financial wheeling and dealing. In an interconnected global economy, if goods and services are allowed to flow across national borders, then payments need to flow across borders, too. It is very difficult—in fact close to impossible—for a nation to allow only the flows of payments that relate to goods and services, while clamping down or taxing other flows of financial capital. If a nation participates in international trade, it must also participate in international capital movements.

Finally, countries all over the world, especially low-income countries, are crying out for foreign investment to help develop their economies. Policies that discourage international financial investment may prevent some possible harm, but they rule out potentially substantial economic benefits as well.

A hard peg exchange rate policy will not allow short-term fluctuations in the exchange rate. If the government first announces a hard peg and then later changes its mind—perhaps the government becomes unwilling to keep interest rates high or to hold high levels of foreign exchange reserves—then the result of abandoning a hard peg could be a dramatic shift in the exchange rate.

In the mid-2000s, about one-third of the countries in the world used a soft peg approach and about one-quarter used a hard peg

approach. The general trend in the 1990s was to shift away from a soft peg approach in favor of either floating rates or a hard peg. The concern is that a successful soft peg policy may, for a time, lead to very little variation in exchange rates, so that firms and banks in the economy begin to act as if a hard peg exists. When the exchange rate does move, the effects are especially painful because firms and banks have not planned and hedged against a possible change. Thus, the argument went, it is better either to be clear that the exchange rate is always flexible, or that it is fixed, but choosing an in-between soft peg option may end up being worst of all.

A Merged Currency

A final approach to exchange rate policy is for a nation to choose a common currency shared with one or more nations is also called a *merged currency*. A merged currency approach eliminates foreign exchange risk altogether. Just as no one worries about exchange rate movements when buying and selling between New York and California, Europeans know that the value of the euro will be the same in Germany and France and other European nations that have adopted the euro.

However, a merged currency also poses problems. Like a hard peg, a merged currency means that a nation has given up altogether on domestic monetary policy, and instead has put its interest rate policies in other hands. When Ecuador uses the U.S. dollar as its currency, it has no voice in whether the Federal Reserve raises or lowers interest rates. The European Central Bank that determines monetary policy for the euro has representatives from all the euro nations. However, from the standpoint of, say, Portugal, there will be times when the decisions of the European Central Bank about monetary policy do not match the decisions that would have been made by a Portuguese central bank.

The lines between these four different exchange rate policies can

blend into each other. For example, a soft peg exchange rate policy in which the government almost never acts to intervene in the exchange rate market will look a great deal like a floating exchange rate. Conversely, a soft peg policy in which the government intervenes often to keep the exchange rate near a specific level will look a lot like a hard peg. A decision to merge currencies with another country is, in effect, a decision to have a permanently fixed exchange rate with those countries, which is like a very hard exchange rate peg. The range of exchange rates policy choices, with their advantages and disadvantages, are summarized in Table 15.3.

Table 15.3. Tradeoffs of Exchange Rate Policies

Situation	Floating Exchange Rates	Soft Peg	Hard Peg	Merged Currency
Large short-run fluctuations in exchange rates?	Often a lot in the short term	Maybe less in the short run, but still large changes over time	None, unless a change in the fixed rate	None
Large long-term fluctuations in exchange rates?	Can often happen	Can often happen	Cannot happen unless hard peg changes, in which case substantial volatility can occur	Cannot happen
Power of central bank to conduct countercyclical monetary policy?	Flexible exchange rates make monetary policy stronger	Some power, although conflicts may arise between exchange rate policy and countercyclical policy	Very little; central bank must keep exchange rate fixed	None; nation does not have its own currency
Costs of holding foreign exchange reserves?	Do not need to hold reserves	Hold moderate reserves that rise and fall over time	Hold large reserves	No need to hold reserves
Risk of being stuck with an exchange rate that causes a large trade imbalance and very high inflows or outflows of financial capital?	Adjusts often	Adjusts over the medium term, if not the short term	May become stuck over time either far above or below the market level	Cannot adjust

Global macroeconomics would be easier if the whole world had one currency and one central bank. The exchange rates between different currencies complicate the picture. If exchange rates are set solely by financial markets, they fluctuate substantially as short-term portfolio investors try to anticipate tomorrow's news. If the government attempts to intervene in exchange rate markets through soft pegs or hard pegs, it gives up at least some of the

power to use monetary policy to focus on domestic inflations and recessions, and it risks causing even greater fluctuations in foreign exchange markets.

There is no consensus among economists about which exchange rate policies are best: floating, soft peg, hard peg, or merged currencies. The choice depends both on how well a nation's central bank can implement a specific exchange rate policy and on how well a nation's firms and banks can adapt to different exchange rate policies. A national economy that does a fairly good job at achieving the four main economic goals of growth, low inflation, low unemployment, and a sustainable *balance of trade* will probably do just fine most of the time with any exchange rate policy; conversely, no exchange rate policy is likely to save an economy that consistently fails at achieving these goals. On the other hand, a merged currency applied across wide geographic and cultural areas carries with it its own set of problems, such as the ability for countries to conduct their own independent monetary policies.

IS A STRONGER DOLLAR GOOD FOR THE U.S. ECONOMY?

The foreign exchange value of the dollar is a price and whether a higher price is good or bad depends on where you are standing: sellers benefit from higher prices and buyers are harmed. A stronger dollar is good for U.S. imports (and people working for U.S. importers) and U.S. investment abroad. It is also good for U.S. tourists going to other countries, since their dollar goes further. But a stronger dollar is bad for U.S. exports (and people working in U.S. export industries); it is bad for foreign investment in the United States (leading, for example, to higher U.S. interest rates); and it is bad for foreign tourists (as well as U.S hotels, restaurants, and others in the tourist industry). In short, whether the U.S. dollar is

good or bad is a more complex question than you may have thought. The economic answer is "it depends."

Self Check: The Balance of Trade

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the two Readings in this section.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

An interactive or media element has been excluded from this version of the text. You can view it online here: https://pressbooks.ccconline.org/accmacro/?p=697

317. Outcome: Globalization

What you'll learn to do: connect globalization, international trade and international finance

Trade and Finance are often confused as being synonymous with globalization. Indeed, trade and international finance have contributed to globalization but they are not the same. Globalization is a process that widens, deepens and speeds-up interconnectedness between people, institutions, markets and nations. Trade and finance are two arteries through which the process of globalization flows. There are many ways to conceptualize globalization.

As globalization increases over time, individuals, firms, institutions, and politicians work within and across countries to define exactly how "open" they want to be and whether they prefer to protect their own products through tariffs or trade restrictions. One thing is for sure, protection and openness to international trade OR finance both have income distribution effects. The interesting question is who reaps the benefits and who carries the burden.

LEARNING ACTIVITIES

The learning activities for this section include the following:

- Reading: Introduction to Globalization
- Reading: Trade Winds
- Simulation: International Trade
- Self Check: Globalization

Take time to review and reflect on each of these activities in order to improve your performance on the assessment for this section.

318. Reading: Introduction to Globalization

Conceptualizing Globalization

Globalization is the process by which the world, previously isolated through physical and technological distance, becomes increasingly interconnected. It is manifested by the increase in interaction between peoples around the world that involves the sharing of ideas, cultures, goods, services and investment.

The last sixty years have witnessed a huge increase in globalization, but the phenomenon has been going on for much longer. Thomas Friedman describes the current trend as the third great wave of globalization in human history.

Globalization has brought fear of loss of jobs and loss of income, which are often described as the "race to the bottom," as industrialized countries are thought to have to reduce wages to be competitive with those in the developing world. Globalization has also spawned fears about loss of culture. Many countries worry about their cultures being overwhelmed by that of the United States. France is a good example. Others fear replacement of their cultures by that of Western nations (e.g., some Islamic states). Countries also fear the loss of national sovereignty as they become part of supranational entitles, like the European Union or the International Monetary Fund. And yet, history shows that globalization has corresponded to higher national incomes and increased opportunities. How can these conflicting views be reconciled?

319. Reading: Trade Winds

Trade Winds

Rapid increases in the flow of goods and services between vastly different nations and cultures have changed what people eat, how they dress, and even how they communicate with one another. For you, increased trade has meant greater choice of what to buy and often lower prices.

Look through your room. Chances are it is full of items from all around the world. The relatively free trade that exists today provides you with expanded choices. No one forced you to buy that shirt from India or that e-book reader whose components are manufactured in various countries in Asia. Presumably you bought them because you preferred them to other shirts and e-book readers you might have bought, perhaps because they had certain characteristics—style, color, perceived quality, or price—that you favored.

Your gains are being experienced worldwide because the winds of international trade have blown generally freer in the past few decades. Nations all over the world have dramatically lowered the barriers they impose on the products of other countries.

In Western Europe, the members of the European Union (EU) have eliminated virtually every restriction on the free flow of goods and services among them. A truckload of electronic equipment from Italy now passes through France on its way to Spain with no more restrictions than would be encountered by a truck delivering goods from Michigan to Illinois. The purchase of the equipment can even be arranged using a new currency, the euro, which has been adopted by most EU nations.

Canada, Mexico, and the United States, while not adopting a common currency, have created a similar free trade area, the North

American Free Trade Area (NAFTA). NAFTA has resulted in a dramatic increase in trade between Canada, the United States, and Mexico.

President Bush proposed and Congress passed in 2005 the creation of a Central American Free Trade Association (CAFTA) that would create a free trade area south of Mexico and linked to the United States. It abolished most tariff restrictions between the United States and six countries of Central America—Costa Rica, the Dominican Republic, El Salvador, Guatemala, Honduras, and Nicaragua. President Bush also proposed free trade agreements with Peru, Colombia, Panama, and South Korea. The agreement with Peru passed at the end of 2007. Free trade agreements with the other three countries finally passed under the administration of President Obama in late 2011.

While many other bilateral and regional free trade agreements have gone into effect in countries around the world, a major worldwide proposal has faltered. In 1995, the World Trade Organization (WTO) was established to "help trade flow smoothly, freely, fairly and predictably" among member nations. Since 2008, it has had 153 member countries. Since World War II, the General Agreement on Tariffs and Trade (GATT)—WTO's predecessor—and WTO have generated a series of agreements that slashed trade restraints among members. These agreements have helped propel international trade, but the negotiations leading to these agreements have always been protracted and tumultuous and issues of nationalism and patriotism are often not far from the surface. The current and ninth round of trade talks are referred to as the Doha Round, because they were officially launched in Doha, Qatar, in 2001. Ten years later, talks were still mired in controversy over the removal of agricultural export subsidies and lowering of trade barriers of various kinds.

Still trade is more extensive and much freer than it was fifty or one hundred years ago. The 2008 financial crisis severely tested the attitudes of many countries toward working toward and implementing agreements that lead to freer trade. Some countries

did take protectionist measures, but by and large they held to their trading system commitments and did not adopt import restrictions. A 2010 study by Hiau Looi Kee, Cristina Neagu, and Alessandro Nicita for the World Bank found that while many countries did adjust their tariffs upward or impose other restrictions on selective products, most changes were on products that did not have a significant effect on trade flows. They estimated that these protectionist policies explain less than 2% of the decline in world trade that occurred during the crisis period.

Why have so many countries moved to make trade freer? What are the effects of free trade? Why do efforts to eliminate trade restrictions meet with resistance? Why do many nations continue to impose barriers against some foreign goods and services? How do such barriers affect the economy? How do such barriers affect *you*?

320. Simulation: International Trade

Try It

Play the simulation below multiple times to see how different choices lead to different outcomes. All simulations allow unlimited attempts so that you can gain experience applying the concepts.

An interactive or media element has been excluded from this version of the text. You can view it online here: https://pressbooks.ccconline.org/accmacro/?p=705

321. Putting It Together: Globalization, Trade and Finance

Summary

The goal of this module was to teach you to analyze the benefits and costs of international trade, and to determine the extent to which barriers to international trade are warranted.

You learned how to:

- Define and calculate comparative and absolute advantage
- Define and calculate gains from trade
- Understand the way imports and exports impact different actors in the economy (businesses, consumers, and workers)
- Explain how globalization has increased over time, especially over the last several decades
- Understand the way government regulations (e.g. tariffs, quotas and non-tariff barriers) affect business, consumers and workers in the economy.
- Differentiate between alternative international trade regimes and how they impact global trade
- Explain how changes in currency exchange rates impact trade balances
- Explain how the balance of trade (surplus or deficit) affects the domestic economy, and how the domestic economy affects the balance of trade

Examples

You learned that trade based on comparative advantage will maximize an individual's or a nation's income, but that there will be winners and losers to trade. For example, employees and owners of a firm that loses business to foreign imports are worse off, even though their loss is less than the gain to consumers. The challenge for policymakers is how to compensate the losers while capturing the gains from trade. Similarly, protectionism benefits some workers and businesses at the expense of other workers and businesses and at the expense of consumers. In this case, the losses to the latter groups are larger than the gains to the former groups. In that sense, protectionism makes a country worse off. Finally, a trade deficit means that a nation is consuming beyond its income, in other words, it is borrowing from the rest of the world. This implies short term benefits and long term costs as those debts must repaid. Whether or not a trade deficit makes sense depends on what is done with the borrowed resources. Borrowing to invest in the future, say for example by building railroads as the U.S. did in the late 1800s, raises the nation's future GDP and enhances their ability to pay back their loans. Borrowing to raise the current standard of living or to allow citizens to retire early, as Greece did in the early 2000s, has the opposite effect.

322. Self Check: Globalization

Check Your Understanding

Answer the question(s) below to see how well you understand the topics covered in the previous section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

You'll have more success on the Self Check if you've completed the two Readings in this section.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

An interactive or media element has been excluded from this version of the text. You can view it online here: https://pressbooks.ccconline.org/accmacro/?p=709

323. Glossary: International Trade

absolute advantage
: when one country can use fewer resources to produce a good compared to another country; when a country is more productive compared to another country

common market
: economic agreement between countries to allow free trade in goods, services, labor, and financial capital between members while having a common external trade policy

comparative advantage
: when a country can produce a good at a lower cost in terms of other goods; or, when a country has a lower opportunity cost of production

economic union
: economic agreement between countries to allow free trade between members, a common external trade policy, and coordinated monetary and fiscal policies

free trade agreement
: economic agreement between countries to allow free trade between members

gain from trade
: a country that can consume more than it can produce as a result of specialization and trade

General Agreement on Tariffs and Trade (GATT)
: forum in which nations could come together to negotiate reductions in tariffs and other barriers to trade; the precursor to the World Trade Organization

import quotas
numerical limits on the quantity of products that can be imported

intra-industry trade
international trade of goods within the same industry

national interest argument
the argument that there are compelling national interests against depending on key imports from other nations

nontariff barriers
ways a nation can draw up rules, regulations, inspections, and paperwork to make it more costly or difficult to import products

protectionism
government policies to reduce or block imports

splitting up the value chain
many of the different stages of producing a good happen in different geographic locations

tariffs
taxes that governments place on imported goods

value chain
how a good is produced in stages

World Trade Organization (WTO)
organization that seeks to negotiate reductions in barriers to trade and to adjudicate complaints about violations of international trade policy; successor to the General Agreement on Tariffs and Trade (GATT)

324. Discussion: Absolute and Comparative Advantage

Suppose that the United States and Canada can each produce two products: lumber and beef. Create a table like the one below, showing labor requirements per unit of output for each country. (Hint: Choose numbers for each country that are easily divisible by one another.)

Labor Requirements per Unit of Output		
	United States	Canada
Lumber		
Beef		

What does absolute advantage mean? How do you calculate absolute advantage? In what output(s) does the U.S. have an absolute advantage? Explain using the data from your table. In what output(s) does Canada have an absolute advantage? Explain using the data from your table.

What does comparative advantage mean? How do you calculate comparative advantage? In what output(s) does the U.S. have a comparative advantage? Explain using the data from your table. In what output(s) does Canada have a comparative advantage? Explain using the data from your table.

What product should each country export? Why?

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