Ten Principles of Economics

CHAPTER-OVERVIEW

Context and Purpose

Chapter 1 is the first chapter in a three-chapter section that serves as the introduction to the text. Chapter 1 introduces ten fundamental principles on which the study of economics is based. In a broad sense, the rest of the text is an elaboration on these ten principles. Chapter 2 will develop how economists approach problems, while Chapter 3 will explain how individuals and countries gain from trade.

The purpose of Chapter 1 is to lay out ten economic principles that will serve as building blocks for the rest of the text. The ten principles can be grouped into three categories: how people make decisions, how people interact, and how the economy works as a whole. Throughout the text, references will be made repeatedly to these ten principles.

Chapter Review

Introduction: Households and society face decisions about how to allocate scarce resources. Resources are scarce in that we have fewer resources than we wish. Economics is the study of how society manages its scarce resources. Economists study how people make decisions about buying and selling and saving and investing. We study how people interact with one another in markets where prices are determined and quantities are exchanged. We also study the economy as a whole when we concern ourselves with total income, unemployment, and inflation.

This chapter addresses ten principles of economics. The text will refer to these principles throughout. The ten principles are grouped into three categories: how people make decisions, how people interact, and how the economy works as a whole.

How People Make Decisions

- People face trade-offs: Economists often say, “There is no such thing as a free lunch.” This means that there are always trade-offs—to get more of something we like, we have to give up something else that we like. For example, if you spend money on dinner and a movie, you won’t be able to spend it on new clothes. Socially, we face trade-offs as a group. For example, there is the

GOALS

In this chapter you will

- Learn that economics is about the allocation of scarce resources
- Examine some of the trade-offs that people face
- Learn the meaning of opportunity cost
- See how to use marginal reasoning when making decisions
- Discuss how incentives affect people’s behavior
- Consider why trade among people or nations can be good for everyone
- Discuss why markets are a good, but not perfect, way to allocate resources
- Learn what determines some trends in the overall economy

OUTCOMES

After accomplishing these goals, you should be able to

- Define scarcity
- Explain the classic trade-off between “guns and butter”
- Add up your particular opportunity cost of attending college
- Compare the marginal costs and marginal benefits of continuing to attend school indefinitely
- Consider how a quadrupling of your tuition payments would affect your decision to educate yourself
- Explain why specialization and trade improve people’s choices
- Give an example of an externality
- Explain the source ofiat and persistent inflation
the government may be able to intervene and improve economic efficiency. The government may also intervene to improve equity with income taxes and welfare. Sometimes well-intentioned policy intervention has unintended consequences.

**How the Economy as a Whole Works**

- **A country’s standard of living depends on its ability to produce goods and services:** There is great variation in average incomes across countries at a point in time and within the same country over time. These differences in incomes and standards of living are largely attributable to differences in productivity. Productivity is the amount of goods and services produced by each hour of a worker’s time. As a result, public-policy intended to improve standards of living should improve education, generate more and better tools, and improve access to current technology.

- **Prices rise when the government prints too much money:** Inflation is an increase in the overall level of prices in the economy. High inflation is costly to the economy. Large and persistent inflation is caused by rapid growth in the quantity of money. Policymakers wishing to keep inflation low should maintain slow growth in the quantity of money.

- **Society faces a short-run trade-off between inflation and unemployment:** In the short run, an increase in the quantity of money stimulates spending, which raises both prices and production. The increase in production requires more hiring, which reduces unemployment. Thus, in the short run, an increase in inflation tends to reduce unemployment, causing a trade-off between inflation and unemployment. The trade-off is temporary but can last for several years. Understanding this trade-off is important for understanding the fluctuations in economic activity known as the business cycle. In the short run, policymakers may be able to affect the mix of inflation and unemployment by changing government spending, taxes, and the quantity of money.

**Helpful Hints**

1. Place yourself in the story. Throughout the text, most economic situations will be composed of economic actors—buyers and sellers, borrowers and lenders, firms and workers, and so on. When you are asked to address how any economic actor would respond to economic incentives, place yourself in the story as the buyer or the seller, the borrower or the lender, the producer or the consumer. Don’t think of yourself always as the buyer (a natural tendency) or always as the seller. You will find that your role-playing will usually produce the right response once you learn to think like an economist—which is the topic of the next chapter.

2. Trade is not a zero-sum game. Some people see an exchange in terms of winners and losers. Their reaction to trade is that, after the sale, if the seller is happy, the buyer must be sad because the seller must have taken something from the buyer. That is, they view trade as a zero-sum game where what one gains the other must have lost. They fail to see that both parties to a voluntary transaction gain because each party is allowed to specialize in what it can produce most efficiently and then trade for items that are produced more efficiently by others. Nobody loses, because trade is voluntary. Therefore, a government policy that limits trade reduces the potential gains from trade.

3. An externality can be positive. Because the classic example of an externality is pollution, it is easy to think of an externality as a cost that lands on a bystander. However, an externality can be positive in that it can be a benefit that lands on a bystander. For example, education is often cited as a product that emits a positive externality because when your neighbor educates herself, she is likely to be more reasonable, responsible, productive, and politically astute. In short, she is a better neighbor. Positive externalities, just as much as negative externalities, may be a reason for the government to intervene to promote efficiency.
classic trade-off between "guns and butter." That is, if we decide to spend more on national defense (guns), then we will have less to spend on social programs (butter). There is also a social trade-off between efficiency (getting the most from our scarce resources) and equity (benefits being distributed fairly across society). Policies such as taxes and welfare make incomes more equal, but these policies reduce returns to hard work, and thus, the economy doesn’t produce as much. As a result, when the government tries to cut the pie into more equal pieces, the pie gets smaller.

- **The cost of something is what you give up to get it:** The opportunity cost of an item is what you give up to get that item. It is the true cost of the item. The opportunity cost of going to college obviously includes your tuition payment. It also includes the value of your time that you could have spent working, valued at your potential wage. It would exclude your room and board payment because you have to eat and sleep whether you are in school or not.

- **Rational people think at the margin:** Rational people systematically do the best they can to achieve their objectives. Marginal changes are incremental changes to an existing plan. Rational decision makers only proceed with an action if the marginal benefit exceeds the marginal cost. For example, you should only attend school for another year if the benefits from that year of schooling exceed the cost of attending that year. A farmer should produce another bushel of corn only if the benefit (price received) exceeds the cost of producing it.

- **People respond to incentives:** An incentive is something that induces a person to act. Since rational people weigh marginal costs and marginal benefits of activities, they will respond when these costs or benefits change. For example, when the price of automobiles rises, buyers have an incentive to buy fewer cars while automobile producers have an incentive to hire more workers and produce more autos. Public policy can alter the costs or benefits of activities. For example, a luxury tax on expensive boats raises the price and discourages purchases. Some policies have unintended consequences because they alter behavior in a manner that was not predicted.

**How People Interact**

- **Trade can make everyone better off:** Trade is not a contest where one wins and one loses. Trade can make each trader better off. Trade allows each trader to specialize in what they do best, whether it be farming, building, or manufacturing, and trade their output for the output of other efficient producers. This is as true for countries as it is for individuals.

- **Markets are usually a good way to organize economic activity:** In a market economy, the decisions about what goods and services to produce, how much to produce, and who gets to consume them are made by millions of firms and households. Firms and households, guided by self-interest, interact in the marketplace where prices and quantities are determined. While this may appear like chaos, Adam Smith made the famous observation in the *Wealth of Nations* in 1776 that self-interested households and firms interact in markets and generate desirable social outcomes as if guided by an "invisible hand." These optimal social outcomes were not their original intent. The prices generated by their competitive activity signal the value of costs and benefits to producers and consumers, whose activities usually maximize the welfare of society. Alternatively, the prices dictated by central planners contain no information on costs and benefits, and therefore, these prices fail to efficiently guide economic activity. Prices also fail to efficiently guide economic activity when governments distort prices with taxes or restrict price movements with price controls.

- **Governments can sometimes improve market outcomes:** Government must first protect property rights in order for markets to work. In addition, government can sometimes intervene in the market to improve efficiency or equity. When markets fail to allocate resources efficiently, there has been market failure. There are many different sources of market failure. An externality is when the actions of one person affect the well-being of a bystander. Pollution is a standard example. Market power is when a single person or group can influence the price. In these cases,
1. People respond to incentives. Governments can alter incentives and, hence, behavior with public policy. However, sometimes public policy generates unintended consequences by producing results that were not anticipated. For each of the following public policies, determine which result was likely the intended result and which was the unintended consequence.

   a. The government raises the minimum wage to $10 per hour. Some workers find jobs at the higher wage making these workers better off. Some workers find no job at all because few firms want to hire low-productivity workers at this high wage.

   b. The government places rent controls on apartments restricting rent to $300 per month. Few landlords are willing to produce an apartment at this price causing more homelessness. Some low-income renters are able to rent an apartment more cheaply.

   c. The government raises the tax on gasoline by $2 per gallon. The deficit is reduced, and people economize on their use of gasoline. There is a boom in bicycle sales.

   d. The government declares marijuana and cocaine illegal. The price of illegal drugs increases, creating more gangs and gang warfare. Due to the high price of illegal drugs, fewer street drugs are consumed.

   e. The government prohibits the killing of wolves. The wolf population increases. Sheep and cattle herds suffer losses.

   f. The government bans imports of sugar from South America. South American sugar beet growers can't repay their loans to U.S. banks and turn to more
profitable crops such as coca leaves and marijuana. U.S. sugar beet growers avoid a financial crisis.

2. Opportunity cost is what you give up to get an item. Since there is no such thing as a free lunch, what would likely be given up to obtain each of the items listed below?
   a. Susan can work full time or go to college. She chooses college.
   b. Susan can work full time or go to college. She chooses work.
   c. Farmer Jones has 100 acres of land. He can plant corn, which yields 100 bushels per acre, or he can plant beans, which yield 40 bushels per acre. He chooses to plant corn.
   d. Farmer Jones has 100 acres of land. He can plant corn, which yields 100 bushels per acre, or he can plant beans, which yield 40 bushels per acre. He chooses to plant beans.
   e. In a and b above and c and d above, which is the opportunity cost of which—college for work or work for college? corn for beans or beans for corn?

Short-Answer Questions

1. Is air scarce? Is clean air scarce?

2. What is the opportunity cost of saving some of your paycheck?
3. Why is there a trade-off between equity and efficiency?

4. Water is necessary for life. Diamonds are not. Is the marginal benefit of an additional glass of water greater or lesser than an additional one-carat diamond? Why?

5. Your car needs to be repaired. You have already paid $500 to have the transmission fixed, but it still doesn't work properly. You can sell your car “as is” for $2,000. If your car were fixed, you could sell it for $2,500. Your car can be fixed with a guarantee for another $300. Should you repair your car? Why?

6. Why do you think air bags have reduced deaths from auto crashes less than we had hoped?

7. Suppose one country is better at producing agricultural products (because they have more fertile land), while another country is better at producing manufactured goods (because they have a better educational system and more engineers). If each country produced their specialty and traded, would there be more or less total output than if each country produced all of their agricultural and manufacturing needs? Why?

8. In the *Wealth of Nations*, Adam Smith said, “It is not from the benevolence of the butcher, the brewer, or the baker that we expect our dinner, but from their regard to their own interest.” What do you think he meant?
Thinking Like an Economist

CHAPTER OVERVIEW

Context-and-Purpose

Chapter 2 is the second chapter in a three-chapter section that serves as the introduction of the text. Chapter 1 introduced ten principles of economics that will be revisited throughout the text. Chapter 2 develops how economists approach problems, while Chapter 3 will explain how individuals and countries gain from trade.

The purpose of Chapter 2 is to familiarize you with how economists approach economic problems. With practice, you will learn how to approach similar problems in this dispassionate systematic way. You will see how economists employ the scientific method, the role of assumptions in model building, and the application of two specific economic models. You will also learn the important distinction between two roles economists can play: as scientists when we try to explain the economic world and as policymakers when we try to improve it.

Chapter Review

Introduction  Like other fields of study, economics has its own jargon and way of thinking. It is necessary to learn the special language of economics, because knowledge of the economic vocabulary will help you communicate with precision to others about economic issues. This chapter will also provide an overview of how economists look at the world.

The Economist as Scientist

While economists don’t use test tubes or telescopes, they are scientists because they employ the scientific method—the dispassionate and objective development and testing of theories.

The scientific method: observation, theory, and more observation: Just as in other sciences, an economist observes an event, develops a theory, and collects data to test the theory. An economist observes inflation, creates a theory that excessive growth in money causes inflation, and then collects data on money growth and inflation to see if there is a relationship. Collecting data to test economic theories is difficult, however, because economists usually cannot create data from experiments.
That is, economists cannot manipulate the economy just to test a theory. Therefore, economists often use data gathered from historical economic events.

The role of assumptions: Assumptions are made to make the world easier to understand. A physicist assumes an object is falling in a vacuum when measuring acceleration due to gravity. This assumption is reasonably accurate for a marble but not for a beach ball. An economist may assume that prices are fixed (can’t be changed) or may assume that prices are flexible (can move up or down in response to market pressures). Since prices often cannot be changed quickly (the menu in a restaurant is expensive to change) but can be changed easily over time, it is reasonable for economists to assume that prices are fixed in the short run but flexible in the long run. The art of scientific thinking is deciding which assumptions to make.

Economic models: Biology teachers employ plastic models of the human body. They are simpler than the actual human body but that is what makes them useful. Economists use economic models that are composed of diagrams and equations. Economic models are based on assumptions and are simplifications of economic reality.

Our first model: the circular-flow diagram: The circular-flow diagram shows the flow of goods and services, factors of production, and monetary payments between households and firms. Households sell the factors of production, such as land, labor, and capital to firms, in the market for factors of production. In exchange, the households receive wages, rent, and profit. Households use these dollars to buy goods and services from firms in the market for goods and services. The firms use this revenue to pay for the factors of production, and so on. This is a simplified model of the entire economy. This version of the circular-flow diagram has been simplified because it excludes international trade and the government.

Our second model: the production possibilities frontier: A production possibilities frontier is a graph that shows the combinations of output the economy can possibly produce given the available factors of production and the available production technology. It is drawn assuming the economy produces only two goods. This model demonstrates the following economic principles:

• If the economy is operating on the production possibilities frontier, it is operating efficiently because it is producing a mix of output that is the maximum possible from the resources available.

• Points inside the curve are, therefore, inefficient. Points outside the curve are currently unattainable.

• If the economy is operating on the production possibilities frontier, we can see the trade-offs society faces. To produce more of one good, it must produce less of the other. The amount of one good given up when producing more of another good is the opportunity cost of the additional production.

• The production possibilities frontier is bowed outward because the opportunity cost of producing more of a good increases as we near maximum production of that good. This is because we use resources better suited toward production of the other good in order to continue to expand production of the first good.

• A technological advance in production shifts the production possibilities frontier outward. This is a demonstration of economic growth.

Microeconomics and Macroeconomics: Economics is studied on various levels. Microeconomics is the study of how households and firms make decisions and how they interact in specific markets. Macroeconomics is the study of economy-wide phenomena such as the federal deficit, the rate of unemployment, and policies to improve our standard of living. Microeconomics and macroeconomics are related because changes in the overall economy arise from decisions of millions of individuals. Although related, the methods employed in microeconomics and macroeconomics differ enough that they are often taught in separate courses.

The Economist as Policy Advisor

When economists attempt to explain the world as it is, they act as scientists. When economists attempt to improve the world, they act as policy advisors. Correspondingly, positive statements describe the world as it is, while normative statements prescribe how the world ought to be. Positive
statements can be confirmed or refuted with evidence. Normative statements involve values (ethics, religion, political philosophy) as well as facts.

For example, “Money growth causes inflation” is a positive statement (of a scientist). “The government ought to reduce inflation” is a normative statement (of a policy advisor). The two statements are related because evidence about whether money causes inflation might help us decide what tool the government should use if it chooses to reduce inflation.

Economists act as policy advisors to the government in many different areas. The president is advised by economists on the Council of Economic Advisers, the Department of the Treasury, the Department of Labor, and the Department of Justice. Congress is advised by economists from the Congressional Budget Office and the Federal Reserve.

Why Economists Disagree

There are two reasons why economists have a reputation for giving conflicting advice to policymakers.

• Economists may have different scientific judgments. That is, economists may disagree about the validity of alternative positive theories regarding how the world works. For example, economists differ in their views of the sensitivity of household saving to changes in the after-tax return to saving.

• Economists may have different values. That is, economists may have different normative views about what policy should try to accomplish. For example, economists differ in their views of whether taxes should be used to redistribute income.

In reality, although there are legitimate disagreements among economists on many issues, there is tremendous agreement on many basic principles of economics.

Let’s Get Going

In the next chapter, we will begin to apply the ideas and methods of economics. As you begin to think like an economist, you will use a variety of skills—mathematics, history, politics, philosophy—with the objectivity of a scientist.

Helpful Hints

1. Opportunity costs are usually not constant along a production possibilities frontier. Notice that the production possibilities frontier shown in Exhibit 1 is bowed outward. It shows the production trade-offs for an economy that produces only paper and pencils.

   If we start at the point where the economy is using all of its resources to produce paper, producing 100 units of pencils only requires a trade-off or an opportunity cost of 25 units of paper (point A to point B). This is because when we move resources from paper to pencil production, we first move those resources best suited for pencil production and poorly suited for paper production.
Therefore, pencil production increases with very little decrease in paper production. However, if the economy were operating at point C, the opportunity cost of an additional 100 pencils (point C to D) is 200 units of paper. This is because we now move resources toward pencil production—resources that were extremely well suited for paper production and are poorly suited for pencil production. Therefore, as we produce more and more of any particular good, the opportunity cost per unit tends to rise because resources are specialized. That is, resources are not equally well suited for producing each output.

The argument above applies when moving either direction on the production-possibilities frontier. For example, if we start at point D (maximum production of pencils), a small reduction in pencil production (100 units) releases enough resources to increase production of paper by a large amount (200 units). However, moving from point B to point A only increases paper production by 25 units.

2. A production possibilities frontier only shows the choices available—not which point of production is best. A common mistake made by students when using production possibilities frontiers is to look at a production possibilities frontier and suggest that a point somewhere near the middle "looks best." Students make this subjective judgment because the middle point appears to provide the biggest total number of units of production of the two goods. However, ask yourself the following question. Using the production possibilities frontier in Exhibit 1, what production point would be best if paper were worth $10 per sheet and pencils were worth 1 cent per dozen? We would move our resources toward paper production. What if paper were worth 1 cent per sheet and pencils were worth $50 each? We would move our resources toward pencil production. Clearly, what we actually choose to produce depends on the price of each good. Therefore, a production possibilities frontier only provides the choices available; it alone cannot determine which choice is best.

3. Economic disagreement is interesting but economic consensus is more important. Economists have a reputation for disagreeing with one another because we tend to highlight our differences. While our disagreements are interesting to us, the matters on which we agree are more important to you. There are a great number of economic principles for which there is near unanimous support within the economics profession. The aim of this text is to concentrate on the areas of agreement within the profession as opposed to the areas of disagreement.
Economic Systems

Read the following description of economic systems, answer the review questions, and then complete the table.

It's a fact: our needs and wants are always greater than the available resources necessary to satisfy us. We all face scarcity, which forces us to choose how best to use the limited resources that are available. Ultimately, society has to make three very important economic decisions: what do we produce, how do we produce, and for whom do we produce? To answer these three questions, a society develops an economic system, or organized way of answering the three questions. Because people do not all share the same values, beliefs, geographic circumstances, and climates, different societies have developed very different economic systems to deal with scarcity. Figure 1-10.1 shows a continuum of the economic systems that have been developed throughout history based on the amount of freedom individuals have to answer the three economic questions.

Figure 1-10.1
Economic Systems

In a pure command economy, all economic decisions are made by the government or even a single leader. Ancient Egypt under the pharaohs and present-day North Korea are close, if not perfect, examples of pure command economies. The leaders decide what is to be produced, how it is produced, and for whom it is produced. Private property is nonexistent in the pure command model, and only the needs of the government are addressed.

In a pure market economy, all economic decisions are left to the individuals in the society. These individuals, motivated by their own self-interest and their desire for private property, answer the three economic questions. To get what they need or want, individuals come together in markets and trade for mutual benefit.

Although pure market economies are nonexistent, something close to the pure market model called capitalism does exist. The United States and a number of other countries can be described as capitalistic economies. Capitalism is an example of a mixed economy. Mixed economies are the reality of today's world. In a mixed economy, both individuals and government answer the three basic economic questions. If most decisions and property are under the control of individuals in the society, then the system can be described as capitalistic. If most decisions and property are under state control, then the system can be described as socialist.
1. What three basic questions must all societies answer?

2. Define economic system.

3. What is a market?

4. Complete the following table:

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<th>Pure command economy</th>
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<th>Pure market economy</th>
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<td>Who answers the three basic economic questions?</td>
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<td>What degree of economic freedom exists for individuals?</td>
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<td>Under which type of economic system would you prefer to live and why? Be prepared to discuss your answers with your classmates.</td>
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The Design of the Tax System

CHAPTER OVERVIEW

Context and Purpose

Chapter 12 is the third chapter in a three-chapter sequence on the economics of the public sector. Chapter 10 addressed externalities. Chapter 11 addressed public goods and common resources. Chapter 12 addresses the tax system. Taxes are inevitable because when the government remedies an externality, provides a public good, or regulates the use of a common resource, it needs tax revenue to perform these functions.

The purpose of Chapter 12 is to build on the lessons learned about taxes in previous chapters. We have seen that a tax reduces the quantity sold in a market, that the distribution of the burden of a tax depends on the relative elasticities of supply and demand, and that taxes cause deadweight losses. We expand our study of taxes in Chapter 12 by addressing how the U.S. government raises and spends money. We then address the difficulty of making a tax system both efficient and equitable.

Chapter Review

Introduction Taxes are inevitable because when the government remedies an externality, provides a public good, or regulates the use of a common resource, it needs tax revenue to perform these functions. In previous chapters that dealt with taxation, we learned that a tax reduces the quantity sold in a market, that the distribution of the burden of a tax depends on the relative elasticities of supply and demand, and that taxes cause deadweight losses. We now address how the U.S. government raises and spends money and how difficult it is to make a tax system both efficient and equitable.

A Financial Overview of the U.S. Government

The government is composed of federal, state, and local governments. Over time, the government has taken a larger share of total income in taxes—from 7 percent in 1902 to around 30 percent in recent years. The tax burden in the United States as measured by the central government’s tax revenue as a percent of GDP is 19 percent. The U.S. tax burden is about average when compared to other countries. Euro-
pean countries have a higher tax burden, and less-developed countries have a lower tax burden than the United States. As countries become wealthier, the tax burden tends to increase.

The U.S. federal government collects about two-thirds of the taxes in our economy. In 2004, the average American paid $6,397 in taxes to the federal government. The largest source of tax revenue for the federal government is individual income taxes (43 percent), followed by social insurance taxes or payroll taxes (39 percent), corporate income taxes (10 percent), and all other taxes (8 percent). A family’s tax liability is a percentage of income after deductions (mortgage interest payments, state and local tax payments, and charitable giving) and is based on the number of dependents. Corporate profits are taxed twice—once as corporate income and once as individual income when profits are paid out as dividends. The category of “other taxes” includes excise taxes (taxes on specific goods), estate taxes, and customs duties.

In 2004, the federal government’s greatest spending was on Social Security (22 percent) followed by national defense (20 percent), income security or welfare (15 percent), Medicare (12 percent), health (mostly Medicaid, 10 percent), net interest (7 percent), and all others that included the federal court system, space program, farm-support programs, and congressional salaries (15 percent). Social Security and income security are transfer payments—payments for which the government does not receive a good or service in return.

A budget deficit is an excess of government spending over government receipts. A budget surplus is an excess of government receipts over government spending. Under current law, the budget deficit will continue to grow because of rising social security and Medicare payments to the elderly and a reduction in the number of taxpayers.

State and local governments collect about 40 percent of all taxes paid. Their greatest source of revenue is sales taxes (19 percent), followed by property taxes (17 percent), individual income taxes (12 percent), corporate income taxes (2 percent), from the federal government (21 percent), and all others that include license fees, tolls, and fares for public transportation (29 percent).

State and local governments spend the greatest share of their funds on education (34 percent), public welfare (16 percent), highways (7 percent), and all others that include libraries, police, trash and snow removal, fire protection, and park maintenance (43 percent).

**Taxes and Efficiency**

A tax system should be both efficient and equitable. Here we address efficiency. A tax is more efficient than another if it raises the same amount of revenue at a smaller cost to taxpayers. The cost of a tax includes the actual tax payment itself plus the following:

- the deadweight loss that results when taxes distort private decisions
- the administrative burden taxpayers bear when they comply with the tax laws

Recall from Chapter 8 that the deadweight loss from a tax is the reduction in economic well-being of taxpayers in excess of the amount of revenue raised by the government. The loss is generated when buyers and sellers allocate resources according to the prices they face after the tax rather than the true costs and benefits of the goods. As a result of a tax, we fail to produce and consume goods on which the benefits exceed the cost of production. Many European countries employ a value-added tax (VAT), which is a consumption tax collected at various stages of production.

Income taxes place a tax on interest income and, therefore, discourage saving. A consumption tax would not distort people’s saving decisions.

The administrative burden of a tax includes the time spent filling out tax forms, the time spent throughout the year keeping records for tax purposes, and the resources the government uses to enforce the tax laws. Simplifying the tax laws would reduce the administrative burden but would require the elimination of many favorite loopholes of taxpayers.

The average tax rate is total taxes paid divided by total income. The marginal tax rate is the extra taxes paid on an additional dollar of income. The average tax rate is most appropriate for gauging the sacrifice made by a taxpayer. The marginal tax rate, however, is most appropriate for gauging how much the tax system distorts incentives and, thus, how inefficient the tax is. Since people think at the margin, a high marginal tax rate discourages hard work and causes a large deadweight loss.

Rational people think at the margin and respond to incentives. In Iceland, when the government moved from collecting taxes based on the previous year’s income to collecting taxes on the cur-
rent year’s income, a year of income had a zero marginal tax rate. As expected, hours worked and production rose during the year with the zero marginal tax rate. As an additional example, when marginal tax rates were reduced in the United States, there was an increase in the percentage of married women who chose to work and the number of hours worked increased for those women who already had jobs.

A lump-sum tax is a tax that is the same amount for every person, regardless of income. A lump-sum tax is the most efficient tax because a lump-sum tax does the following:

- generates a marginal tax rate of zero so it does not distort decision making and thus creates no deadweight loss;
- imposes the minimum administrative burden.

We rarely see lump-sum taxes, however, because many perceive them as unfair or not equitable since rich and poor pay the same amount.

Taxes and Equity

There are different principles on which taxes can be based to generate fairness or equity. The benefits principle states that people should pay taxes based on the benefits they receive from government services. This principle can be used to justify gasoline taxes to pay for roads and to justify that the rich should pay more taxes than the poor because the rich benefit more from fire and police protection, national defense, and the court system. This principle can also be used to justify antipoverty programs paid for by the rich because the rich may benefit more than the middle class from not living in a society with poverty.

The ability-to-pay principle states that taxes should be levied on a person according to how well that person can shoulder the burden. This principle suggests that all taxpayers should make an “equal sacrifice” to support the government. The concept of “equal sacrifice” leads to two notions of equity: vertical equity and horizontal equity. Vertical equity states that taxpayers with a greater ability to pay taxes should pay larger amounts, and horizontal equity states that taxpayers with similar abilities to pay taxes should pay the same amount.

A proportional tax is a tax for which high-income and low-income taxpayers pay the same fraction of income. A regressive tax is a tax for which high-income taxpayers pay a smaller fraction of their income than do low-income taxpayers. A progressive tax is a tax for which high-income taxpayers pay a larger fraction of their income than do low-income taxpayers. If taxes are based on the ability-to-pay principle, then vertical equity requires that the rich pay more taxes than the poor, and thus, taxes should be progressive. The U.S. tax system is progressive because the highest income quintile of American families pays 26.3 percent of their income in taxes while the lowest income quintile pays 5.5 percent. After taking account of government transfers, the poorest quintile pays a negative 30 percent in taxes (they receive more than they pay).

A flat tax is an income tax that has the same marginal rate for all taxpayers. It is simple and can be progressive if a threshold amount of income is exempt from taxation.

Horizontal equity is difficult to accomplish because it is difficult to determine when two families truly have similar abilities to pay. For example, married couples are taxed as if they were a single taxpayer. Since they get only one exclusion (income that is not taxed), a greater amount of a married couple’s combined income is taxed than when each member of the couple was single. This is the so-called “marriage tax.”

It is necessary to address tax incidence in order to evaluate tax equity. This is because the person from whom the tax is collected often is not the person that bears the burden of the tax. The flypaper theory of tax incidence ignores the true burden of the tax and mistakenly assumes that the person from whom the tax is collected is also the one that bears the burden of the tax. For example, the corporate income tax is collected from corporations but it is actually paid by the owners, customers, and workers of the corporation.

Conclusion: The Trade-Off between Equity and Efficiency

The goals of equity and efficiency for the tax system often conflict, and people attach different weights to these two goals. President Reagan was concerned with the efficiency of the tax system so
he proposed lowering marginal tax rates. President Clinton was more concerned with equity of the tax system so he proposed raising marginal tax rates. George W. Bush plans to reduce the highest rate to 35 percent.

Helpful Hints

1. The benefits principle of taxation suggests that people should pay taxes based on the benefits they receive from government services. This is similar to having the government utilize a user fee (a price charged by the government for using a public good) when it supplies a public good. For example, the government can charge people a direct user fee when they use a government-owned toll road. Alternatively, the government can utilize a gasoline tax as an indirect user fee to pay for the entire road system. Either way, the people who benefit from the road pay for the road.

2. Remember, only people pay taxes. When we tax a business such as a corporation, the corporation is a tax collector, not a taxpayer. The burden of the tax will be shifted to the owners, customers, and workers of the corporation based on the elasticities of supply and demand in the relevant markets for the corporation’s labor, capital, and products.

Terms and Definitions

Choose a definition for each key term.

Key Terms

- Budget deficit
- Budget surplus
- Average tax rate
- Marginal tax rate
- Lump-sum tax
- Benefits principle
- Ability-to-pay principle
- Vertical equity
- Horizontal equity
- Proportional tax
- Regressive tax
- Progressive tax

Definitions

1. A tax for which high-income and low-income taxpayers pay the same fraction of income

2. The idea that taxes should be levied on a person according to how well that person can shoulder the burden

3. The extra taxes paid on an additional dollar of income

4. A tax that is the same amount for every person

5. An excess of government receipts over government spending

6. The idea that taxpayers with a greater ability to pay taxes should pay larger amounts

7. A tax for which high-income taxpayers pay a larger fraction of their income than do low-income taxpayers

8. An excess of government spending over government receipts

9. The idea that taxpayers with similar abilities to pay taxes should pay the same amount

10. The idea that people should pay taxes based on the benefits they receive from government services

11. Total taxes paid divided by total income

12. A tax for which high-income taxpayers pay a smaller fraction of their income than do low-income taxpayers
PROBLEMS AND SHORT-ANSWER QUESTIONS

Practice Problems

1. a. Fill out the table below assuming that the government taxes 20 percent of the first $30,000 of income and 50 percent of all income above $30,000.

<table>
<thead>
<tr>
<th>Income</th>
<th>Taxes Paid</th>
<th>Average Tax Rate</th>
<th>Marginal Tax Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>$10,000</td>
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</tbody>
</table>

b. Compare the taxes for someone making $10,000 to those of someone making $50,000 in part a above. Is this tax system progressive, regressive, or proportional? Explain.

________________________________________________________________________
________________________________________________________________________

2. a. Fill out the table below assuming that the government imposes a lump-sum tax of $6,000 on all individuals.

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<thead>
<tr>
<th>Income</th>
<th>Taxes Paid</th>
<th>Average Tax Rate</th>
<th>Marginal Tax Rate</th>
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</thead>
<tbody>
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<td>$10,000</td>
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</table>

b. Compare the taxes for someone making $10,000 to those of someone making $50,000 in part a above. Is this tax system progressive, regressive, or proportional? Explain.

________________________________________________________________________
________________________________________________________________________
3. a. Fill out the table below assuming that the government taxes 20 percent of all income.

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<tr>
<th>Income</th>
<th>Taxes Paid</th>
<th>Average Tax Rate</th>
<th>Marginal Tax Rate</th>
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<tbody>
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<td>$10,000</td>
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</table>

b. Compare the taxes for someone making $10,000 to those of someone making $50,000 in part a above. Is this tax system progressive, regressive, or proportional? Explain.

4. a. Fill out the table below assuming that the government taxes 40 percent of the first $10,000 of income and 10 percent of all income above $10,000.

<table>
<thead>
<tr>
<th>Income</th>
<th>Taxes Paid</th>
<th>Average Tax Rate</th>
<th>Marginal Tax Rate</th>
</tr>
</thead>
<tbody>
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<td>$10,000</td>
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</table>

b. Compare the taxes for someone making $10,000 to those of someone making $50,000 in part a above. Is this tax system progressive, regressive, or proportional? Explain.

5. a. Suppose the only objective of the tax system is to collect $6,000 from people who make $30,000. Which of the tax systems described in questions 1 through 4 is best? Why?

b. Suppose the only objective of the tax system is to be efficient. Which of the tax systems described in questions 1 through 4 is best? Why?
The Lorenz Curve and Gini Coefficient

The labor markets often fail to allocate income equally. Some households earn much income while many more earn little income. Differences in worker productivity, varying trade patterns, patterns of past discrimination, and tax policies are some of the reasons for what economists call income inequality. For example, increased demand for workers with at least bachelor's degrees and decreased demand for workers with only high school diplomas have resulted in income inequality as college-educated laborers' income has risen and high school-educated laborers' income has fallen.

Two important measures of income inequality are the Lorenz curve and the Gini coefficient. The Lorenz curve is a graph of income inequality that shows what percentage of a country's income is being earned by a percentage of the country's households.

Figure 5-7.1
Lorenz Curve #1

In Figure 5-7.1, the line of equality represents a perfectly even distribution of income. A perfectly even distribution means that 10 percent of the households earn 10 percent of the income, 20 percent of the households earn 20 percent of the income, and so on. The Lorenz curve shows the actual distribution of income. The closer the Lorenz curve is to the line of equality, the more evenly distributed is the income. The more the Lorenz curve sags away from the line of equality, the more unevenly income is distributed. Figure 5-7.2 shows more income inequality than Figure 5-7.1.
1. In Figure 5-7.3, determine the amount of income that is being earned by 50 percent of the households in the country of Maxopia.

2. Now, determine the percentage of income being earned by 88 percent of the households.
3. Using Figure 5-7.4, determine the percentage of income being earned by 50 percent of the households and then by 88 percent of the households in the country of Minopia. You may want to use a ruler to help you.

(A) 50 percent of households earn ____________ of the income.

(B) 88 percent of households earn ____________ of the income.

Figure 5-7.4

Lorenz Curve for the Country of Minopia

4. Compare your results from Questions 1 and 2 with your results from Questions 3A and 3B. Which country has more income equality—Maxopia or Minopia?
Another measure of income inequality is the Gini coefficient. The Gini coefficient compares the area between the line of equality and the Lorenz curve (as seen in area A in Figure 5-7.5) with the total area under the line of equality (the sum of areas A and B in Figure 5-7.5).

**Figure 5-7.5**

**Lorenz Curve #5**

In Figure 5-7.5, the Gini coefficient \( = \frac{A}{A + B} \). The coefficient ranges from 0 to 1. A Gini coefficient of 0 indicates perfect income equality, while a Gini coefficient of 1 indicates perfect income inequality because just one household is earning 100 percent of the income.

5. As the area of A increases relative to the area of B, what is happening to income inequality?

6. If the country Economica has a Gini coefficient of 0.5, while the country Graphland has a Gini coefficient of 0.75, then in which country is income more evenly distributed?

7. Assume that Economica has a Gini coefficient of 0.5. If Economica's government imposes a redistributive income tax on the top 50 percent of households, then how will the following change:

   (A) The Lorenz curve
   (B) The Gini coefficient
   (C) The line of equality
   (D) The income distribution of Economica
The Circular Flow of Resources, Goods, Services and Money Payments

One way of illustrating the overall operation of a market economy is through a circular flow diagram such as the one on this page. This diagram presents a highly simplified overview of how a market economy operates.

Owners of resources (families and individuals) supply the services of their land, labor and capital to business firms in exchange for money-income payments in the form of wages and salaries, rents, interest and profits. Owners of the resources in turn use these income payments to purchase the finished goods and services supplied by the business firms. Business firms then use the proceeds from these sales to pay the resource owners for the services the firms receive by employing the resources. This is how the circular flow of resources, goods and services, and money-income payments is established and maintained.

Payments in the lower part of the diagram, which is sometimes called the factor market, appear as income to the resource owners who sell productive services. But these same payments appear as costs to the business firms that buy productive services.

Likewise, payments in the upper part of the diagram, which represents the product market, appear as costs to the resource owners who buy goods and services, but these same payments appear as income to the business firms that sell goods and services.

An important point to emphasize is that all of the money payments shown in the diagram are determined by an interdependent set of markets. In a system of interdependent markets, every price depends to some extent on every other price. For example, the prices resource owners are willing to pay for finished goods and services depend on the prices (income) they receive for the use of their resources. The prices of resources, in turn, depend on how much business firms are willing to pay for the services the resources provide. The diagram shows that everyone’s expenditure is someone else’s income and that the interaction between the markets determines these flows.

Figure 5.1
The Circular Flow of Resources, Goods, Services and Money Payments

Circular Flow Activity

1. Give three examples of resource owners.

2. Define a business firm.

3. What is the product market?

4. Give three examples of transactions you made this week in the product market.

5. What is a factor market?

6. Give an example of a transaction you or your family made this month in a factor market.

7. How are businesses connected to factor and product markets?
8. What determines the prices of land, labor, capital and entrepreneurship in a factor market?

9. Where do resource owners get the money to buy goods and services in the product market?

10. Where do business firms get the money to pay resource owners for their land, labor, capital and entrepreneurship in factor markets?

11. Why is it important to know that a market economy is characterized by interdependence?