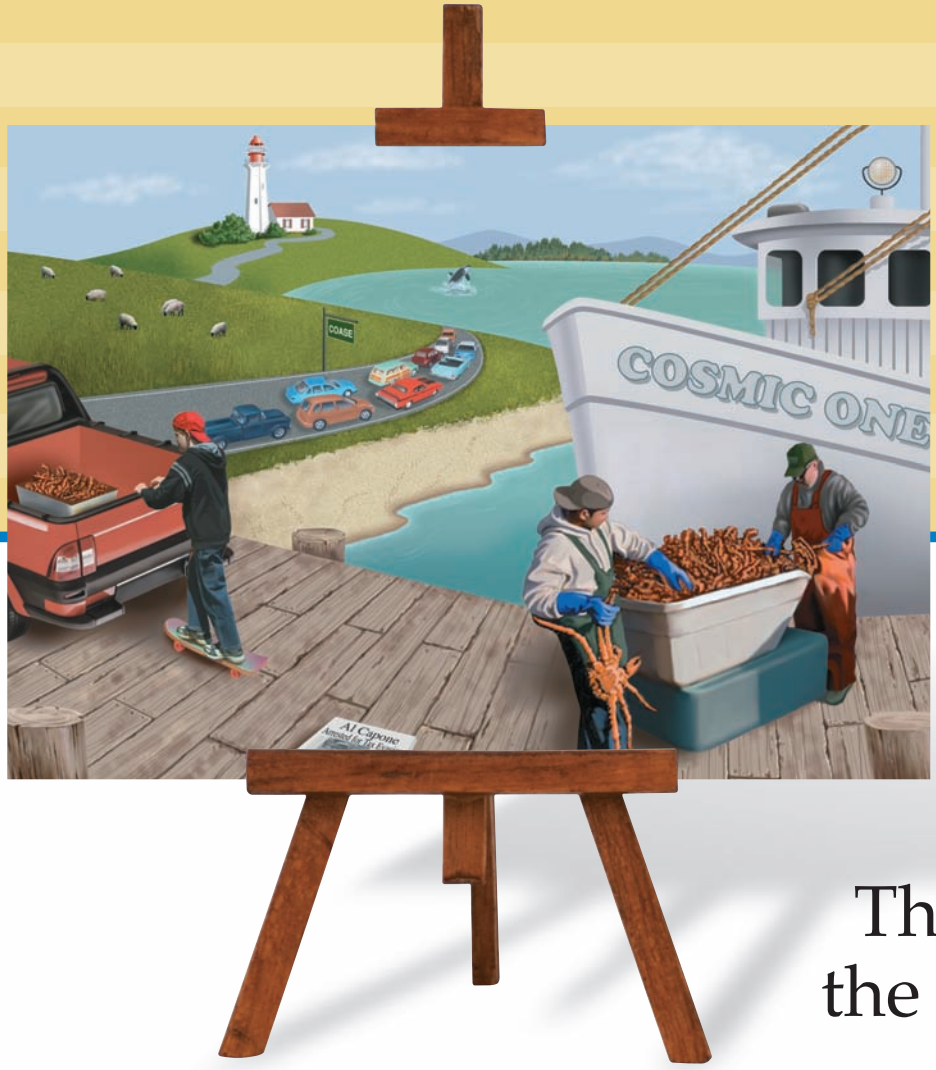


CHAPTER

12

The Design of the Tax System

Al "Scarface" Capone, the notorious 1920s gangster and crime boss, was never convicted for his many violent crimes. Yet, eventually, he did go to jail—for tax evasion. He had neglected to heed Ben Franklin's observation that "in this world nothing is certain but death and taxes."

When Franklin made this claim in 1789, the average American paid less than 5 percent of his income in taxes, and that remained true for the next hundred years. Over the course of the 20th century, however, taxes became ever more important in the life of the typical U.S. citizen. Today, all taxes taken together—including personal income taxes, corporate income taxes, payroll taxes, sales taxes, and property taxes—use up more than a quarter of the average American's income. In many European countries, the tax bite is even larger.

Taxes are inevitable because we as citizens expect our government to provide us with various goods and services. The previous two chapters shed light on one of the *Ten Principles of Economics* from Chapter 1: The government can

sometimes improve market outcomes. When the government remedies an externality (such as air pollution), provides a public good (such as national defense), or regulates the use of a common resource (such as fish in a public lake), it can raise economic well-being. Yet these activities are costly. For the government to perform these and its many other functions, it needs to raise revenue through taxation.

We began our study of taxation in earlier chapters, where we saw how a tax on a good affects supply and demand for that good. In Chapter 6, we saw that a tax reduces the quantity sold in a market, and we examined how the burden of a tax is shared by buyers and sellers depending on the elasticities of supply and demand. In Chapter 8, we examined how taxes affect economic well-being. We learned that taxes cause *deadweight losses:* The reduction in consumer and producer surplus resulting from a tax exceeds the revenue raised by the government.

In this chapter, we build on these lessons to discuss the design of a tax system. We begin with a financial overview of the U.S. government. When thinking about the tax system, it is useful to know some basic facts about how the U.S. government raises and spends money. We then consider the fundamental principles of taxation. Most people agree that taxes should impose as small a cost on society as possible and that the burden of taxes should be distributed fairly. That is, the tax system should be both *efficient* and *equitable*. As we will see, however, stating these goals is easier than achieving them.

12-1 A Financial Overview of the U.S. Government

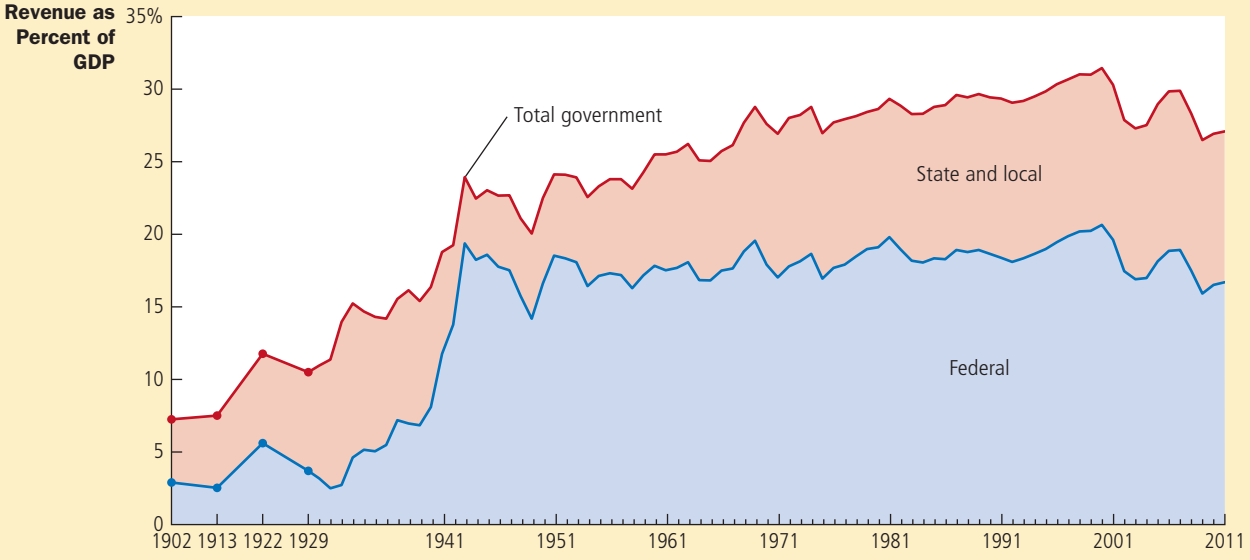
How much of the nation's income does the government take as taxes? Figure 1 shows government revenue, including federal, state, and local governments, as a percentage of total income for the U.S. economy. It shows that the role of

FIGURE 1

Government Revenue as a Percentage of GDP

This figure shows revenue of the federal government and of state and local governments as a percentage of gross domestic product (GDP), which measures total income in the economy. It shows that the government plays a large role in the U.S. economy and that its role has grown over time.

Source: *Historical Statistics of the United States*; Bureau of Economic Analysis; and author's calculations.



government has grown substantially over the past century. In 1902, the government collected 7 percent of total income; in recent years, government has collected almost 30 percent. In other words, as the economy's income has grown, the government's revenue from taxation has grown even more.

Table 1 compares the tax burden for several major countries, as measured by the government's tax revenue as a percentage of the nation's total income. The United States has a low tax burden compared to most other advanced economies. Many European nations have much higher taxes, which finance a more generous social safety net, including more substantial income support for the poor and unemployed and universal government-provided healthcare.

TABLE 1

Total Government Tax Revenue as a Percentage of GDP

Denmark	48%	Canada	31
Sweden	45	Greece	31
France	44	Japan	28
Italy	43	Australia	26
Germany	37	United States	25
United Kingdom	36	Chile	21
Spain	32	Mexico	20

Source: OECD. Data are for 2011.

The overall size of government tells only part of the story. Behind the total dollar figures lie thousands of individual decisions about taxes and spending. To understand the government's finances more fully, let's look at how the total breaks down into some broad categories.

12-1a The Federal Government

The U.S. federal government collects about two-thirds of the taxes in our economy. It raises this money in a number of ways, and it finds even more ways to spend it.

Receipts Table 2 shows the receipts of the federal government in 2011. Total receipts that year were $2,520 billion, a number so large that it is hard to comprehend. To bring this astronomical number down to earth, we can divide it by the size of the U.S. population, which was about 312 million in 2011. We then find that the average American paid $8,077 to the federal government.

TABLE 2

Receipts of the Federal Government: 2011

Tax	Amount (billions)	Amount per Person	Percent of Receipts
Individual income taxes	$1,075	$3,446	43%
Social insurance taxes	906	2,904	36
Corporate income taxes	304	974	12
Other	235	753	9
Total	$2,520	$8,077	100%

Source: Bureau of Economic Analysis. Columns may not sum to total due to rounding.

The largest source of revenue for the federal government is the individual income tax. As April 15 approaches each year, almost every American family fills out a tax form to determine how much income tax it owes the government. Each family is required to report its income from all sources: wages from working, interest on savings, dividends from corporations in which it owns shares, profits from any small businesses it operates, and so on. The family's *tax liability* (how much it owes) is then based on its total income.

A family's income tax liability is not simply proportional to its income. Instead, the law requires a more complicated calculation. Taxable income is computed as total income minus an amount based on the number of dependents (primarily children) and minus certain expenses that policymakers have deemed "deductible" (such as mortgage interest payments, state and local tax payments, and charitable giving). Then the tax liability is calculated from taxable income using a schedule such as the one shown in Table 3.

This table presents the *marginal tax rate*—the tax rate applied to each additional dollar of income. Because the marginal tax rate rises as income rises, higher-income families pay a larger percentage of their income in taxes. Note that each tax rate in the table applies only to income within the associated range, not to a person's entire income. For example, a person with an income of $1 million still pays only 10 percent of the first $8,925. (Later in this chapter we discuss the concept of the marginal tax rate more fully.)

Almost as important to the federal government as the individual income tax are payroll taxes. A *payroll tax* is a tax on the wages that a firm pays its workers. Table 2 calls this revenue *social insurance taxes* because the revenue from these taxes is earmarked to pay for Social Security and Medicare. Social Security is an income-support program designed primarily to maintain the living standards of the elderly. Medicare is the government health program for the elderly. Table 2 shows that the average American paid $2,904 in social insurance taxes in 2011.

Next in magnitude, but much smaller than either individual income taxes or social insurance taxes, is the corporate income tax. A *corporation* is a business set up to have its own legal existence, distinct and separate from its owners. The government taxes each corporation based on its profit—the amount the corporation receives for the goods or services it sells minus the costs of producing those goods or services. Notice that corporate profits are, in essence, taxed twice. They

TABLE 3

The Federal Income Tax Rates: 2013

This table shows the marginal tax rates for an unmarried taxpayer. The taxes owed by a taxpayer depend on all the marginal tax rates up to his income level. For example, a taxpayer with income of $25,000 pays 10 percent of the first $8,925 of income, and then 15 percent of the rest.

On Taxable Income . . .	The Tax Rate Is . . .
Up to $8,925	10%
From $8,925 to $36,250	15
From $36,250 to $87,850	25
From $87,850 to $183,250	28
From $183,250 to $398,350	33
From $398,350 to $400,000	35
Over $400,000	39.6

are taxed once by the corporate income tax when the corporation earns the profits; they are taxed a second time by the individual income tax when the corporation uses its profits to pay dividends to its shareholders. In part to compensate for this double taxation, policymakers have decided to tax dividend income at lower rates than other types of income: In 2013, the top marginal tax rate on dividend income was only 20 percent (plus a 3.8 percent Medicare tax), compared with the top tax rate on ordinary income of 39.6 percent (plus the same 3.8 percent).

The last category, labeled "other" in Table 2, makes up 9 percent of receipts. This category includes *excise taxes*, which are taxes on specific goods like gasoline, cigarettes, and alcoholic beverages. It also includes various small items, such as estate taxes and customs duties.

Spending Table 4 shows the spending of the federal government in 2011. Total spending was $3,757 billion, or $12,042 per person. This table also shows how the federal government's spending was divided among major categories.

The largest category in Table 4 is for income security, a category that includes a variety of transfer payments. A *transfer payment* is a government payment not made in exchange for a good or service. Such payments include the Social Security income of the elderly and disabled, unemployment insurance payments made to workers who have lost their jobs, and welfare payments to the poor. This category made up about a third of spending by the federal government in 2011. The federal government pays some of this money to state and local governments, which administer the programs under federal guidelines.

The second largest category of spending is on health programs. This category includes Medicare (the government's health plan for the elderly), Medicaid (the federal health program for the poor), and spending on medical research, such as that conducted through the National Institutes of Health. Total health spending makes up about a quarter of the federal budget.

The next largest category of spending is national defense. This includes both the salaries of military personnel and the purchases of military equipment such as guns, fighter jets, and warships. Spending on national defense fluctuates over time as international tensions and the political climate change. Not surprisingly, spending on national defense rises substantially during wars.

TABLE 4

Spending of the Federal Government: 2011

Category	Amount (billions)	Amount per Person	Percent of Spending
Income Security	$1,233	$3,951	33%
Health	940	3,013	25
National defense	717	2,298	19
Net interest	325	1,042	9
Other	542	1,737	14
Total	$3,757	$12,042	100%

Source: Bureau of Economic Analysis.
Columns may not sum to total due to rounding.

Next on the list is net interest. When a person borrows from a bank, the bank requires the borrower to pay interest for the loan. The same is true when the government borrows from the public. The more indebted the government, the larger the amount it must spend in interest payments.

The "other" category in Table 4 consists of many less expensive functions of government. It includes, for example, the federal court system, the space program, farm-support programs, housing credit programs, as well as the salaries of members of Congress and the president.

You might have noticed that total receipts of the federal government shown in Table 2 fall short of total spending shown in Table 4 by more than $1 trillion. In such a situation, the government is said to run a **budget deficit**. When receipts exceed spending, the government is said to run a **budget surplus**. The government finances a budget deficit by borrowing from the public. That is, it sells government debt to the private sector, including both investors in the United States and those abroad. When the government runs a budget surplus, it uses the excess receipts to reduce its outstanding debts.

budget deficit
an excess of government spending over government receipts

budget surplus
an excess of government receipts over government spending

case study

The Fiscal Challenge Ahead

From 2009 to 2012, the U.S. federal government ran budget deficits that exceeded $1 trillion every year, the largest budget shortfalls since World War II. These large budget deficits were due primarily to the deep recession the economy was experiencing at the time. Recessions tend to increase government spending and reduce government revenue. Indeed, as the economy started to recover, the budget deficit started to shrink.

Yet this short-term increase in the deficit is only the tip of an ominous iceberg: Long-term projections of the government's budget show that, under current law, the government will spend vastly more than it will receive in tax revenue in the decades ahead. As a percentage of gross domestic product (GDP, the total income in the economy), taxes are projected to be about constant. But government spending as a percentage of GDP is projected to rise substantially over the next several decades.

One reason for the rise in government spending is that Social Security and Medicare provide significant benefits for the elderly, who are a growing percentage of the overall population. Over the past half century, medical advances and lifestyle improvements have greatly increased life expectancy. In 1950, a 65-year-old man could expect to live for another 13 years; now he can expect to live another 17 years. The life expectancy of a 65-year-old woman has risen from 16 years in 1950 to 20 years today. At the same time, people are having fewer children. In 1950, the typical woman had three children. Today, the number is about two. As a result of smaller families, the labor force is growing more slowly now than it has in the past.

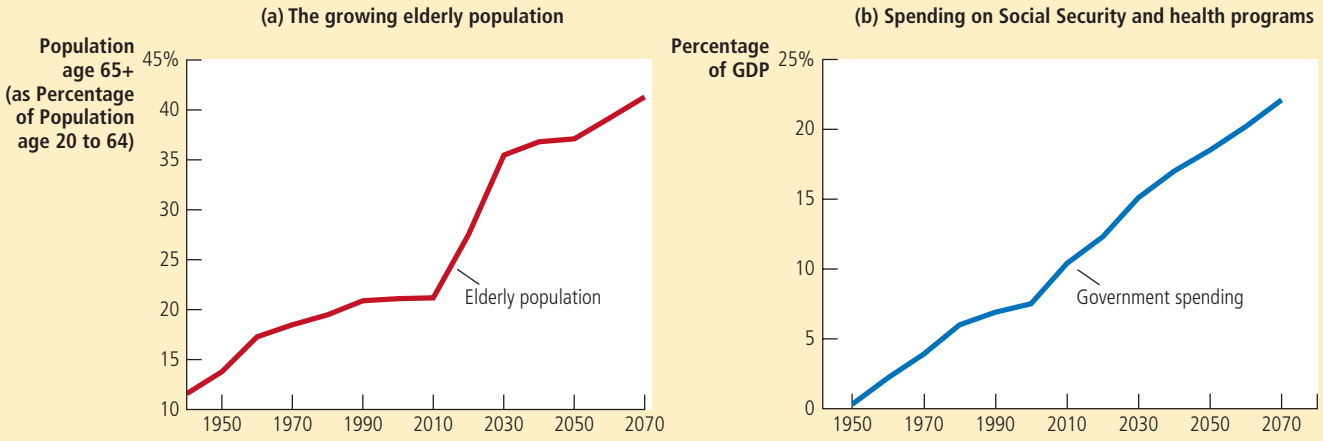
Panel (a) of Figure 2 shows the demographic shift that is arising from the combination of longer life expectancy and lower fertility. In 1950, the elderly population equaled about 14 percent of the working-age population. Now the elderly are about 21 percent of the working-age population, and that figure will rise to about 40 percent over the next 50 years. Turning those numbers on their head, this means that in 1950 there were about 7 working-age people for every elderly person, whereas in 2050 there will be only 2.5. As a result, there will be fewer workers paying taxes to support the government benefits that each elderly person receives.

Panel (a) shows the U.S. population age 65 and older as a percentage of the population age 20 to 64. The growing elderly population will put increasing pressure on the government budget. Panel (b) shows government spending on Social Security and health programs as a percentage of GDP. The projection for future years assumes no change in current law. Unless changes in benefits are enacted, government spending on these programs will rise significantly and will require large tax increases to pay for them.

FIGURE 2

The Demographic and Fiscal Challenge

Source: Congressional Budget Office.



A second, related trend that will affect government spending in the decades ahead is the rising cost of healthcare. The federal government provides healthcare to the elderly through the Medicare system and to the poor through Medicaid. And once the health insurance reform passed in 2010 is fully implemented, the government will start providing subsidies for health insurance to many families with low to moderate incomes. As the cost of healthcare increases, government spending on these programs will increase as well.

Policymakers have proposed various ways to stem the rise in healthcare costs, such as reducing the burden of lawsuits on the healthcare system, encouraging more competition among healthcare providers, promoting greater use of information technology, and providing better incentives to doctors to choose more cost-effective treatments. Many health economists, however, believe that such measures will have only a limited impact on reducing the government's healthcare expenditures. They argue that the main reason for rising healthcare costs is medical advances that provide new, better, but often expensive ways to extend and improve our lives. So even if these reforms are worth pursuing, spending on healthcare programs will nonetheless continue to rise.

Panel (b) of Figure 2 shows government spending on Social Security and health programs as a percentage of GDP. Spending on these programs has risen from less than 1 percent in 1950 to more than 10 percent today. The combination of a growing elderly population and rising healthcare costs is expected to continue the trend.

How our society will handle these spending increases is an open question. Simply increasing the budget deficit is not feasible. A budget deficit just pushes the cost of government spending onto a future generation of taxpayers, who will

inherit a government with greater debts. In the long run, the government needs to pay for what it spends.

Some economists believe that to pay for these commitments, we will need to raise taxes substantially as a percentage of GDP. If so, the long-term trend we saw in Figure 1 will continue. Spending on Social Security and health programs is expected to rise by about 10 percentage points of GDP. Because taxes are now 30 percent of GDP, paying for these benefits would require approximately a one-third increase in all taxes.

Other economists believe that such high tax rates would impose too great a cost on younger workers. They believe that policymakers should reduce the promises now being made to the elderly of the future and that, at the same time, people should be encouraged to take a greater role in caring for themselves as they age. This might entail raising the normal retirement age, while giving people more incentive to save during their working years to prepare for their own retirement and health costs.

It is likely that the final resolution will involve a combination of measures. No one can dispute that resolving this debate is one of the great challenges ahead.

12-1b State and Local Governments

State and local governments collect about 40 percent of all taxes paid. Let's look at how they obtain tax revenue and how they spend it.

Receipts Table 5 shows the receipts of U.S. state and local governments. Total receipts for 2011 were $2,064 billion, or $6,615 per person. The table also shows how this total is broken down into different kinds of taxes.

The two most important taxes for state and local governments are sales taxes and property taxes. Sales taxes are levied as a percentage of the total amount spent at retail stores. Every time a customer buys something, he pays the storekeeper an extra amount that the storekeeper remits to the government. (Some states exclude certain items that are considered necessities, such as food and clothing.) Property taxes are levied as a percentage of the estimated value of land and structures and are paid by property owners. Together, these two taxes make up more than 40 percent of all receipts of state and local governments.

TABLE 5

Receipts of State and Local Governments: 2011

Source: Bureau of Economic Analysis. Columns may not sum to total due to rounding.

Tax	Amount (billions)	Amount per Person	Percent of Receipts
Sales taxes	$462	$1,481	22%
Property taxes	440	1,410	21
Individual income taxes	323	1,035	16
Corporate income taxes	48	154	2
Federal government	498	1,596	24
Other	293	939	14
Total	$2,064	$6,615	100%

State and local governments also levy individual and corporate income taxes. In many cases, state and local income taxes are similar to federal income taxes. In other cases, they are quite different. For example, some states tax income from wages less heavily than income earned in the form of interest and dividends. Some states do not tax income at all.

State and local governments also receive substantial funds from the federal government. To some extent, the federal government's policy of sharing its revenue with state governments redistributes funds from high-income states (which pay more taxes) to low-income states (which receive more benefits). Often, these funds are tied to specific programs that the federal government wants to subsidize.

Finally, state and local governments receive much of their receipts from various sources included in the "other" category in Table 5. These include fees for fishing and hunting licenses, tolls from roads and bridges, and fares for public buses and subways.

Spending Table 6 shows the total spending of state and local governments in 2011 and its breakdown among the major categories.

By far the biggest single expenditure for state and local governments is education. Local governments pay for the public schools, which educate most students from kindergarten through high school. State governments contribute to the support of public universities. In 2011, education accounted for about a third of the spending of state and local governments.

The second largest category of spending is for health programs, such as Medicaid, followed by spending on public order and safety, which includes the police, firefighters, courts, and prisons. Next come income security programs, the building and maintenance of roads and highways, and interest on state and local government debt. The "other" category in Table 6 includes the many additional services provided by state and local governments, such as libraries, garbage and snow removal, and the maintenance of public parks and playgrounds.

Quick Quiz *What are the two most important sources of tax revenue for the federal government? • What are the two most important sources of tax revenue for state and local governments?*

TABLE 6

Spending of State and Local Governments: 2011

Category	Amount (billions)	Amount Per Person	Percent of Spending
Education	$730	$2,340	34%
Health	481	1,542	22
Public order and safety	285	913	13
Income security	163	522	8
Highways	127	407	6
Interest	109	350	5
Other	271	869	13
Total	$2,166	$6,942	100%

Source: Bureau of Economic Analysis. Columns may not sum to total due to rounding.

12-2 Taxes and Efficiency

Now that we have seen how various levels of the U.S. government raise and spend money, let's consider how one might evaluate its tax policy and design a tax system. The primary aim of a tax system is to raise revenue for the government, but there are many ways to raise any given amount of money. When choosing among the many alternative tax systems, policymakers have two objectives: efficiency and equity.

One tax system is more efficient than another if it raises the same amount of revenue at a smaller cost to taxpayers. What are the costs of taxes to taxpayers? The most obvious cost is the tax payment itself. This transfer of money from the taxpayer to the government is an inevitable feature of any tax system. Yet taxes also impose two other costs, which well-designed tax policy tries to avoid or, at least, minimize:

- The deadweight losses that result when taxes distort the decisions that people make;
- The administrative burdens that taxpayers bear as they comply with the tax laws.

An efficient tax system is one that imposes small deadweight losses and small administrative burdens.

"I was gonna fix the place up, but if I did, the city would just raise my taxes!"

12-2a Deadweight Losses

One of the *Ten Principles of Economics* is that people respond to incentives, and this includes incentives provided by the tax system. If the government taxes ice cream, people eat less ice cream and more frozen yogurt. If the government taxes housing, people live in smaller houses and spend more of their income on other things. If the government taxes labor earnings, people work less and enjoy more leisure.

Because taxes distort incentives, they entail deadweight losses. As we first discussed in Chapter 8, the deadweight loss of a tax is the reduction in economic well-being of taxpayers in excess of the amount of revenue raised by the government. The deadweight loss is the inefficiency that a tax creates as people allocate resources according to the tax incentive rather than the true costs and benefits of the goods and services that they buy and sell.

To recall how taxes cause deadweight losses, consider an example. Suppose that Joe places an $8 value on a pizza and Jane places a $6 value on it. If there is no tax on pizza, the price of pizza will reflect the cost of making it. Let's suppose that the price of pizza is $5, so both Joe and Jane choose to buy one. Both consumers get some surplus of value over the amount paid. Joe gets consumer surplus of $3, and Jane gets consumer surplus of $1. Total surplus is $4.

Now suppose that the government levies a $2 tax on pizza and the price of pizza rises to $7. (This occurs if supply is perfectly elastic.) Joe still buys a pizza, but now he has consumer surplus of only $1. Jane now decides not to buy a pizza because its price is higher than its value to her. The government collects tax revenue of $2 on Joe's pizza. Total consumer surplus has fallen by $3 (from $4 to $1). Because total surplus has fallen by more than the tax revenue, the tax has a deadweight loss. In this case, the deadweight loss is $1.

Notice that the deadweight loss comes not from Joe, the person who pays the tax, but from Jane, the person who doesn't. The reduction of $2 in Joe's surplus exactly offsets the amount of revenue the government collects. The deadweight loss arises because the tax causes Jane to alter her behavior. When the tax raises the price of pizza, Jane is worse off, and yet there is no offsetting revenue to the government. This reduction in Jane's welfare is the deadweight loss of the tax.

case study

Should Income or Consumption Be Taxed?

When taxes induce people to change their behavior—such as inducing Jane to buy less pizza—the taxes cause deadweight losses and make the allocation of resources less efficient. As we have already seen, much government revenue comes from the individual income tax. In a case study in Chapter 8, we discussed how this tax discourages people from working as hard as they otherwise might. Another inefficiency caused by this tax is that it discourages people from saving.

Consider a person 25 years old who is considering saving $1,000. If he puts this money in a savings account that earns 8 percent and leaves it there, he will have $21,720 when he retires at age 65. Yet if the government taxes one-fourth of his interest income each year, the effective interest rate is only 6 percent. After 40 years of earning 6 percent, the $1,000 grows to only $10,290, less than half of what it would have been without taxation. Thus, because interest income is taxed, saving is much less attractive.

Some economists advocate eliminating the current tax system's disincentive toward saving by changing the basis of taxation. Rather than taxing the amount of

income that people earn, the government could tax the amount that people spend. Under this proposal, all income that is saved would not be taxed until the saving is later spent. This alternative system, called a *consumption tax,* would not distort people's saving decisions.

Various provisions of current law already make the tax system a bit like a consumption tax. Taxpayers can put a limited amount of their income into special savings accounts, such as Individual Retirement Accounts and 401(k) plans, and this income and the accumulated interest it earns escape taxation until the money is withdrawn at retirement. For people who do most of their saving through these retirement accounts, their tax bill is, in effect, based on their consumption rather than their income.

European countries tend to rely more on consumption taxes than does the United States. Most of them raise a significant amount of government revenue through a value-added tax, or a VAT. A VAT is like the retail sales tax that many U.S. states use. But rather than collecting all of the tax at the retail level when the consumer buys the final good, the government collects the tax in stages as the good is being produced (that is, as value is added by firms along the chain of production).

Various U.S. policymakers have proposed that the tax code move further in the direction of taxing consumption rather than income. In 2005, economist Alan Greenspan, then Chairman of the Federal Reserve, offered this advice to a presidential commission on tax reform: "As you know, many economists believe that a consumption tax would be best from the perspective of promoting economic growth—particularly if one were designing a tax system from scratch—because a consumption tax is likely to encourage saving and capital formation. However, getting from the current tax system to a consumption tax raises a challenging set of transition issues." ◢

12-2b Administrative Burden

If you ask the typical person on April 15 for an opinion about the tax system, you might get an earful (perhaps peppered with expletives) about the headache of filling out tax forms. The administrative burden of any tax system is part of the inefficiency it creates. This burden includes not only the time spent in early April filling out forms but also the time spent throughout the year keeping records for tax purposes and the resources the government has to use to enforce the tax laws.

Many taxpayers—especially those in higher tax brackets—hire tax lawyers and accountants to help them with their taxes. These experts in the complex tax laws fill out the tax forms for their clients and help them arrange their affairs in a way that reduces the amount of taxes owed. This behavior is legal tax avoidance, which is different from illegal tax evasion.

Critics of our tax system say that these advisers help their clients avoid taxes by abusing some of the detailed provisions of the tax code, often dubbed "loopholes." In some cases, loopholes are congressional mistakes: They arise from ambiguities or omissions in the tax laws. More often, they arise because Congress has chosen to give special treatment to specific types of behavior. For example, the U.S. federal tax code gives preferential treatment to investors in municipal bonds because Congress wanted to make it easier for state and local governments to borrow money. To some extent, this provision benefits states and localities; and to some extent, it benefits high-income taxpayers. Most loopholes are well known

by those in Congress who make tax policy, but what looks like a loophole to one taxpayer may look like a justifiable tax deduction to another.

The resources devoted to complying with the tax laws are a type of deadweight loss. The government gets only the amount of taxes paid. By contrast, the taxpayer loses not only this amount but also the time and money spent documenting, computing, and avoiding taxes.

The administrative burden of the tax system could be reduced by simplifying the tax laws. Yet simplification is often politically difficult. Most people are ready to simplify the tax code by eliminating the loopholes that benefit others, but few are eager to give up the loopholes that they benefit from themselves. In the end, the complexity of the tax law results from the political process as various taxpayers with their own special interests lobby for their causes.

12-2c Marginal Tax Rates versus Average Tax Rates

When discussing the efficiency and equity of income taxes, economists distinguish between two notions of the tax rate: the average and the marginal. The **average tax rate** is total taxes paid divided by total income. The **marginal tax rate** is the amount that taxes increase from an additional dollar of income.

average tax rate
total taxes paid divided by total income

marginal tax rate
the amount that taxes increase from an additional dollar of income

For example, suppose that the government taxes 20 percent of the first $50,000 of income and 50 percent of all income above $50,000. Under this tax, a person who makes $60,000 pays a tax of $15,000: 20 percent of the first $50,000 ($0.20 \times \$50{,}000 = \$10{,}000$) plus 50 percent of the next $10,000 ($0.50 \times \$10{,}000 = \$5{,}000$). For this person, the average tax rate is $15,000/$60,000, or 25 percent. But the marginal tax rate is 50 percent. If the taxpayer earned an additional dollar of income, that dollar would be subject to the 50 percent tax rate, so the amount the taxpayer would owe to the government would rise by $0.50.

The marginal and average tax rates each contain a useful piece of information. If we are trying to gauge the sacrifice made by a taxpayer, the average tax rate is more appropriate because it measures the fraction of income paid in taxes. By contrast, if we are trying to gauge how much the tax system distorts incentives, the marginal tax rate is more meaningful. One of the *Ten Principles of Economics* in Chapter 1 is that rational people think at the margin. A corollary to this principle is that the marginal tax rate measures how much the tax system discourages people from working. If you are thinking of working an extra few hours, the marginal tax rate determines how much the government takes of your additional earnings. It is the marginal tax rate, therefore, that determines the deadweight loss of an income tax.

12-2d Lump-Sum Taxes

Suppose the government imposes a tax of $4,000 on everyone. That is, everyone owes the same amount, regardless of earnings or any actions that a person might take. Such a tax is called a **lump-sum tax**.

lump-sum tax
a tax that is the same amount for every person

A lump-sum tax shows clearly the difference between average and marginal tax rates. For a taxpayer with income of $20,000, the average tax rate of a $4,000 lump-sum tax is 20 percent; for a taxpayer with income of $40,000, the average tax rate is 10 percent. For both taxpayers, the marginal tax rate is zero because no tax is owed on an additional dollar of income.

A lump-sum tax is the most efficient tax possible. Because a person's decisions do not alter the amount owed, the tax does not distort incentives and, therefore, does not cause deadweight losses. Because everyone can easily compute the amount owed and because there is no benefit to hiring tax lawyers and accountants, the lump-sum tax imposes a minimal administrative burden on taxpayers.

If lump-sum taxes are so efficient, why do we rarely observe them in the real world? The reason is that efficiency is only one goal of the tax system. A lump-sum tax would take the same amount from the poor and the rich, an outcome most people would view as unfair. To understand the tax systems that we observe, we must therefore consider the other major goal of tax policy: equity.

Quick Quiz *What is meant by the* efficiency *of a tax system?* • *What can make a tax system inefficient?*

12-3 Taxes and Equity

Ever since American colonists dumped imported tea into Boston harbor to protest high British taxes, tax policy has generated some of the most heated debates in American politics. The heat is rarely fueled by questions of efficiency. Instead, it arises from disagreements over how the tax burden should be distributed. Senator Russell Long once mimicked the public debate with this ditty:

> Don't tax you.
> Don't tax me.
> Tax that fella behind the tree.

Of course, if we are to rely on the government to provide some of the goods and services we want, taxes must fall on someone. In this section, we consider the equity of a tax system. How should the burden of taxes be divided among the population? How do we evaluate whether a tax system is fair? Everyone agrees that the tax system should be equitable, but there is much disagreement about how to judge the equity of a tax system.

12-3a The Benefits Principle

benefits principle
the idea that people should pay taxes based on the benefits they receive from government services

One principle of taxation, called the **benefits principle**, states that people should pay taxes based on the benefits they receive from government services. This principle tries to make public goods similar to private goods. It seems fair that a person who often goes to the movies pays more in total for movie tickets than a person who rarely goes. Similarly, a person who gets great benefit from a public good should pay more for it than a person who gets little benefit.

The gasoline tax, for instance, is sometimes justified using the benefits principle. In some states, revenues from the gasoline tax are used to build and maintain roads. Because those who buy gasoline are the same people who use the roads, the gasoline tax might be viewed as a fair way to pay for this government service.

The benefits principle can also be used to argue that wealthy citizens should pay higher taxes than poorer ones. Why? Simply because the wealthy benefit more from public services. Consider, for example, the benefits of police protection from theft. Citizens with much to protect benefit more from police than do those with less to protect. Therefore, according to the benefits principle, the wealthy should contribute more than the poor to the cost of maintaining the police force. The same argument can be used for many other public services, such as fire protection, national defense, and the court system.

It is even possible to use the benefits principle to argue for antipoverty programs funded by taxes on the wealthy. As we discussed in Chapter 11, people may prefer living in a society without poverty, suggesting that antipoverty programs are a public good. If the wealthy place a greater dollar value on this public good than members of the middle class do, perhaps just because the wealthy have more to spend, then according to the benefits principle, they should be taxed more heavily to pay for these programs.

12-3b The Ability-to-Pay Principle

Another way to evaluate the equity of a tax system is called the **ability-to-pay principle**, which states that taxes should be levied on a person according to how well that person can shoulder the burden. This principle is sometimes justified by the claim that all citizens should make an "equal sacrifice" to support the government. The magnitude of a person's sacrifice, however, depends not only on the size of his tax payment but also on his income and other circumstances. A $1,000 tax paid by a poor person may require a larger sacrifice than a $10,000 tax paid by a rich one.

The ability-to-pay principle leads to two corollary notions of equity: vertical equity and horizontal equity. **Vertical equity** states that taxpayers with a greater ability to pay should contribute a larger amount. **Horizontal equity** states that taxpayers with similar abilities to pay should contribute the same amount. These notions of equity are widely accepted, but applying them to evaluate a tax system is rarely straightforward.

Vertical Equity If taxes are based on ability to pay, then richer taxpayers should pay more than poorer taxpayers. But how much more should the rich pay? Much of the debate over tax policy concerns this question.

Consider the three tax systems in Table 7. In each case, taxpayers with higher incomes pay more. Yet the systems differ in how quickly taxes rise with income. The first system is called **proportional** because all taxpayers pay the same fraction of income. The second system is called **regressive** because high-income taxpayers pay a smaller fraction of their income, even though they pay a larger amount. The third system is called **progressive** because high-income taxpayers pay a larger fraction of their income.

Which of these three tax systems is most fair? There is no obvious answer, and economic theory does not offer any help in trying to find one. Equity, like beauty, is in the eye of the beholder.

ability-to-pay principle
the idea that taxes should be levied on a person according to how well that person can shoulder the burden

vertical equity
the idea that taxpayers with a greater ability to pay taxes should pay larger amounts

horizontal equity
the idea that taxpayers with similar abilities to pay taxes should pay the same amount

proportional tax
a tax for which high-income and low-income taxpayers pay the same fraction of income

regressive tax
a tax for which high-income taxpayers pay a smaller fraction of their income than do low-income taxpayers

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

TABLE 7
Three Tax Systems

	Proportional Tax		Regressive Tax		Progressive Tax	
Income	Amount of Tax	Percent of Income	Amount of Tax	Percent of Income	Amount of Tax	Percent of Income
$50,000	$12,500	25%	$15,000	30%	$10,000	20%
100,000	25,000	25	25,000	25	25,000	25
200,000	50,000	25	40,000	20	60,000	30

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How the Tax Burden Is Distributed

Much debate over tax policy concerns whether the wealthy pay their fair share. There is no objective way to make this judgment. In evaluating the issue for yourself, however, it is useful to know how much families with different incomes pay under the current tax system.

Table 8 presents some data on how federal taxes are distributed among income classes. These figures are for 2009, the most recent year available as this book was going to press, and were tabulated by the Congressional Budget Office. They include all federal taxes—individual income taxes, payroll taxes, corporate income taxes, and excise taxes—but not state and local taxes. When calculating a household's tax burden, the CBO allocates corporate income taxes to the owners of capital and payroll taxes to workers.

To construct the table, households are ranked according to their income and placed into five groups of equal size, called *quintiles*. The table also presents data on the richest 1 percent of Americans. The second column of the table shows the average income of each group. Income includes both market income (income that households have earned from their work and savings) and transfer payments from government programs, such as Social Security and welfare. The poorest one-fifth of households had average income of $23,500, and the richest one-fifth had average income of $223,500. The richest 1 percent had average income of over $1.2 million.

The third column of the table shows total taxes as a percentage of income. As you can see, the U.S. federal tax system is progressive. The poorest fifth of households paid 1.0 percent of their incomes in taxes, and the richest fifth paid 23.2 percent. The top 1 percent paid 28.9 percent of their incomes.

The fourth and fifth columns compare the distribution of income and the distribution of taxes. The poorest quintile earned 5.1 percent of all income and paid 0.3 percent of all taxes. The richest quintile earned 50.8 percent of all income and paid 67.9 percent of all taxes. The richest 1 percent (which, remember, is 1/20 the size of each quintile) earned 13.4 percent of all income and paid 22.3 percent of all taxes.

These numbers on taxes paid are a good starting point for understanding how the burden of government is distributed, but they give an incomplete picture. Money flows not only from households to the government in the form of taxes but also from the government back to households in the form of transfer payments. In some ways, transfer payments are the opposite of taxes. Including transfers as negative taxes substantially changes the distribution of the tax burden. The richest

TABLE 8

The Burden of Federal Taxes

Source: Congressional Budget Office Analysis. Figures are for 2009.

Quintile	Average Income	Taxes as a Percentage of Income	Percentage of All Income	Percentage of All Taxes
Lowest	$23,500	1.0%	5.1%	0.3%
Second	43,400	6.8	9.8	3.8
Middle	64,300	11.1	14.7	9.4
Fourth	93,800	15.1	21.1	18.3
Highest	223,500	23.2	50.8	67.9
Top 1%	1,219,700	28.9	13.4	22.3

quintile of households still pays about one-quarter of its income to the government, even after transfers are subtracted, and the top 1 percent still pays almost 30 percent. By contrast, the average tax rate for the poorest quintile becomes a sizeable negative number. That is, typical households in the bottom of the income distribution receive substantially more in transfers than they pay in taxes. The lesson is clear: To understand fully the progressivity of government policies, one must take account of both what people pay and what they receive.

Finally, it is worth noting that the numbers in Table 8 are a bit out of date. In late 2012, the U.S. Congress passed and President Obama signed a tax bill that increased taxes significantly from those that prevailed previously, particularly for taxpayers at the top of the income distribution. For individuals earning taxable income more than $400,000 and couples earning more than $450,000, the marginal income tax rate was increased from 35 to 39.6 percent. As a result, the tax system in place for 2013 and beyond is more progressive than the one shown in the table. ◢

Horizontal Equity If taxes are based on ability to pay, then similar taxpayers should pay similar amounts of taxes. But what determines if two taxpayers are similar? Families differ in many ways. To evaluate whether a tax code is horizontally equitable, one must determine which differences are relevant for a family's ability to pay and which differences are not.

Suppose the Smith and Jones families each have income of $100,000. The Smiths have no children, but Mr. Smith has an illness that results in medical expenses of $40,000. The Joneses are in good health, but they have four children. Two of the Jones children are in college, generating tuition bills of $60,000. Would it be fair for these two families to pay the same tax because they have the same income? Would it be fair to give the Smiths a tax break to help them offset their high medical expenses? Would it be fair to give the Joneses a tax break to help them with their tuition expenses?

There are no easy answers to these questions. In practice, the U.S. tax code is filled with special provisions that alter a family's tax obligations based on its specific circumstances.

12-3c Tax Incidence and Tax Equity

Tax incidence—the study of who bears the burden of taxes—is central to evaluating tax equity. As we first saw in Chapter 6, the person who bears the burden of a tax is not always the person who gets the tax bill from the government. Because taxes alter supply and demand, they alter equilibrium prices. As a result, they affect people beyond those who, according to statute, actually pay the tax. When evaluating the vertical and horizontal equity of any tax, it is important to take these indirect effects into account.

Many discussions of tax equity ignore the indirect effects of taxes and are based on what economists mockingly call the *flypaper theory* of tax incidence. According to this theory, the burden of a tax, like a fly on flypaper, sticks wherever it first lands. This assumption, however, is rarely valid.

For example, a person not trained in economics might argue that a tax on expensive fur coats is vertically equitable because most buyers of furs are wealthy. Yet if these buyers can easily substitute other luxuries for furs, then a tax on furs might only reduce the sale of furs. In the end, the burden of the tax will fall more on those who make and sell furs than on those who buy them. Because most workers who make furs are not wealthy, the equity of a fur tax could be quite different from what the flypaper theory indicates.

IN THE NEWS

Tax Expenditures

Tax reformers and deficit hawks often suggest reducing the deductions, credits, and exclusions that narrow the tax base.

The Blur Between Spending and Taxes

By N. Gregory Mankiw

Should the government cut spending or raise taxes to deal with its long-term fiscal imbalance? As President Obama's deficit commission rolls out its final report in the coming weeks, this issue will most likely divide the political right and left. But, in many ways, the question is the wrong one. The distinction between spending and taxation is often murky and sometimes meaningless.

Imagine that there is some activity—say, snipe hunting—that members of Congress want to encourage. Senator Porkbelly proposes a government subsidy. "America needs more snipe hunters," he says. "I propose that every time an American bags a snipe, the federal government should pay him or her $100."

"No, no," says Congressman Blowhard. "The Porkbelly plan would increase the size of an already bloated government. Let's instead reduce the burden of taxation. I propose that every time an American tracks down a snipe, the hunter should get a $100 credit to reduce his or her tax liabilities."

To be sure, government accountants may treat the Porkbelly and Blowhard plans differently. They would likely deem the subsidy to be a spending increase and the credit to be a tax cut. Moreover, the rhetoric of the two politicians about spending and taxes may appeal to different political bases.

But it hardly takes an economic genius to see how little difference there is between the two plans. Both policies enrich the nation's snipe hunters. And because the government must balance its books, at least in the long run, the gains of the snipe hunters must come at the cost of higher taxes or lower government benefits for the rest of us.

Economists call the Blowhard plan a "tax expenditure." The tax code is filled with them—although not yet one for snipe hunting. Every time a politician promises a "targeted tax cut," he or she is probably offering up a form of government spending in disguise.

Erskine B. Bowles and Alan K. Simpson, the chairmen of President Obama's deficit reduction commission, have taken at hard look at these tax expenditures—and they don't like what they see. In their draft proposal, released earlier this month, they proposed doing away with tax expenditures, which together cost the Treasury over $1 trillion a year.

Such a drastic step would allow Mr. Bowles and Mr. Simpson to move the budget toward fiscal sustainability, while simultaneously reducing all income tax rates. Under their plan, the top tax rate would fall to 23 percent from the 35 percent in today's law (and the 39.6 percent currently advocated by Democratic leadership).

This approach has long been the basic recipe for tax reform. By broadening the tax base and lowering tax rates, we can increase government revenue and distort incentives less. That should command widespread applause across the ideological spectrum. Unfortunately, the reaction has been less enthusiastic.

Pundits on the left are suspicious of any plan that reduces marginal tax rates on the rich. But, as Mr. Bowles and Mr. Simpson point out, tax expenditures disproportionately

case study

Who Pays the Corporate Income Tax?

The corporate income tax provides a good example of the importance of tax incidence for tax policy. The corporate tax is popular among voters. After all, corporations are not people. Voters are always eager to have their taxes reduced and have some impersonal corporation pick up the tab.

But before deciding that the corporate income tax is a good way for the government to raise revenue, we should consider who bears the burden of the corporate tax. This is a difficult question on which economists disagree, but one thing is certain: *People pay all taxes*. When the government levies a tax on a corporation, the corporation is more like a tax collector than a taxpayer. The burden of the tax ultimately falls on people—the owners, customers, or workers of the corporation.

Many economists believe that workers and customers bear much of the burden of the corporate income tax. To see why, consider an example. Suppose that the

benefit those at the top of the economic ladder. According to their figures, tax expenditures increase the after-tax income of those in the bottom quintile by about 6 percent. Those in the top 1 percent of the income distribution enjoy about twice that gain. Progressives who are concerned about the gap between rich and poor should be eager to scale back tax expenditures.

Pundits on the right, meanwhile, are suspicious of anything that increases government revenue. But they should recognize that tax expenditures are best viewed as a hidden form of spending. If we eliminate tax expenditures and reduce marginal tax rates, as Mr. Bowles and Mr. Simpson propose, we are essentially doing what economic conservatives have long advocated: cutting spending and taxes.

Yet another political problem is that each tax expenditure has its own political constituency. If Congressman Blowhard ever got his way, the snipe hunters of the world would surely fight to keep their tax break.

One major tax expenditure that the Bowles–Simpson plan would curtail or eliminate is the mortgage interest deduction. Without doubt, many homeowners and the real estate industry will object. But they won't have the merits on their side.

This subsidy to homeownership is neither economically efficient nor particularly equitable. Economists have long pointed out that tax subsidies to housing, together with the high taxes on corporations, cause too much of the economy's capital stock to be tied up in residential structures and too little in corporate capital. This misallocation of resources results in lower productivity and reduced real wages.

Moreover, there is nothing particularly ignoble about renting that deserves the scorn of the tax code. But let's face it: subsidizing homeowners is the same as penalizing renters. In the end, someone has to pick up the tab.

There are certain tax expenditures that I like. My personal favorite is the deduction for charitable giving. It encourages philanthropy and, thus, private rather than governmental solutions to society's problems.

But I know that solving the long-term fiscal problem won't be easy. Everyone will have to give a little, and perhaps even more than a little. I am willing to give up my favorite tax expenditure if everyone else is willing to give up theirs.

The Bowles–Simpson proposal is not perfect, but it is far better than the status quo. The question ahead is whether we can get Senator Porkbelly and Congressman Blowhard to agree.

The New York Times, November 21, 2010/Artist David Klein

Source: *New York Times*, November 21, 2010.

U.S. government decides to raise the tax on the income earned by car companies. At first, this tax hurts the owners of the car companies, who receive less profit. But over time, these owners will respond to the tax. Because producing cars is less profitable, they invest less in building new car factories. Instead, they invest their wealth in other ways—for example, by buying larger houses or by building factories in other industries or other countries. With fewer car factories, the supply of cars declines, as does the demand for autoworkers. Thus, a tax on corporations making cars causes the price of cars to rise and the wages of autoworkers to fall.

The corporate income tax shows how dangerous the flypaper theory of tax incidence can be. The corporate income tax is popular in part because it appears to be paid by rich corporations. Yet those who bear the ultimate burden of the tax—the customers and workers of corporations—are often not rich. If the true incidence of the corporate tax were more widely known, this tax might be less popular among voters.

Bill Pugliano/Getty Images

This worker pays part of the corporate income tax.

Quick Quiz *Explain the* benefits principle *and the* ability-to-pay principle. • *What are* vertical equity *and* horizontal equity*?* • *Why is studying tax incidence important for determining the equity of a tax system?*

12-4 Conclusion: The Trade-off between Equity and Efficiency

Almost everyone agrees that equity and efficiency are the two most important goals of a tax system. But these two goals often conflict, especially when equity is judged by the progressivity of the tax system. People disagree about tax policy often because they attach different weights to these goals.

The recent history of tax policy shows how political leaders differ in their views on equity and efficiency. When Ronald Reagan was elected president in 1980, the marginal tax rate on the earnings of the richest Americans was 50 percent. On interest income, the marginal tax rate was 70 percent. Reagan argued that such high tax rates greatly distorted economic incentives to work and save. In other words, he claimed that these high tax rates cost too much in terms of economic efficiency. Tax reform was, therefore, a high priority of his administration. Reagan signed into law large cuts in tax rates in 1981 and then again in 1986. When Reagan left office in 1989, the richest Americans faced a marginal tax rate of only 28 percent.

The pendulum of political debate swings both ways. When Bill Clinton ran for president in 1992, he argued that the rich were not paying their fair share of taxes. In other words, the low tax rates on the rich violated his view of vertical equity. In 1993, President Clinton signed into law a bill that raised the tax rates on the

richest Americans to about 40 percent. When George W. Bush ran for president, he reprised many of Reagan's themes, and as president he reversed part of the Clinton tax increase, reducing the highest tax rate to 35 percent. Barack Obama pledged during the 2008 presidential campaign that he would raise taxes on high-income households, and starting in 2013 the top marginal tax rate was back at about 40 percent.

Economics alone cannot determine the best way to balance the goals of efficiency and equity. This issue involves political philosophy as well as economics. But economists have an important role in this debate: They can shed light on the trade-offs that society inevitably faces when designing the tax system and can help us avoid policies that sacrifice efficiency without any benefit in terms of equity.

Summary

- The U.S. government raises revenue using various taxes. The most important taxes for the federal government are individual income taxes and payroll taxes for social insurance. The most important taxes for state and local governments are sales taxes and property taxes.
- The efficiency of a tax system refers to the costs it imposes on taxpayers. There are two costs of taxes beyond the transfer of resources from the taxpayer to the government. The first is the deadweight loss that arises as taxes alter incentives and distort the allocation of resources. The second is the administrative burden of complying with the tax laws.
- The equity of a tax system concerns whether the tax burden is distributed fairly among the population. According to the benefits principle, it is fair for people to pay taxes based on the benefits they receive from the government. According to the ability-to-pay principle, it is fair for people to pay taxes based on their capability to handle the financial burden. When evaluating the equity of a tax system, it is important to remember a lesson from the study of tax incidence: The distribution of tax burdens is not the same as the distribution of tax bills.
- When considering changes in the tax laws, policymakers often face a trade-off between efficiency and equity. Much of the debate over tax policy arises because people give different weights to these two goals.

Key Concepts

budget deficit, *p. 238*
budget surplus, *p. 238*
average tax rate, *p. 245*
marginal tax rate, *p. 245*
lump-sum tax, *p. 245*
benefits principle, *p. 246*
ability-to-pay principle, *p. 247*
vertical equity, *p. 247*
horizontal equity, *p. 247*
proportional tax, *p. 247*
regressive tax, *p. 247*
progressive tax, *p. 247*

Questions for Review

1. Over the past century, has the government's tax revenue grown more or less slowly than the rest of the economy?
2. Explain how corporate profits are taxed twice.
3. Why is the burden of a tax to taxpayers greater than the revenue received by the government?
4. Why do some economists advocate taxing consumption rather than income?
5. What is the marginal tax rate on a lump-sum tax? How is this related to the efficiency of the tax?
6. Give two arguments why wealthy taxpayers should pay more taxes than poor taxpayers.
7. What is the concept of horizontal equity and why is it hard to apply?

Quick Check Multiple Choice

1. The two largest sources of tax revenue for the U.S. federal government are
   a. individual and corporate income taxes.
   b. individual income taxes and payroll taxes for social insurance.
   c. corporate income taxes and payroll taxes for social insurance.
   d. payroll taxes for social insurance and property taxes.

2. Andy gives piano lessons. He has an opportunity cost of $50 per lesson and charges $60. He has two students: Bob, who has a willingness to pay of $70, and Carl, who has a willingness to pay of $90. When the government puts a $20 tax on piano lessons and Andy raises his price to $80, the deadweight loss is _____ and the tax revenue is _____.
   a. $10, $20
   b. $10, $40
   c. $20, $20
   d. $20, $40

3. If the tax code exempts the first $20,000 of income from taxation and then taxes 25 percent of all income above that level, then a person who earns $50,000 has an average tax rate of _____ percent and a marginal tax rate of _____ percent.
   a. 15, 25
   b. 25, 15
   c. 25, 30
   d. 30, 25

4. A toll is a tax on those citizens who use toll roads. This policy can be viewed as an application of
   a. the benefits principle.
   b. horizontal equity.
   c. vertical equity.
   d. tax progressivity.

5. In the United States, taxpayers in the top 1 percent of the income distribution pay about _____ percent of their income in federal taxes.
   a. 5
   b. 10
   c. 20
   d. 30

6. If the corporate income tax induces businesses to reduce their capital investment, then
   a. the tax does not have any deadweight loss.
   b. corporate shareholders benefit from the tax.
   c. workers bear some of the burden of the tax.
   d. the tax achieves the goal of vertical equity.

Problems and Applications

1. In a published source or on the Internet, find out whether the U.S. federal government had a budget deficit or surplus last year. What do policymakers expect to happen over the next few years? (*Hint*: The website of the Congressional Budget Office is http://www.cbo.gov.)

2. The information in many of the tables in this chapter can be found in the *Economic Report of the President*, which appears annually. Using a recent issue of the report at your library or on the Internet, answer the following questions and provide some numbers to support your answers. (*Hint*: The website of the Government Printing Office is http://www.gpo.gov.)
   a. Figure 1 shows that government revenue as a percentage of total income has increased over time. Is this increase primarily attributable to changes in federal government revenue or in state and local government revenue?
   b. Looking at the combined revenue of the federal government and state and local governments, how has the composition of total revenue changed over time? Are personal income taxes more or less important? Social insurance taxes? Corporate profits taxes?
   c. Looking at the combined expenditures of the federal government and state and local governments, how have the relative shares of transfer payments and purchases of goods and services changed over time?

3. The chapter states that the elderly population in the United States is growing more rapidly than the total population. In particular, the number of workers is rising slowly, while the number of retirees is rising quickly. Concerned about the future of Social Security, some members of Congress propose a "freeze" on the program.
   a. If total expenditures were frozen, what would happen to benefits per retiree? To tax payments per worker? (Assume that Social Security taxes and receipts are balanced in each year.)

   b. If benefits per retiree were frozen, what would happen to total expenditures? To tax payments per worker?
   c. If tax payments per worker were frozen, what would happen to total expenditures? To benefits per retiree?
   d. What do your answers to parts (a), (b), and (c) imply about the difficult decisions faced by policymakers?

4. Suppose you are a typical person in the U.S. economy. You pay 4 percent of your income in a state income tax and 15.3 percent of your labor earnings in federal payroll taxes (employer and employee shares combined). You also pay federal income taxes as in Table 3. How much tax of each type do you pay if you earn $20,000 a year? Taking all taxes into account, what are your average and marginal tax rates? What happens to your tax bill and to your average and marginal tax rates if your income rises to $40,000?

5. Some states exclude necessities, such as food and clothing, from their sales tax. Other states do not. Discuss the merits of this exclusion. Consider both efficiency and equity.

6. When someone owns an asset (such as a share of stock) that rises in value, he has an "accrued" capital gain. If he sells the asset, he "realizes" the gains that have previously accrued. Under the U.S. income tax system, realized capital gains are taxed, but accrued gains are not.
   a. Explain how individuals' behavior is affected by this rule.
   b. Some economists believe that cuts in capital gains tax rates, especially temporary ones, can raise tax revenue. How might this be so?
   c. Do you think it is a good rule to tax realized but not accrued capital gains? Why or why not?

7. Suppose that your state raises its sales tax from 5 percent to 6 percent. The state revenue commissioner forecasts a 20 percent increase in sales tax revenue. Is this plausible? Explain.

8. The Tax Reform Act of 1986 eliminated the deductibility of interest payments on consumer debt (mostly credit cards and auto loans) but maintained the deductibility of interest payments on mortgages and home equity loans. What do you think happened to the relative amounts of borrowing through consumer debt and home equity debt?

9. Categorize each of the following funding schemes as examples of the benefits principle or the ability-to-pay principle.
   a. Visitors to many national parks pay an entrance fee.
   b. Local property taxes support elementary and secondary schools.
   c. An airport trust fund collects a tax on each plane ticket sold and uses the money to improve airports and the air traffic control system.