



RICARDO J. CABALLERO is Ford Professor of International Economics at MIT. He has received many honors, the most notable of which are the Frisch Medal of the Econometric Society (2002) and being named Chile's Economist of the Year (2001). A highly regarded teacher, he is much sought as a special lecturer and in 2005 gave the prestigious Yrjo Jahnsson Lecture at the University of Helsinki.

Professor Caballero earned his B.S. degree in 1982 and M.A. in 1983 at Pontificia Universidad Católica de Chile. He then moved to the United States and obtained his Ph.D. at MIT in 1988.

Michael Parkin talked with Ricardo Caballero about his work and the progress that economists have made in understanding economic fluctuations.

*Professor Caballero, why did you decide to become an economist?*

Did I decide? I'm convinced that one is either born an economist or not. I began studying business, but as soon as I took the first course in economics, I was captivated by the simple but elegant logic of (good) economic reasoning. Given the complexity of the real world, economic analysis is necessarily abstract. But at the same time, economics is mostly about concrete and important issues that affect the lives of millions of people. Abstraction and relevance—this is a wonderful but strange combination. Not everybody feels comfortable with it, but if you do, economics is for you.

*Most of your work has been on business cycles and other high-frequency phenomena. Can we begin by reviewing the costs of recessions? Robert Lucas says that postwar U.S. recessions have cost very little. Do you agree?*

No ... but I'm not sure Robert Lucas was really trying to say that. My sense is that he was trying to push the profession to focus a bit more on long-run growth issues. Putting down the costs of recessions was a useful debating device to make his important point.

I believe that the statement that recessions are not costly is incorrect.

First, I think his calculation of this magnitude reflects some fundamental flaw in the way the work-horse models we use in economics fail to account for the costs of risk and volatility. This flaw shows up in many different puzzles in economics, including the well-known equity premium puzzle. Economic models underestimate, by an order of magnitude, how unhappy agents are about facing uncertainty.

Second, it is highly unlikely that recessions and medium-term growth are completely separable. In particular, the ongoing process of restructuring, which is central to productivity growth, is severely hampered by deep recessions.

Recessions are costly because they waste enormous resources, affect physical and human investment decisions, have large negative distributional consequences, influence political outcomes, and so on.

**Recessions are costly because they waste enormous resources [and] affect physical and human investment decisions.**

\*You can read the full interview with Ricardo J. Caballero in [MyEconLab](#).



## 30 FISCAL POLICY

After studying this chapter, you will be able to:

- ◆ Describe the federal budget process and the recent history of outlays, receipts, deficits, and debt
- ◆ Explain the supply-side effects of fiscal policy
- ◆ Explain how fiscal policy choices redistribute benefits and costs across generations
- ◆ Explain how fiscal stimulus is used to fight a recession

**Most governments have a budget deficit and debt, but Japan's tops them all and might be a warning to the United States and others about dangers that lie ahead.**

How do government deficits and debt influence the economy? Do they create jobs, or do they destroy them? Do they slow economic growth? Do they impose a burden on future generations?

This chapter studies these fiscal policy questions in the U.S. economy today. In *Economics in the News* at the end of the chapter, we look at the extreme fiscal policy challenges facing Japan and the lesson they hold for the United States.

## The Federal Budget

The **federal budget** is an annual statement of the outlays and receipts of the government of the United States together with the laws and regulations that approve and support them. The federal budget has two purposes:

1. To finance federal government programs and activities, and
2. To achieve macroeconomic objectives

The first purpose of the federal budget was its only purpose before the Great Depression of the 1930s. The second purpose arose as a reaction to the Great Depression and the rise of the ideas of economist John Maynard Keynes. The use of the federal budget to achieve macroeconomic objectives such as full employment, sustained economic growth, and price level stability is called **fiscal policy**. It is this aspect of the budget that is the focus of this chapter.

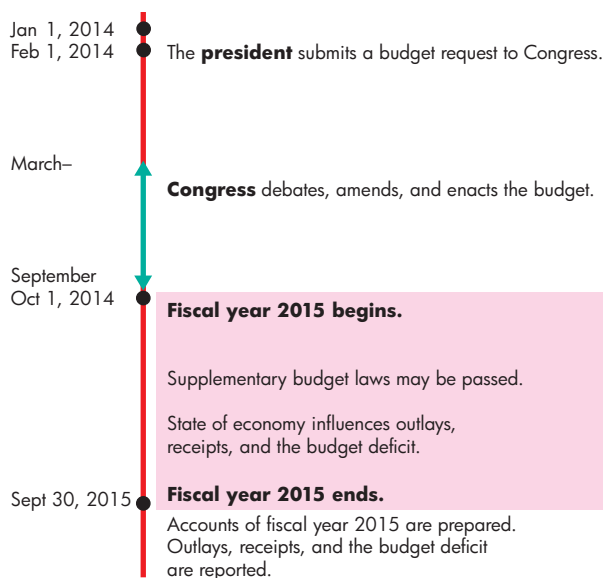
### The Institutions and Laws

Fiscal policy is made by the president and Congress on an annual timeline that is shown in Fig. 30.1 for the 2015 budget.

**The Roles of the President and Congress** The president *proposes* a budget to Congress each February. Congress debates the proposed budget and passes the budget acts in September. The president either signs those acts into law or vetoes the *entire* budget bill. The president does not have the veto power to eliminate specific items in a budget bill and approve others—known as a *line-item veto*. Many state governors have long had line-item veto authority. Congress attempted to grant these powers to the president of the United States in 1996, but in a 1998 Supreme Court ruling, the line-item veto for the president was declared unconstitutional. Although the president proposes and ultimately approves the budget, the task of making the tough decisions on spending and taxes rests with Congress.

Congress begins its work on the budget with the president's proposal. The House of Representatives and the Senate develop their own budget ideas in their respective House and Senate Budget Committees. Formal conferences between the two houses eventually resolve differences of view, and a series of spending

**FIGURE 30.1** The Federal Budget Timeline in Fiscal 2015



The federal budget process begins with the president's request in February. Congress debates and amends the request and enacts a budget before the start of the fiscal year on October 1. The president signs the budget acts into law or vetoes the entire budget bill. Throughout the fiscal year, Congress might pass supplementary budget laws. The budget outcome is calculated after the end of the fiscal year.

### MyEconLab Animation

acts and an overall budget act are usually passed by both houses before the start of the fiscal year. A *fiscal year* is a year that runs from October 1 to September 30 in the next calendar year. *Fiscal 2015* is the fiscal year that *begins* on October 1, 2014.

During a fiscal year, Congress often passes supplementary budget laws, and the budget outcome is influenced by the evolving state of the economy. For example, if a recession begins, tax revenues fall and welfare payments increase.

**The Employment Act of 1946** Fiscal policy operates within the framework of the landmark *Employment Act of 1946* in which Congress declared that

... it is the continuing policy and responsibility of the Federal Government to use all practicable means ... to coordinate and utilize all its plans, functions, and resources ... to promote maximum employment, production, and purchasing power.



This act recognized a role for government actions to keep unemployment low, the economy expanding, and inflation in check. The *Full Employment and Balanced Growth Act of 1978*, more commonly known as the *Humphrey-Hawkins Act*, went farther than the Employment Act of 1946 and set a specific target of 4 percent for the unemployment rate. But this target has never been treated as an unwavering policy goal. Under the 1946 act, the president must describe the current economic situation and the policies he believes are needed in the annual *Economic Report of the President*, which the Council of Economic Advisers writes.

**The Council of Economic Advisers** The president's Council of Economic Advisers was established in the Employment Act of 1946. The Council consists of a chairperson and two other members, all of whom are economists on a one- or two-year leave from their regular university or public service jobs. In 2014, the chair of President Obama's Council of Economic Advisers was Jason Furman formerly at the Brookings Institution. The **Council of Economic Advisers** monitors the economy and keeps the President and the public informed about the current state of the economy and the best available forecasts of where it is heading. This economic intelligence activity is one source of data that informs the budget-making process.

Let's look at the most recent federal budget.

## Highlights of the 2015 Budget

Table 30.1 shows the main items in the federal budget proposed by President Obama for 2015. The numbers are projected amounts for the fiscal year beginning on October 1, 2014—Fiscal 2015. Notice the three main parts of the table: *Receipts* are the government's tax revenues, *outlays* are the government's payments, and the *deficit* is the amount by which the government's outlays exceed its receipts.

**Receipts** Receipts were projected to be \$3,514 billion in Fiscal 2015. These receipts come from four sources:

1. Personal income taxes
2. Social Security taxes
3. Corporate income taxes
4. Indirect taxes and other receipts

The largest source of receipts is *personal income taxes*, which in 2015 are expected to be \$1,505 billion.

These taxes are paid by individuals on their incomes. The second largest source is *Social Security taxes*. These taxes are paid by workers and their employers to finance the government's Social Security programs. Third in size are *corporate income taxes*. These taxes are paid by companies on their profits. Finally, the smallest source of federal receipts is what are called *indirect taxes*. These taxes are on the sale of gasoline, alcoholic beverages, and a few other items.

**Outlays** Outlays are classified into three categories:

1. Transfer payments
2. Expenditure on goods and services
3. Debt interest

The largest item of outlays, *transfer payments*, is the payment to individuals, businesses, other levels of government, and the rest of the world. In 2015, this item is expected to be \$2,649 billion. It includes Social Security benefits, Medicare and Medicaid, unemployment checks, welfare payments, farm subsidies, grants to state and local governments, and payments to international agencies. It also includes capital transfers to bail out failing financial institutions. Transfer payments, especially those for Medicare and Medicaid, are sources of persistent growth in

**TABLE 30.1** Federal Budget in Fiscal 2015

Item	Projections (billions of dollars)
<b>Receipts</b>	<b>3,514</b>
Personal income taxes	1,505
Social Security taxes	1,176
Corporate income taxes	537
Indirect taxes and other receipts	296
<b>Outlays</b>	<b>4,158</b>
Transfer payments	2,649
Expenditure on goods and services	1,030
Debt interest	479
<b>Deficit</b>	<b>644</b>

Source of data: Budget of the United States Government, Fiscal Year 2015, Table 14.1.

government expenditures and are a major source of concern and political debate.

*Expenditure on goods and services* is the expenditure on final goods and services, and in 2015 it is expected to total \$1,030 billion. This expenditure, which includes that on national defense, homeland security, research on cures for AIDS, computers for the Internal Revenue Service, government cars and trucks, and federal highways, has decreased in recent years. This component of the federal budget is the *government expenditure on goods and services* that appears in the circular flow of expenditure and income and in the National Income and Product Accounts (see Chapter 21, pp. 531–532).

*Debt interest* is the interest on the government debt. In 2015, this item is expected to be \$479 billion—almost 12 percent of total expenditure. This interest payment is large because the government has a debt of almost \$13 trillion, which has arisen from many years of budget deficits during the 1970s, 1980s, 1990s, and 2000s.

**Surplus or Deficit** The government's budget balance is equal to receipts minus outlays.

$$\text{Budget balance} = \text{Receipts} - \text{Outlays}.$$

If receipts exceed outlays, the government has a **budget surplus**. If outlays exceed receipts, the government has

a **budget deficit**. If receipts equal outlays, the government has a **balanced budget**. For Fiscal 2015, with projected outlays of \$4,158 billion and receipts of \$3,514 billion, the government projected a budget deficit of \$644 billion.

Big numbers like these are hard to visualize and hard to compare over time. To get a better sense of the magnitude of receipts, outlays, and the deficit, we often express them as percentages of GDP. Expressing them in this way lets us see how large government is relative to the size of the economy, and it also helps us to study *changes* in the scale of government over time.

How typical is the federal budget of Fiscal 2015? Let's look at the recent history of the budget.

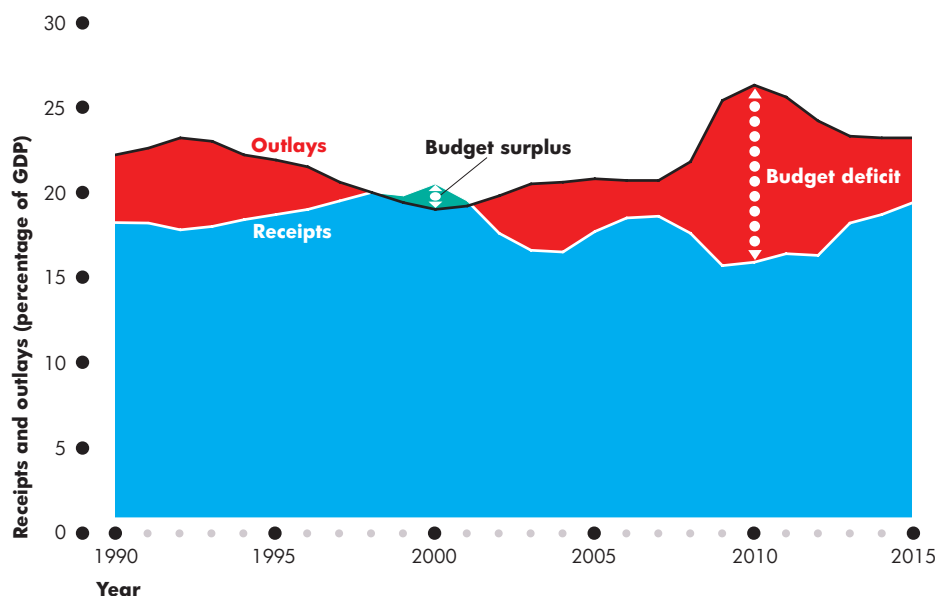
### The Budget in Historical Perspective

Figure 30.2 shows the government's receipts, outlays, and budget surplus or deficit since 1990. You can see that except for the four years around 2000, the budget has been in persistent deficit.

You can also see that after 2008, the deficit was extraordinarily large, peaking in 2010 at more than 10 percent of GDP and remaining close to 10 percent for three years.

An earlier large deficit in 1992 gradually shrank through the 1990s expansion and in 1998 the first

**FIGURE 30.2** The Budget Surplus and Deficit



The figure records the federal government's outlays, receipts, and budget balance from 1990 to 2015. Except for the four years 1998 through 2001, the budget has been in deficit. The deficit after 2008 reached a new all-time high and occurred because outlays increased. Receipts have fluctuated but have displayed no trend (as a percentage of GDP).

Source of data: Budget of the United States Government, Fiscal Year 2015, Table 14.2.

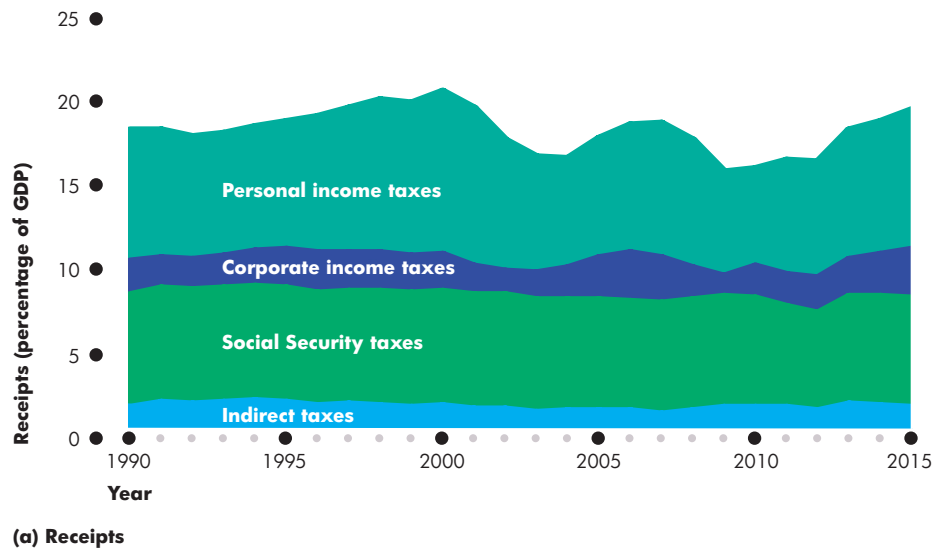
budget surplus since 1969 emerged. But by 2002, the budget was again in deficit and during the 2008–2009 recession, the deficit reached a new all-time high.

Why did the budget deficit grow during the early 1990s, vanish in the late 1990s, and re-emerge in the 2000s? Did outlays increase, or did receipts shrink, and which components of outlays and receipts changed most to swell and then shrink the deficit? Let's look at receipts and outlays in a bit more detail.

**Receipts** Figure 30.3(a) shows the components of government receipts as percentages of GDP from 1990 to 2015. Total receipts fluctuate because personal income taxes and corporate income taxes fluctuate. Other receipts (Social Security taxes and indirect taxes) are a near-constant percentage of GDP.

Personal and corporate income tax receipts trended upward during the 1990s, downward during the 2000s, and then upward again after 2010.

**FIGURE 30.3** Federal Government Receipts and Outlays

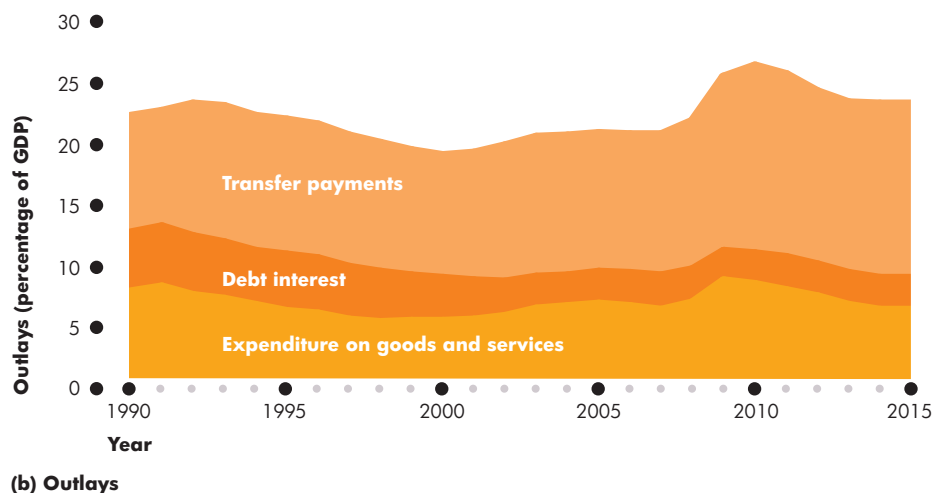


In part (a), receipts from personal and corporate income taxes (as a percentage of GDP) increased during the 1990s, and fluctuated wildly during the 2000s. The other components of receipts remained steady. Over the entire period, receipts fell slightly.

In part (b), expenditure on goods and services as a percentage of GDP decreased through 2001 but then increased because expenditure on security-related goods and services increased sharply after 2001.

Transfer payments increased through the 1990s and exploded to a new all-time high percentage of GDP by 2010, before shrinking slightly.

Debt interest decreased during the 1990s and early 2000s, helped by a shrinking budget deficit during the 1990s and low interest rates after 2008.



Source of data: Budget of the United States Government, Fiscal Year 2015, Table 14.2.

**Outlays** Figure 30.3(b) shows the components of government outlays as percentages of GDP from 1990 to 2015. Two features of government outlays stand out. First, expenditure on goods and services decreased from 1990 through 2000 and then increased. The increase after 2000 was mainly on security-related goods and services in the wake of the attacks that occurred on September 11, 2001, and defense expenditure. Second, transfer payments increased over the entire period and exploded after 2008 when the government tried to stimulate economic activity.

You've seen that the U.S. government budget deficit is large. But how does it compare to the deficits of other countries? The answer: It is one of the largest as *Economics in Action* (p. 736) shows. Of the major economies, only Japan has a larger deficit as a percentage of GDP.

Deficits bring debts, as you will now see.

### Budget Balance and Debt

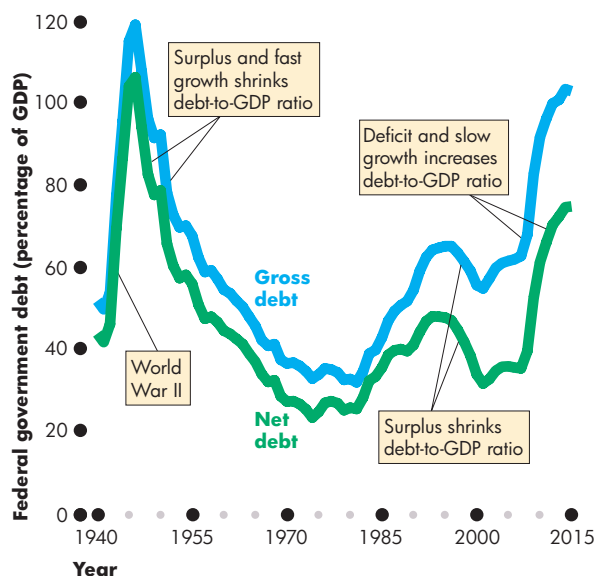
When the government has a budget deficit it borrows, and when it has a budget surplus it makes loan repayments. **Government debt** is the total amount that the government has borrowed. It is the sum of past budget deficits minus the sum of past budget surpluses. A government budget deficit increases government debt. A persistent budget deficit feeds itself: It leads to increased borrowing, which leads to larger interest payments, which in turn lead to a larger deficit. That is the story of an increasing budget deficit during the 1970s and 1980s and again today.

Figure 30.4 shows government debt since 1940, measured as a percentage of GDP—the debt-to-GDP ratio. The government debt-to-GDP ratio was at an all-time high at the end of World War II when it exceeded 110 percent. Budget surpluses and rapid economic growth, especially during the 1960s, lowered the debt-to-GDP ratio through 1974. Small budget deficits increased the ratio slightly through the 1970s, and large budget deficits increased it dramatically during the 1980s and the 1990–1991 recession.

The growth rate of the debt-to-GDP ratio slowed as the economy expanded during the mid-1990s and fell when the budget went into surplus in the late 1990s and early 2000s.

After the global financial crisis of 2008, when the budget deficit reached a record high for peacetime, and real GDP stopped growing, the debt-to-GDP ratio climbed again, and steeply.

**FIGURE 30.4** The Federal Government Debt



Government debt (the accumulation of past budget deficits minus past budget surpluses) was at its highest at the end of World War II. Debt as a percentage of GDP fell through 1974 but then started to increase. After a further brief decline during the 1990s, it exploded during the 2010s.

Source of data: *Budget of the United States Government, Fiscal Year 2015, Table 7.1.*

MyEconLab Real-time data

**Debt and Capital** Businesses and individuals incur debts to buy capital—assets that yield a return. In fact, the main point of debt is to enable people to buy assets that will earn a return that exceeds the interest paid on the debt. The government is similar to individuals and businesses in this regard. Much state government expenditure is on public assets such as highways, public schools, and universities, that yield a social return greater than the interest rate.

Federal government assets, most of which are national defense capital, were valued at \$1.8 trillion in 2013. But federal debt, at \$12.6 trillion, is seven times the value of the Federal government's capital stock. So some government debt has been incurred to finance public consumption expenditure and transfer payments, which do not have a social return. Future generations bear the cost of this debt.

## AT ISSUE

### How, Whether, and When to Balance the Federal Budget

The details change from year to year but the central issue remains: Should fiscal policy focus on stimulating demand to achieve full employment and redistribute income from the richest Americans to the middle class and the poor? Or should the focus be on strengthening the incentives to work, save, and invest and on lowering the ratio of federal debt to GDP to increase potential GDP and speed economic growth?

Both sides argue that their approach benefits the middle class and poorer Americans. Let's look at the competing proposals.

#### The Obama Budget Plan

- The President's budget plan envisions an ongoing deficit and growing debt.
- In Fiscal 2015, spending increases by less than tax revenues and the deficit shrinks by \$85 billion from 3.7 percent of GDP to 3.1 percent.
- The budget plan for 2015 through 2024 keeps the dollar value of the deficit at an average of \$500 billion a year but lowers the deficit as a percentage of GDP to 1.6 percent by 2025.
- Government debt (net of financial assets held by government) grows from \$11.5 trillion in 2014 to \$16.5 trillion in 2024, but the debt-to-GDP ratio shrinks from 75 percent to 69 percent.
- Spending cuts through 2024 arising from health savings, immigration reform, and debt interest will save \$750 billion over the decade.
- Additional spending on education, innovation, infrastructure, and security will add \$140 billion over the decade.
- Reforms in the way businesses are taxed are expected to increase tax revenues by \$150 billion over the decade.



"What I offer in this budget is a set of concrete, practical proposals to speed up growth, strengthen the middle class, and build new ladders of opportunity into the middle class—all while continuing to improve the Nation's long-run fiscal position."

*Budget Message of the President, Fiscal 2015*

#### Paul Ryan's Budget Plan

- Paul Ryan's (House Republican) budget plan seeks to balance the budget by 2023 and thereafter run a surplus that gradually lowers government debt.
- Ryan's proposed deficit slashing begins with a bang in Fiscal 2015: a cut of \$433 billion in spending and an increase of \$370 billion in tax revenues.
- The budget plan for 2015 through 2024 keeps the dollar value of the deficit at an average of less than \$100 billion a year and holds the deficit as a percentage of GDP to less than 0.5 percent.
- Government debt (net of financial assets held by government) grows only slightly and the debt-to-GDP ratio shrinks to less than 60 percent.
- Ryan get all of his savings from spending cuts. His revenue plan brings in the same number of dollars as in the President's plan.
- Healthcare is the item that takes the greatest hit, with Ryan proposing to cut Medicaid and end Obamacare, lowering spending by almost \$300 billion per year.

"Unless we change course, we will have a debt crisis. Pressed for cash, the government will take the easy way out: It will crank up the printing presses. The final stage of this intergenerational theft will be the debasement of our currency."

*The Path to Prosperity: A Responsible, Balanced Budget*  
[www.budget.house.gov](http://www.budget.house.gov)





## ECONOMICS IN ACTION

### The U.S. Government Budget in Global Perspective

How does the U.S. government budget deficit compare with those of other major economies?

#### Comparing Like with Like

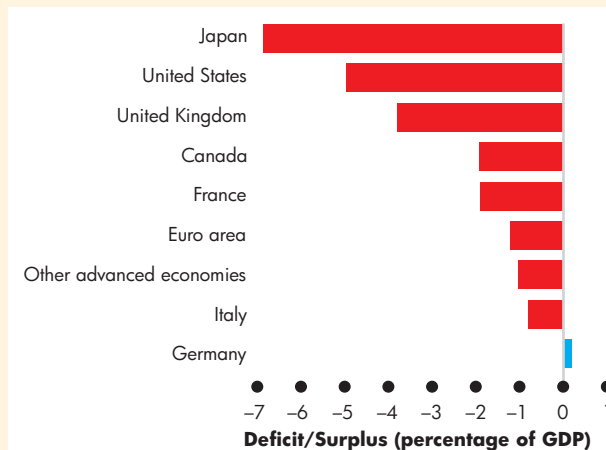
To compare the budget deficits of governments across economies, we must take into account the fact that some countries, and the United States is one of them, have large state and local governments, while others, and the United Kingdom is one, have a large central government and small local governments. These differences make the international comparison more valid at the level of total government.

#### Deficits Almost Everywhere

The figure shows the budget balances of all levels of government in eight economies in 2014. Fiscal stimulus to fight the global recession of 2008 resulted in deficits almost everywhere. Of the countries shown here, only Germany had a budget surplus in 2014.

Japan had the largest deficit and the United States had the second largest. The United Kingdom and some other European countries also had large deficits.

Italy and other advanced economies as a group, which includes the newly industrialized economies of Asia (Hong Kong, South Korea, Singapore, and Taiwan) had the smallest deficits.



**Government Budgets Around the World**

Source of data: International Monetary Fund, *World Economic Outlook*, April 2014.

## State and Local Budgets

The *total government* sector of the United States includes state and local governments as well as the federal government. In Fiscal 2015, when federal government outlays were \$4,158 billion, state and local outlays were a further \$2,700 billion. Most of these expenditures were on public schools, colleges, and universities (\$550 billion); local police and fire services; and roads.

It is the combination of federal, state, and local government receipts, outlays, and budget deficits that influences the economy. But state and local budgets are not designed to stabilize the aggregate economy. So sometimes, when the federal government cuts taxes or outlays, state and local governments do the reverse and, to a degree, cancel out the effects of the federal actions. For example, since 2000, federal taxes have decreased as a percentage of GDP, but state and local taxes and total government taxes have increased.

## REVIEW QUIZ

- 1 What is fiscal policy, who makes it, and what is it designed to influence?
- 2 What special role does the president play in creating fiscal policy?
- 3 What special roles do the Budget Committees of the House of Representatives and the Senate play in creating fiscal policy?
- 4 What is the timeline for the U.S. federal budget each year? When does a fiscal year begin and end?
- 5 Is the federal government budget today in surplus or deficit?

Work these questions in Study Plan 30.1 and get instant feedback. Do a Key Terms Quiz.

**MyEconLab**

Now that you know what the federal budget is and what the main components of receipts and outlays are, it is time to study the *effects* of fiscal policy. We begin by learning about the effects of taxes on employment, aggregate supply, and potential GDP. Then we see how fiscal policy brings redistribution across generations. Finally, we look at fiscal stimulus and see how it might be used to speed recovery from recession and stabilize the business cycle.

## Supply-Side Effects of Fiscal Policy

How do taxes on personal and corporate income affect real GDP and employment? The answer to these questions is controversial. Some economists, known as *supply-siders*, believe these effects to be large and an accumulating body of evidence suggests that they are correct. To see why these effects might be large, we'll begin with a refresher on how full employment and potential GDP are determined in the absence of taxes. Then we'll introduce an income tax and see how it changes the economic outcome.

### Full Employment and Potential GDP

You learned in Chapter 23 (pp. 584–586) how the full-employment quantity of labor and potential GDP are determined. At full employment, the real wage rate adjusts to make the quantity of labor demanded equal the quantity of labor supplied. Potential GDP is the real GDP that the full-employment quantity of labor produces.

Figure 30.5 illustrates a full-employment situation. In part (a), the demand for labor curve is  $LD$  and the supply of labor curve is  $LS$ . At a real wage rate of \$30 an hour, 250 billion hours of labor a year are employed and the economy is at full employment.

In Fig. 30.5(b), the production function is  $PF$ . When 250 billion hours of labor are employed, real GDP—which is also potential GDP—is \$16 trillion.

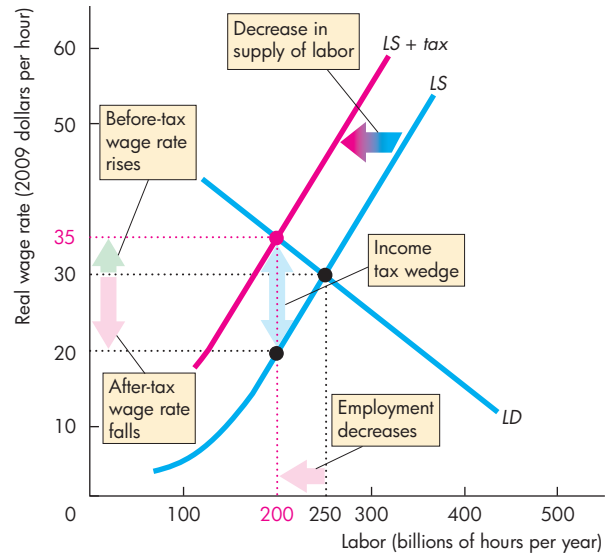
Let's now see how an income tax changes potential GDP.

### The Effects of the Income Tax

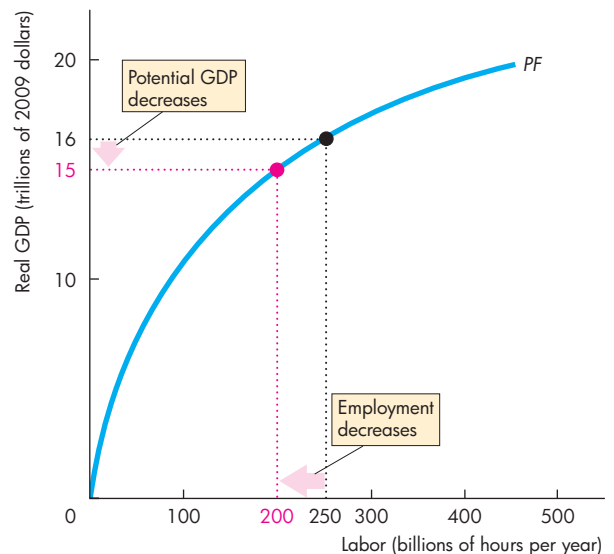
The tax on labor income influences potential GDP and aggregate supply by changing the full-employment quantity of labor. The income tax weakens the incentive to work and drives a wedge between the take-home wage of workers and the cost of labor to businesses. The result is a smaller quantity of labor and a smaller potential GDP.

Figure 30.5 shows this outcome. In the labor market, the income tax has no effect on the demand for labor, which remains at  $LD$ . The reason is that the quantity of labor that businesses plan to hire depends only on how productive labor is and what it costs—its real wage rate.

**FIGURE 30.5** The Effects of the Income Tax on Aggregate Supply



**(a) Income tax and the labor market**



**(b) Income tax and potential GDP**

In part (a), with no income tax, the real wage rate is \$30 an hour and employment is 250 billion hours. In part (b), potential GDP is \$16 trillion. An income tax shifts the supply of labor curve leftward to  $LS + tax$ . The before-tax wage rate rises to \$35 an hour, the after-tax wage rate falls to \$20 an hour, and the quantity of labor employed decreases to 200 billion hours. With less labor, potential GDP decreases.

But the supply of labor *does* change. With no income tax, the real wage rate is \$30 an hour and 250 billion hours of labor a year are employed. An income tax weakens the incentive to work and decreases the supply of labor. The reason is that for each dollar of before-tax earnings, workers must pay the government an amount determined by the income tax code. So workers look at the after-tax wage rate when they decide how much labor to supply. An income tax shifts the supply curve leftward to  $LS + tax$ . The vertical distance between the  $LS$  curve and the  $LS + tax$  curve measures the amount of income tax. With the smaller supply of labor, the *before-tax* wage rate rises to \$35 an hour but the *after-tax* wage rate falls to \$20 an hour. The gap created between the before-tax and after-tax wage rates is called the **tax wedge**.

The new equilibrium quantity of labor employed is 200 billion hours a year—less than in the no-tax case. Because the full-employment quantity of labor decreases, so does potential GDP. And a decrease in potential GDP decreases aggregate supply.

In this example, the tax rate is high—\$15 tax on a \$35 wage rate is a tax rate of about 43 percent. A lower tax rate would have a smaller effect on employment and potential GDP.

An increase in the tax rate to above 43 percent would decrease the supply of labor by more than the decrease shown in Fig. 30.5. Equilibrium employment and potential GDP would also decrease still further. A tax cut would increase the supply of labor, increase equilibrium employment, and increase potential GDP.

## Taxes on Expenditure and the Tax Wedge

The tax wedge that we've just considered is only a part of the wedge that affects labor-supply decisions. Taxes on consumption expenditure add to the wedge. The reason is that a tax on consumption raises the prices paid for consumption goods and services and is equivalent to a cut in the real wage rate.

The incentive to supply labor depends on the goods and services that an hour of labor can buy. The higher the taxes on goods and services and the lower the after-tax wage rate, the less is the incentive to supply labor. If the income tax rate is 25 percent and the tax rate on consumption expenditure is 10 percent, a dollar earned buys only 65 cents worth of goods and services. The tax wedge is 35 percent.

## ECONOMICS IN ACTION

### Some Real-World Tax Wedges

Edward C. Prescott of Arizona State University, who shared the 2004 Nobel Prize for Economic Science, has estimated the tax wedges for a number of countries, among them the United States, the United Kingdom, and France.

The U.S. tax wedge is a combination of 13 percent tax on consumption and 32 percent tax on incomes. The income tax component of the U.S. tax wedge includes Social Security taxes and is the *marginal* tax rate—the tax rate paid on the marginal dollar earned.

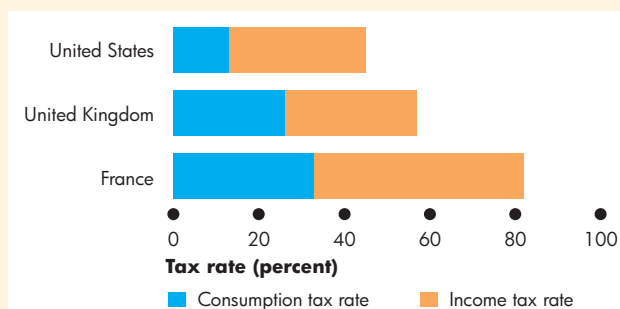
Prescott estimates that in France, tax rates on consumption are 33 percent and on incomes are 49 percent.

The estimates for the United Kingdom fall between those for the United States and France. The figure shows these components of the tax wedges in the three countries.

### Does the Tax Wedge Matter?

According to Prescott's estimates, the tax wedge has a powerful effect on employment and potential GDP. Potential GDP in France is 30 percent below that of the United States (per person), and the entire difference can be attributed to the difference in the tax wedge in the two countries.

Potential GDP in the United Kingdom is 28 percent below that of the United States (per person), and about a third of the difference arises from the different tax wedges. (The rest is due to different productivities.)



### Three Tax Wedges

Source of data: Edward C. Prescott, "Prosperity and Depression," *The American Economic Review*, Vol. 92, No. 2, Papers and Proceedings (May, 2002), pp. 39–53.

## Taxes and the Incentive to Save and Invest

A tax on interest income weakens the incentive to save and drives a wedge between the after-tax interest rate earned by savers and the interest rate paid by firms. These effects are analogous to those of a tax on labor income. But they are more serious for two reasons.

First, a tax on labor income lowers the quantity of labor employed and lowers potential GDP, while a tax on capital income lowers the quantity of saving and investment and *slows the growth rate of real GDP*.

Second, the true tax rate on interest income is much higher than that on labor income because of the way in which inflation and taxes on interest income interact. Let's examine this interaction.

**Effect of Tax Rate on Real Interest Rate** The interest rate that influences investment and saving plans is the *real after-tax interest rate*. The real *after-tax* interest rate subtracts the income tax rate paid on interest income from the real interest rate. But the taxes depend on the nominal interest rate, not the real interest rate. So the higher the inflation rate, the higher is the true tax rate on interest income. Here is an example. Suppose the real interest rate is 4 percent a year and the tax rate is 40 percent.

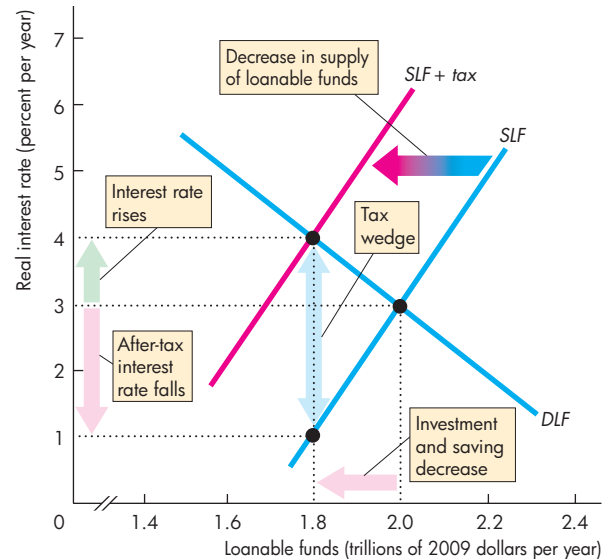
If there is no inflation, the nominal interest rate equals the real interest rate. The tax on 4 percent interest is 1.6 percent (40 percent of 4 percent), so the real after-tax interest rate is 4 percent minus 1.6 percent, which equals 2.4 percent.

If the inflation rate is 6 percent a year, the nominal interest rate is 10 percent. The tax on 10 percent interest is 4 percent (40 percent of 10 percent), so the real after-tax interest rate is 4 percent minus 4 percent, which equals zero. The true tax rate in this case is not 40 percent but 100 percent!

**Effect of Income Tax on Saving and Investment** In Fig. 30.6, initially there are no taxes. Also, the government has a balanced budget. The demand for loanable funds curve, which is also the investment demand curve, is *DLF*. The supply of loanable funds curve, which is also the saving supply curve, is *SLF*. The equilibrium interest rate is 3 percent a year, and the quantity of funds borrowed and lent is \$2 trillion a year.

A tax on interest income has no effect on the demand for loanable funds. The quantity of investment and borrowing that firms plan to undertake depends only on how productive capital is and what it costs—its

**FIGURE 30.6** The Effects of a Tax on Capital Income



The demand for loanable funds and investment demand curve is *DLF*, and the supply of loanable funds and saving supply curve is *SLF*. With no income tax, the real interest rate is 3 percent a year and investment is \$2 trillion. An income tax shifts the supply curve leftward to *SLF + tax*. The interest rate rises to 4 percent a year, the after-tax interest rate falls to 1 percent a year, and investment decreases to \$1.8 trillion. With less investment, the real GDP growth rate decreases.

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real interest rate. But a tax on interest income weakens the incentive to save and lend and decreases the supply of loanable funds. For each dollar of before-tax interest, savers must pay the government an amount determined by the tax code. So savers look at the after-tax real interest rate when they decide how much to save.

When a tax is imposed, saving decreases and the supply of loanable funds curve shifts leftward to *SLF + tax*. The amount of tax payable is measured by the vertical distance between the *SLF* curve and the *SLF + tax* curve. With this smaller supply of loanable funds, the interest rate rises to 4 percent a year but the *after-tax* interest rate falls to 1 percent a year. A tax wedge is driven between the interest rate and the after-tax interest rate, and the equilibrium quantity of loanable funds decreases. Saving and investment also decrease.



## ECONOMICS IN THE NEWS

### Taxes and the Global Location of Business

#### U.S. Firms Move Abroad to Cut Taxes

More big U.S. companies are moving abroad. Tax bills are their main reason and some are moving because they worry that U.S. taxes will rise in the future as the tax code changes to shrink the federal budget deficit.

Source: *The Wall Street Journal*, August 28, 2012

#### SOME FACTS ABOUT CORPORATE INCOME TAXES

- The U.S. corporate income tax rate is among the world's highest.
- Figure 1 shows the corporation income tax rates in a selection of countries.

#### THE QUESTIONS

- On which factor incomes does the corporate income tax fall?
- How does the U.S. corporate income tax influence investment, potential GDP, and the growth rate?
- How does the U.S. corporate income tax rate influence employment?

#### THE ANSWERS

- The corporate income tax is a tax on interest earned by capital and profit earned by entrepreneurs.
- The corporate income tax rate influences investment and the level and growth rate of potential GDP by driving a wedge between the interest paid by borrowers and the interest earned by lenders.
- Figure 2 illustrates the corporate income tax wedge in the market for loanable funds.
- The demand for loanable funds is  $DLF$  and with no corporate income tax, the supply of loanable funds is  $SLF$ . The equilibrium real interest rate is 3.4 percent a year and this quantity of loanable funds finances saving and investment of \$2.5 trillion. (The numbers are assumed but realistic.)
- With the tax wedge from the U.S. 40 percent corporate tax rate, the supply of loanable funds curve is  $SLF + U.S. tax$ . The real interest rate is 4 percent and investment and saving are only \$2 trillion.
- With the smaller tax wedge from Canada's 26 percent corporate tax rate, the supply of loanable funds curve is  $SLF + Canada tax$ . The real interest rate is lower at 3.8 percent a year and investment

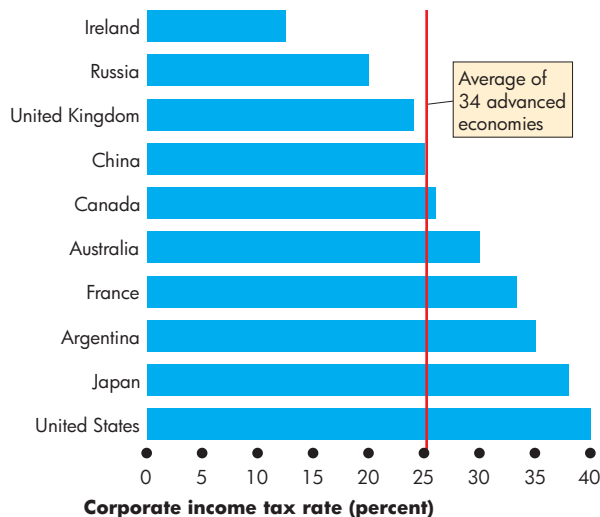


Figure 1 International Comparison of Corporate Income Tax Rates

and saving are higher at \$2.2 trillion.

- A smaller amount of saving and investment means a smaller capital stock, smaller potential GDP, and a slower growth rate of potential GDP.
- A smaller capital stock means that labor is less productive, the demand for labor is lower, and the quantity of labor employed is smaller.
- The high U.S. corporate income tax rate lowers incomes and costs jobs.

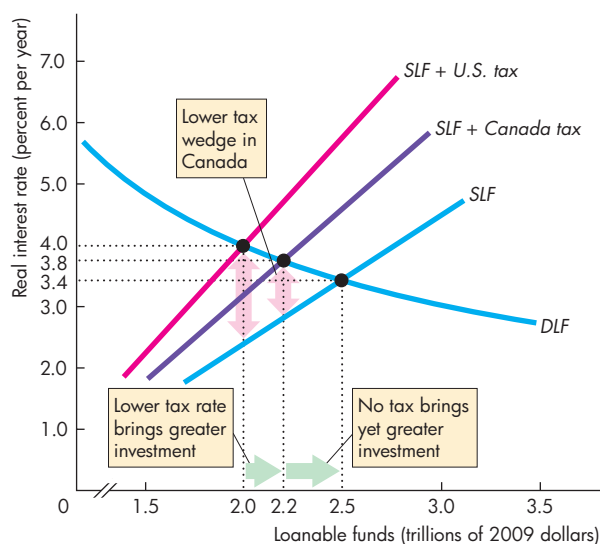


Figure 2 How the Corporate Tax Rate Changes Saving and Investment

## Tax Revenues and the Laffer Curve

An interesting consequence of the effect of taxes on employment and saving is that a higher tax *rate* does not always bring greater tax *revenue*. A higher tax rate brings in more revenue per dollar earned. But because a higher tax rate decreases the number of dollars earned, two forces operate in opposite directions on the tax revenue collected.

The relationship between the tax rate and the amount of tax revenue collected is called the **Laffer curve**. The curve is so named because Arthur B. Laffer, a member of President Reagan's Economic Policy Advisory Board, drew such a curve on a table napkin and launched the idea that tax *cuts* could *increase* tax revenue.

Figure 30.7 shows a Laffer curve. The tax *rate* is on the  $x$ -axis, and total tax *revenue* is on the  $y$ -axis. For tax rates below  $T^*$ , an increase in the tax rate increases tax revenue; at  $T^*$ , tax revenue is maximized; and a tax rate increase above  $T^*$  decreases tax revenue.

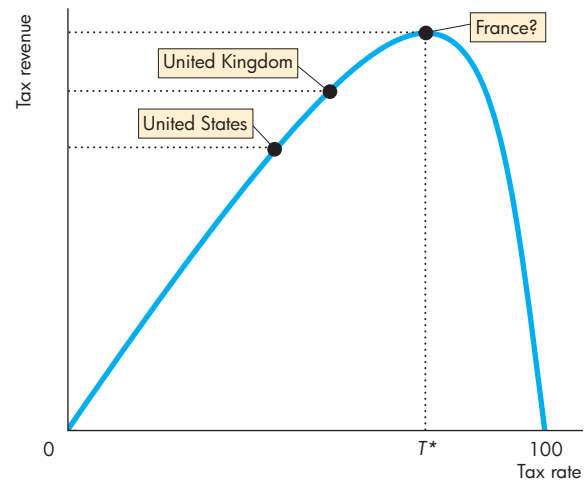
Most people think that the United States is on the upward-sloping part of the Laffer curve; so is the United Kingdom. But France might be close to the maximum point or perhaps even beyond it.

## The Supply-Side Debate

Before 1980, few economists paid attention to the supply-side effects of taxes on employment and potential GDP. Then, when Ronald Reagan took office as president, a group of supply-siders began to argue the virtues of cutting taxes. Arthur Laffer was one of them. Laffer and his supporters were not held in high esteem among mainstream economists, but they were influential for a period. They correctly argued that tax cuts would increase employment and increase output. But they incorrectly argued that tax cuts would increase tax revenues and decrease the budget deficit. For this prediction to be correct, the United States would have had to be on the “wrong” side of the Laffer curve. Given that U.S. tax rates are among the lowest in the industrial world, it is unlikely that this condition was met. And when the Reagan administration did cut taxes, the budget deficit increased, a fact that reinforces this view.

Supply-side economics became tarnished because of its association with Laffer and came to be called “voodoo economics.” But mainstream economists, including Martin Feldstein, a Harvard professor who was Reagan's chief economic adviser, recognized the

**FIGURE 30.7** A Laffer Curve



A Laffer curve shows the relationship between the tax rate and tax revenues. For tax rates below  $T^*$ , an increase in the tax rate increases tax revenue. At the tax rate  $T^*$ , tax revenue is maximized. For tax rates above  $T^*$ , an increase in the tax rate decreases tax revenue.

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power of tax cuts as incentives but took the standard view that tax cuts without spending cuts would swell the budget deficit and bring further serious problems. This view is now widely accepted by economists of all political persuasions.

## REVIEW QUIZ

- 1 How does a tax on labor income influence the equilibrium quantity of employment?
- 2 How does the tax wedge influence potential GDP?
- 3 Why are consumption taxes relevant for measuring the tax wedge?
- 4 Why are income taxes on capital income more powerful than those on labor income?
- 5 What is the Laffer curve and why is it unlikely that the United States is on the “wrong” side of it?

Work these questions in Study Plan 30.2 and get instant feedback. Do a Key Terms Quiz.

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You now know how taxes influence potential GDP and saving and investment. Next we look at the intergenerational effects of fiscal policy.

## Generational Effects of Fiscal Policy

Is a budget deficit a burden on future generations? If it is, how will the burden be borne? And is the budget deficit the only burden on future generations? What about the deficit in the Social Security fund? Does it matter who owns the bonds that the government sells to finance its deficit? What about the bonds owned by foreigners? Won't repaying those bonds impose a bigger burden than repaying bonds owned by Americans?

To answer questions like these, we use a tool called **generational accounting**—an accounting system that measures the lifetime tax burden and benefits of each generation. This accounting system was developed by Alan Auerbach of the University of Pennsylvania and Laurence Kotlikoff of Boston University. Generational accounts for the United States have been prepared by Jagadeesh Gokhale of the Cato Institute and Kent Smetters of the Wharton School at the University of Pennsylvania.

### Generational Accounting and Present Value

Income taxes and Social Security taxes are paid by people who have jobs. Social Security benefits are paid to people after they retire. So to compare taxes and benefits, we must compare the value of taxes paid by people during their working years with the benefits received in their retirement years. To compare the value of an amount of money at one date with that at a later date, we use the concept of present value. A *present value* is an amount of money that, if invested today, will grow to equal a given future amount when the interest that it earns is taken into account. We can compare dollars today with dollars in 2065 or any other future year by using present values.

For example, if the interest rate is 5 percent a year, \$1,000 invested today will grow, with interest, to \$11,467 after 50 years. So the present value (in 2015) of \$11,467 in 2065 is \$1,000.

By using present values, we can assess the magnitude of the government's debts to older Americans in the form of pensions and medical benefits.

But the assumed interest rate and growth rate of taxes and benefits critically influence the answers we get. For example, at an interest rate of 3 percent a year, the present value (in 2015) of \$11,467 in 2065

is \$2,616. The lower the interest rate, the greater is the present value of a given future amount.

Because there is uncertainty about the proper interest rate to use to calculate present values, plausible alternative numbers are used to estimate a range of present values.

Using generational accounting and present values, economists have studied the situation facing the federal government arising from its Social Security obligations, and they have found a time bomb!

### The Social Security Time Bomb

When Social Security was introduced in the New Deal of the 1930s, today's demographic situation was not foreseen. The age distribution of the U.S. population today is dominated by the surge in the birth rate after World War II that created what is called the "baby boom generation." There are 77 million "baby boomers."

The first of the baby boomers started collecting Social Security pensions in 2008 and in 2011 they became eligible for Medicare benefits. By 2030, all the baby boomers will have reached retirement age and the population supported by Social Security and Medicare benefits will have doubled.

Under the existing laws, the federal government has an obligation to this increasing number of citizens to pay pensions and Medicare benefits on an already declared scale. These obligations are a debt owed by the government and are just as real as the bonds that the government issues to finance its current budget deficit.

To assess the full extent of the government's obligations, economists use the concept of fiscal imbalance. **Fiscal imbalance** is the present value of the government's commitments to pay benefits minus the present value of its tax revenues. Fiscal imbalance is an attempt to measure the scale of the government's true liabilities.

In an update, Gokhale estimates that the Social Security and Medicare fiscal imbalance was \$68 trillion in 2014. To put the \$68 trillion in perspective, note that U.S. GDP in 2014 was \$17 trillion. So the fiscal imbalance was 4 times the value of one year's production. Furthermore, the fiscal imbalance grows every year by an amount that in 2014 was approaching \$2 trillion.

These are enormous numbers and point to a catastrophic future. How can the federal government meet its Social Security obligations? Gokhale and

Smetters consider four alternatives. They are

- Raise income taxes
- Raise Social Security taxes
- Cut Social Security benefits
- Cut federal government discretionary spending

Gokhale and Smetters estimate that if we had started in 2003 and made only one of these changes, income taxes would need to be raised by 69 percent, or Social Security taxes raised by 95 percent, or Social Security benefits cut by 56 percent. Even if the government stopped all its discretionary spending, including that on national defense, it would not be able to pay its bills. By combining the four measures, the pain from each could be lessened, but the pain would still be severe.

A further way of meeting these obligations is to pay by printing money. As you learned in Chapter 25 (see pp. 646–647), the consequence of this solution would be a seriously high inflation rate.

## Generational Imbalance

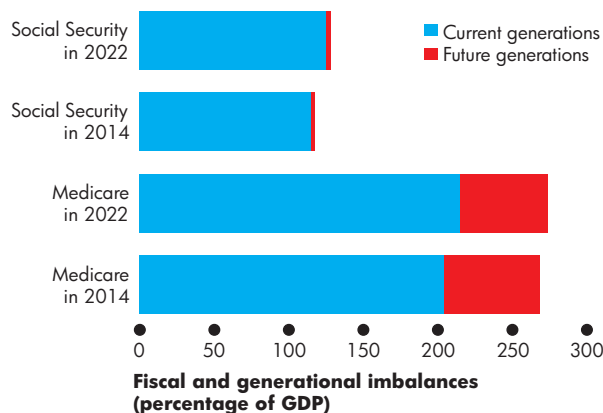
A fiscal imbalance must eventually be corrected and when it is, people either pay higher taxes or receive lower benefits. The concept of generational imbalance tells us who will pay. **Generational imbalance** is the division of the fiscal imbalance between the current and future generations, assuming that the current generation will enjoy the existing levels of taxes and benefits.

Figure 30.8 shows an estimate of how the fiscal imbalance is distributed across the current generation (those born before 1988) and the future generation (those born in or after 1988). The generational imbalance also shows that the major source of the imbalance is Medicare. Social Security pension benefits create a fiscal imbalance, but these benefits will be more than fully paid for by the current generation. But the current generation will not pay for all its Medicare costs, and the balance will fall on future generations. If we sum all the items, the current generation will pay 83 percent and future generations will pay 17 percent of the fiscal imbalance.

Because the estimated fiscal imbalance is so large, it is not possible to predict how it will be resolved. But we can predict that the outcome will involve both lower benefits and higher taxes, or paying bills with new money and creating inflation.

The Fed would have to cooperate if inflation were to be used to deal with the imbalance, and this cooperation might be hard to obtain.

**FIGURE 30.8** Fiscal and Generational Imbalances



The bars show the scale of the fiscal imbalance. The largest component at more than 250 percent of GDP is Medicare benefits. These benefits are also the main component of the generational imbalance. Social Security pensions are paid for entirely by the current generation.

Source of data: Jagadeesh Gokhale, *The Government Debt Iceberg*, The Institute of Economic Affairs, London, 2014.

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## International Debt

So far in our discussion of government deficits and debts, we've ignored the role played by the rest of the world. We'll conclude this discussion by considering the role and magnitude of international debt.

You've seen that borrowing from the rest of the world is one source of loanable funds. And you've also seen that this source of funds became larger during the late 1990s and 2000s.

How large is the contribution of the rest of the world? How much business investment have we paid for by borrowing from the rest of the world? And how much U.S. government debt is held abroad?

Table 30.2 answers these questions. In June 2014, the United States had a net debt to the rest of the world of \$11.7 trillion. Of that debt, \$5.8 trillion was U.S. government borrowing—about 48 percent of total U.S. government debt. U.S. corporations had used \$8.6 trillion of foreign funds (in bonds and equities).

The international debt of the United States is important because, when that debt is repaid, the United States will transfer real resources to the rest of



**TABLE 30.2** What the United States Owed the Rest of the World in June 2014

	\$ trillions
<b>(a) U.S. liabilities</b>	
Deposits in U.S. banks	1.2
U.S. government securities	5.8
U.S. corporate bonds and equities	8.6
Other items (net)	-3.9
<b>Total</b>	<b>11.7</b>
<b>(b) U.S. government securities</b>	
Held by rest of world	5.8
Held in the United States	6.2
<b>Total</b>	<b>12.0</b>

Source of data: Federal Reserve Board.

the world. Instead of running a large net exports deficit, the United States will need a surplus of exports over imports. To make a surplus possible, U.S. saving must increase and consumption must decrease. Some tough choices lie ahead.

## REVIEW QUIZ

- 1 What is a present value?
- 2 Distinguish between fiscal imbalance and generational imbalance.
- 3 How large was the estimated U.S. fiscal imbalance in 2014 and how did it divide between current and future generations?
- 4 What is the source of the U.S. fiscal imbalance and what are the painful choices that we face?
- 5 How much of U.S. government debt is held by the rest of the world?

Work these questions in Study Plan 30.3 and get instant feedback. Do a Key Terms Quiz.

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You now know how the supply-side effects of fiscal policy work and you've seen the shocking scale of fiscal imbalance. We conclude this chapter by looking at fiscal policy as a tool for fighting a recession.

## Fiscal Stimulus

The 2008–2009 recession brought Keynesian macroeconomic ideas (see Chapter 27, pp. 702–703) back into fashion and put a spotlight on **fiscal stimulus**—the use of fiscal policy to increase production and employment. But whether fiscal policy is truly stimulating, and if so, how stimulating, are questions that generate much discussion and disagreement. You're now going to explore these questions.

Fiscal stimulus can be either *automatic* or *discretionary*. A fiscal policy action that is triggered by the state of the economy with no action by government is called **automatic fiscal policy**. The increase in total unemployment benefits triggered by the massive rise in the unemployment rate through 2009 is an example of automatic fiscal policy.

A fiscal policy action initiated by an act of Congress is called **discretionary fiscal policy**. It requires a change in a spending program or in a tax law. A fiscal stimulus act passed by Congress in 2009 (see *Economics in Action* on p. 784) is an example of discretionary fiscal policy.

Whether automatic or discretionary, an increase in government outlays or a decrease in government receipts can stimulate production and jobs. An increase in expenditure on goods and services directly increases aggregate expenditure. And an increase in transfer payments (such as unemployment benefits) or a decrease in tax revenues increases disposable income, which enables people to increase consumption expenditure. Lower taxes also strengthen the incentives to work and invest.

We'll begin by looking at automatic fiscal policy and the interaction between the business cycle and the budget balance.

## Automatic Fiscal Policy and Cyclical and Structural Budget Balances

Two items in the government budget change automatically in response to the state of the economy. They are *tax revenues* and *needs-tested spending*.

**Automatic Changes in Tax Revenues** The tax laws that Congress enacts don't legislate the number of tax *dollars* the government will raise. Rather they define the tax *rates* that people must pay. Tax dollars paid depend on tax rates and incomes. But incomes vary with real GDP, so tax revenues depend on real GDP. When real GDP increases in a business cycle

expansion, wages and profits rise, so tax revenues from these incomes rise. When real GDP decreases in a recession, wages and profits fall, so tax revenues fall.

**Needs-Tested Spending** The government creates programs that pay benefits to qualified people and businesses. The spending on these programs results in transfer payments that depend on the economic state of individual citizens and businesses. When the economy expands, unemployment falls, the number of people experiencing economic hardship decreases, so needs-tested spending decreases. When the economy is in a recession, unemployment is high and the number of people experiencing economic hardship increases, so needs-tested spending on unemployment benefits and food stamps increases.

**Automatic Stimulus** Because government receipts fall and outlays increase in a recession, the budget provides automatic stimulus that helps to shrink the recessionary gap. Similarly, because receipts rise and outlays decrease in a boom, the budget provides automatic restraint to shrink an inflationary gap.

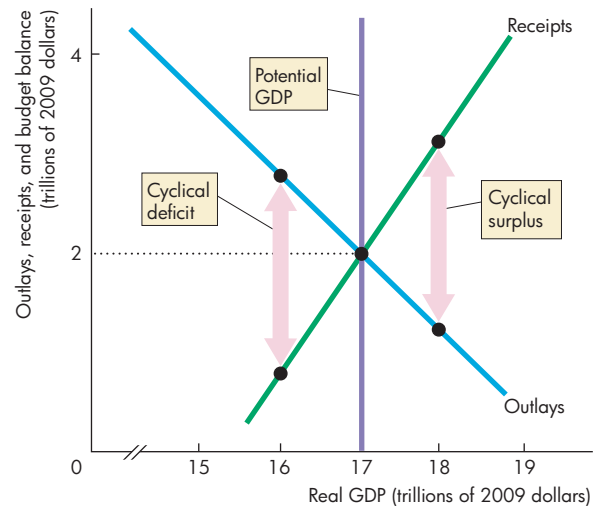
**Cyclical and Structural Budget Balances** To identify the government budget deficit that arises from the business cycle, we distinguish between the **structural surplus or deficit**, which is the budget balance that would occur if the economy were at full employment, and the **cyclical surplus or deficit**, which is the actual surplus or deficit *minus* the structural surplus or deficit.

Figure 30.9 illustrates these concepts. Outlays *decrease* as real GDP *increases*, so the outlays curve slopes downward; and receipts *increase* as real GDP *increases*, so the receipts curve slopes upward.

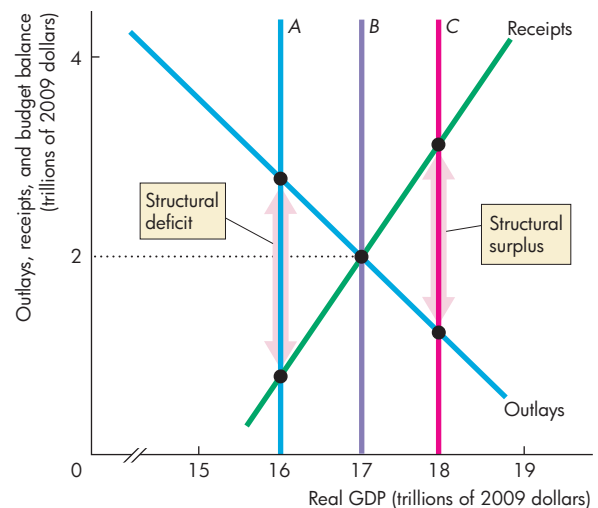
In Fig. 30.9(a), potential GDP is \$17 trillion and if real GDP equals potential GDP, the government has a *balanced budget*. There is no structural surplus or deficit. But there might be a cyclical surplus or deficit. If real GDP is less than potential GDP at \$16 trillion, outlays exceed receipts and there is a *cyclical deficit*. If real GDP is greater than potential GDP at \$18 trillion, outlays are less than receipts and there is a *cyclical surplus*.

In Fig. 30.9(b), if potential GDP equals \$17 trillion (line B), the *structural balance is zero*. But if potential GDP is \$16 trillion (line A), the government budget has a *structural deficit*. And if potential GDP is \$18 trillion (line C), the government budget has a *structural surplus*.

**FIGURE 30.9** Cyclical and Structural Surpluses and Deficits



**(a) Cyclical deficit and cyclical surplus**



**(b) Structural deficit and structural surplus**

In part (a), potential GDP is \$17 trillion. When real GDP is less than potential GDP, the budget is in deficit and it is a *cyclical deficit*. When real GDP exceeds potential GDP, the budget is in surplus and it is a *cyclical surplus*. The government has a *balanced budget* when real GDP equals potential GDP.

In part (b), if potential GDP is \$16 trillion, the deficit is a *structural deficit* and if potential GDP is \$18 trillion, the surplus is a *structural surplus*. If potential GDP is \$17 trillion, the budget is in structural balance.

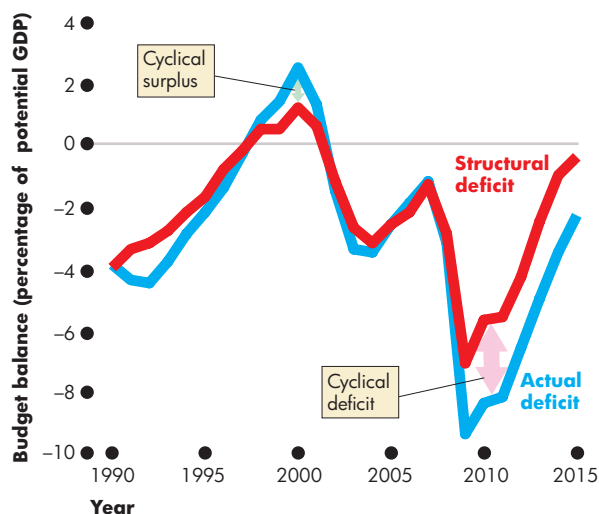
**U.S. Structural Budget Balance in 2014** The U.S. federal budget in 2014 was in deficit at \$0.64 trillion and the recessionary gap (the gap between real GDP and potential GDP) was \$0.7 trillion. With a large recessionary gap, you would expect some of the deficit to be cyclical. But how much of the 2014 deficit was cyclical and how much was structural?

The Congressional Budget Office (CBO) answers this question by analyzing the detailed items in the budget. According to the CBO, the cyclical deficit in 2014 was \$0.18 trillion and the structural deficit was \$0.46 trillion. Figure 30.10 shows the cyclical and structural deficit between 1990 and 2015.

You can see that the structural deficit was small in 2007, increased in 2008, and exploded in 2009. The 2009 fiscal stimulus package (see *Economics in Action*) created most of this structural deficit.

When full employment returns, which the CBO says will be in 2018, the cyclical deficit will vanish. But the structural deficit must be addressed by further acts of Congress. No one knows the discretionary measures that will be taken to reduce the structural deficit and this awkward fact creates enormous uncertainty.

**FIGURE 30.10** U.S. Cyclical and Structural Budget Balance



As real GDP shrank in the 2008–2009 recession, receipts fell, outlays increased, and the budget deficit increased. But the cyclical deficit is small compared to the actual deficit.

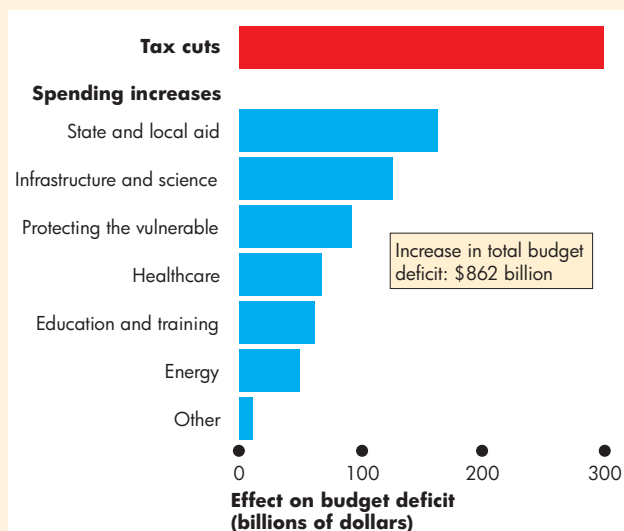
Source of data: Congressional Budget Office.

## ECONOMICS IN ACTION

### The 2009 Fiscal Stimulus Package

Congress passed the *American Recovery and Reinvestment Act of 2009* (the 2009 Fiscal Stimulus Act) in February 2009, and President Obama signed it into law at an economic forum he hosted in Denver. This act was the third and most ambitious in a series of stimulus packages and its purpose was to increase investment and consumer expenditure and lead to the creation of jobs.

The total package added \$862 billion to the federal government's budget deficit: \$288 billion from tax cuts and the rest from increased spending. The spending increases included payments to state and local governments (\$144 billion), spending on infrastructure and science projects (\$111 billion), and programs in healthcare (\$59 billion), education and training (\$53 billion), and energy (\$43 billion).



**The Components of the 2009 Fiscal Stimulus Act**



The president signs the 2009 fiscal stimulus act.

## Discretionary Fiscal Stimulus

Most discussion of *discretionary* fiscal stimulus focuses on its effects on aggregate demand. But you've seen (on pp. 775–777) that taxes influence aggregate supply and that the balance of taxes and spending—the government budget deficit—can crowd out investment and slow the pace of economic growth. So discretionary fiscal stimulus has both supply-side and demand-side effects that end up determining its overall effectiveness.

We're going to begin our examination of discretionary fiscal stimulus by looking at its effects on aggregate demand.

**Fiscal Stimulus and Aggregate Demand** Changes in government expenditure and changes in taxes change aggregate demand by their influence on spending plans, and they also have multiplier effects.

Let's look at the two main fiscal policy multipliers: the government expenditure multiplier and tax multipliers.

The **government expenditure multiplier** is the quantitative effect of a change in government expenditure on real GDP. Because government expenditure is a component of aggregate expenditure, an increase in government spending increases aggregate expenditure and real GDP. But does a \$1 billion increase in government expenditure increase real GDP by \$1 billion, or more than \$1 billion, or less than \$1 billion?

When an increase in government expenditure increases real GDP, incomes rise and the higher incomes bring an increase in consumption expenditure. If this were the only consequence of increased government expenditure, the government expenditure multiplier would be greater than 1.

But an increase in government expenditure increases government borrowing (or decreases government lending if there is a budget surplus) and raises the real interest rate. With a higher cost of borrowing, investment decreases, which partly offsets the increase in government spending. If this were the only consequence of increased government expenditure, the multiplier would be less than 1.

The actual multiplier depends on which of the above effects is stronger and the consensus is that the crowding-out effect is strong enough to make the government expenditure multiplier less than 1.

The **tax multiplier** is the quantitative effect of a change in taxes on real GDP. The demand-side effects of a tax cut are likely to be smaller than an equivalent increase in government expenditure. The reason is that a tax cut influences aggregate demand by increasing

disposable income, only part of which gets spent. So the initial injection of expenditure from a \$1 billion tax cut is less than \$1 billion.

A tax cut has similar crowding-out consequences to a spending increase. It increases government borrowing (or decreases government lending), raises the real interest rate, and cuts investment.

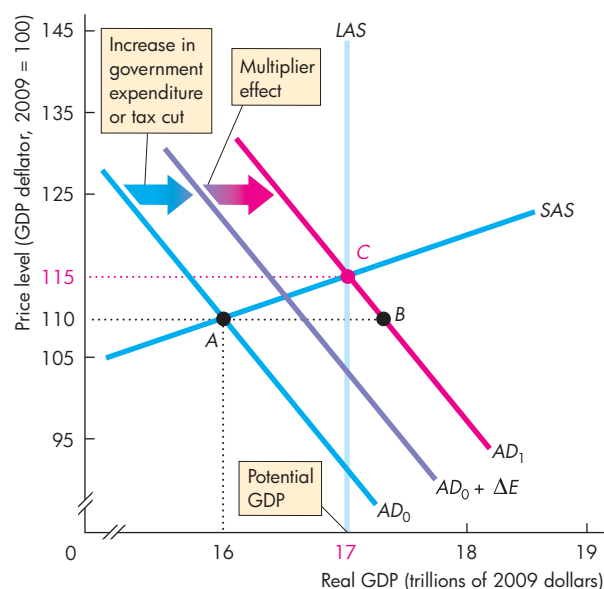
The tax multiplier effect on aggregate demand depends on these two opposing effects and is probably quite small.

**Graphical Illustration of Fiscal Stimulus** Figure 30.11 shows how fiscal stimulus is supposed to work if it is perfectly executed and has its desired effects.

Potential GDP is \$17 trillion and real GDP is below potential at \$16 trillion so the economy has a recessionary gap of \$1 trillion.

To restore full employment, the government passes a fiscal stimulus package. An increase in

**FIGURE 30.11** Expansionary Fiscal Policy



Potential GDP is \$17 trillion, real GDP is \$16 trillion, and there is a \$1 trillion recessionary gap. An increase in government expenditure and a tax cut increase aggregate expenditure by  $\Delta E$ . The multiplier increases consumption expenditure. The AD curve shifts rightward to  $AD_1$ , the price level rises to 115, real GDP increases to \$17 trillion, and the recessionary gap is eliminated.



government expenditure and a tax cut increase aggregate expenditure by  $\Delta E$ . If this were the only change in spending plans, the  $AD$  curve would shift rightward to become the curve labeled  $AD_0 + \Delta E$  in Fig. 30.11. But if fiscal stimulus sets off a multiplier process that increases consumption expenditure, and does not crowd out much investment expenditure, aggregate demand increases further and the  $AD$  curve shifts to  $AD_1$ .

With no change in the price level, the economy would move from point  $A$  to point  $B$  on  $AD_1$ . But the increase in aggregate demand brings a rise in the price level along the upward-sloping  $SAS$  curve and the economy moves to point  $C$ .

At point  $C$ , the economy returns to full employment and the recessionary gap is eliminated.

**Fiscal Stimulus and Aggregate Supply** You've seen earlier in this chapter that taxes influence aggregate supply. A tax on labor income (on wages) drives a wedge between the cost of labor and the take-home pay of workers and lowers employment and output (p. 776). A tax on capital income (on interest) drives a wedge between the cost of borrowing and the return to lending and lowers saving and investment (p. 777). With less saving and investment, the real GDP growth rate slows.

These negative effects of taxes on real GDP and its growth rate and on employment mean that a tax *cut* increases real GDP and its growth rate and increases employment.

These supply-side effects of a tax cut occur along with the demand-side effects and are probably much larger than the demand-side effects and make the overall tax multiplier much larger than the government expenditure multiplier—see *Economics in Action*.

An increase in government expenditure financed by borrowing increases the demand for loanable funds and raises the real interest rate, which in turn lowers investment and private saving. This cut in investment is the main reason why the government expenditure multiplier is so small and why a deficit-financed increase in government spending ends up making only a small contribution to job creation. And because government expenditure crowds out investment, it lowers future real GDP.

So a fiscal stimulus package that is heavy on tax cuts and light on government spending works. But an increase in government expenditure alone is not an effective way to stimulate production and create jobs.

The description of the effects of discretionary fiscal stimulus and its graphical illustration in Fig. 30.11 make it look easy: Calculate the recessionary gap and the multipliers, change government expenditure and taxes, and eliminate the gap. In reality, things are not that easy.

Getting the magnitude and the timing right is difficult, and we'll now examine this challenge.

**Magnitude of Stimulus** Economists have diverging views about the size of the government spending and tax multipliers because there is insufficient empirical evidence on which to pin their size with accuracy. This fact makes it impossible for Congress to determine the amount of stimulus needed to close a given

## ECONOMICS IN ACTION

### How Big Are the Fiscal Stimulus Multipliers?

When the 2009 fiscal stimulus package cut taxes by \$300 billion and increased government spending by a little over \$500 billion, by how much did aggregate expenditure and real GDP change? How big were the fiscal policy multipliers? Was the government expenditure multiplier larger than the tax multiplier? These questions are about the multiplier effects on *equilibrium real GDP*, not just on aggregate demand.

President Obama's chief economic adviser in 2009, Christina Romer, a University of California, Berkeley, professor, expected the government expenditure multiplier to be about 1.5. So she was expecting the spending increase of \$500 billion to go a long way toward closing the \$1 trillion output gap by some time in 2010.

Robert Barro, a professor at Harvard University, says this multiplier number is not in line with previous experience. Based on his calculations, an additional \$500 billion of government spending would increase aggregate expenditure by only \$250 billion because it would lower private spending in a crowding-out effect by \$250 billion—the multiplier is 0.5.

Harald Uhlig, a professor at the University of Chicago, says that the government expenditure multiplier on real GDP is even smaller and lies between 0.3 and 0.4, so that a \$500 billion increase in government spending increases aggregate expenditure by between \$150 billion and \$200 billion.

output gap. Further, the actual output gap is not known and can only be estimated with error. For these two reasons, discretionary fiscal policy is risky.

**Time Lags** Discretionary fiscal stimulus actions are also seriously hampered by three time lags:

- Recognition lag
- Law-making lag
- Impact lag

**Recognition Lag** The recognition lag is the time it takes to figure out that fiscal policy actions are needed. This process involves assessing the current state of the economy and forecasting its future state.

There is greater agreement about tax multipliers. Because tax cuts strengthen the incentive to work and to invest, they increase aggregate supply as well as aggregate demand.

These multipliers get bigger as more time elapses. Harald Uhlig says that after one year, the tax multiplier is 0.5 so that the \$300 billion tax cut would increase real GDP by about \$150 billion by early 2010. But with two years of time to respond, real GDP would be \$600 billion higher—a multiplier of 2. And after three years, the tax multiplier builds up to more than 6.

The implications of the work of Barro and Uhlig are that tax cuts are a powerful way to stimulate real GDP and employment but spending increases are not effective.

Christina Romer agrees that the economy hasn't performed in line with a multiplier of 1.5 but says other factors deteriorated and without the fiscal stimulus, the outcome would have been even worse.



Christina Romer: 1.5



Robert Barro: 0.5



Harald Uhlig: 0.4

**Law-Making Lag** The *law-making lag* is the time it takes Congress to pass the laws needed to change taxes or spending. This process takes time because each member of Congress has a different idea about what is the best tax or spending program to change, so long debates and committee meetings are needed to reconcile conflicting views. The economy might benefit from fiscal stimulation today, but by the time Congress acts, a different fiscal medicine might be needed.

**Impact Lag** The *impact lag* is the time it takes from passing a tax or spending change to its effects on real GDP being felt. This lag depends partly on the speed with which government agencies can act and partly on the timing of changes in spending plans by households and businesses. These changes are spread out over a number of quarters and possibly a number of years.

Economic forecasting is steadily improving, but it remains inexact and subject to error. The range of uncertainty about the magnitudes of the spending and tax multipliers make discretionary fiscal stimulus an imprecise tool for boosting production and jobs and the crowding out consequences raise serious questions about its effects on long-term economic growth.

## REVIEW QUIZ

- 1 What is the distinction between automatic and discretionary fiscal policy?
- 2 How do taxes and needs-tested spending programs work as automatic fiscal policy to dampen the business cycle?
- 3 How do we tell whether a budget deficit needs discretionary action to remove it?
- 4 How can the federal government use discretionary fiscal policy to stimulate the economy?
- 5 Why might fiscal stimulus crowd out investment?

Work these questions in Study Plan 30.4 and get instant feedback. Do a Key Terms Quiz.

**MyEconLab**

◆ You've now seen the effects of fiscal policy, and *Economics in the News* on pp. 788–789 applies what you've learned to examine Japan's extreme situation and the fiscal policy challenge it faces.

# A Fiscal Policy Challenge

## Japanese Debt: Still Climbing

*The Financial Times*

March 24, 2014

Last summer Takeshi Fujimaki ran for parliament on a platform of economic Armageddon. Japan's debt was out of control, he told voters, and it was only a matter of time before everyone dumped government bonds, sending yields soaring, and the yen skittering all the way to 1,000 against the dollar. ...

Mr. Fujimaki is not a lone crank. Although few share his sense of abject despair, no one disputes that Japan's debt is worryingly high. The International Monetary Fund and OECD both warn that deep cuts to spending must be made, beyond the government's basic pledge to balance its books—excluding debt-servicing costs—by 2020. ...

Last ... week the Diet waved through its biggest budget for the fiscal year ahead. Gross debt issuance comes to a record Y182tn (\$1.78tn), about the same size as the economy of India. ...

Mr. Abe is going all-out for growth because he has to. Barring the type of scenario outlined by Mr. Fujimaki, only growth can fix its debt problem. ...

State finances have deteriorated partly because of demography. Social Security payments to a fast-ageing population have nearly tripled since 1990 to Y31tn—about a third of the total budget—in the fiscal year beginning in April. ...

But the real problem is that as the economy languished, Japan collected less and less tax, forcing the state to borrow to plug gaps between income and expenditure. ...

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### ESSENCE OF THE STORY

- Since 1990, slow real GDP growth has lowered tax revenues, a fast-ageing population has nearly tripled Social Security payments, and Japan's government debt has soared.
- Only faster real GDP growth or inflation can fix Japan's debt problem.
- The government has pledged to have no deficit—excluding debt interest—by 2020.
- The IMF and OECD say even deeper government spending cuts must be made.
- In March 2014, the Diet (parliament) passed its biggest budget ever, borrowing 182 trillion yen (\$1.78 trillion).

**MyEconLab** More Economics in the News

## ECONOMIC ANALYSIS

- Japan's fiscal policy challenge described in the news article is finding a way to stop and then reverse an ever rising government debt ratio—government debt as a percentage of GDP.
- Figure 1 shows the scale and upward direction of the problem. Gross debt was 250 percent of GDP in 2014, up from about 70 percent in 1990.
- The news article says that only faster growth or inflation can fix the debt problem. The debt ratio =  $\text{Debt} \div \text{GDP}$ . And  $\text{GDP} = PY$ , where  $P$  is the price level and  $Y$  is real GDP, so the debt ratio =  $\text{Debt} \div PY$ . Faster growth increases  $Y$  faster and inflation increases  $P$  faster, either of which lowers the debt ratio.
- There is a third way to fix the debt problem: Cut government spending. And that is the only effective way. The reason is that high government spending crowds out investment and without an increase in investment, real GDP cannot grow faster.
- Figure 2 shows how government spending has crowded out investment. In 1990, investment at 34 percent of GDP was larger than government spending (expenditure on goods and services and transfer payments) at 30 percent. By 2014, investment had shrunk to 20 percent and government spending had increased to 40 percent of GDP.
- The problem with cutting government spending is that in the short run, it decreases aggregate demand and widens the output gap.
- Figure 3 illustrates this short-run consequence of a government spending cut.
- In 2013, Japan's potential GDP was 537 trillion yen, shown by the long-run aggregate supply curve,  $LAS$ . The short-run aggregate supply curve was  $SAS$ .
- With the 2013 aggregate demand curve  $AD_0$ , real GDP was 525 trillion yen and the price level was 91 (91 percent of its 2009 level).
- Japan was experiencing stagnation and deflation.
- A fiscal policy aimed at cutting government expenditure and lowering the budget deficit by also increasing taxes would decrease aggregate demand.
- If aggregate demand decreased to  $AD_1$ , real GDP would decrease to 500 trillion yen and the recessionary gap would widen.
- Monetary policy might be used alongside fiscal policy to avoid this outcome and prevent real GDP from falling.
- Japan's government budget and debt is an extreme version of the United States'.

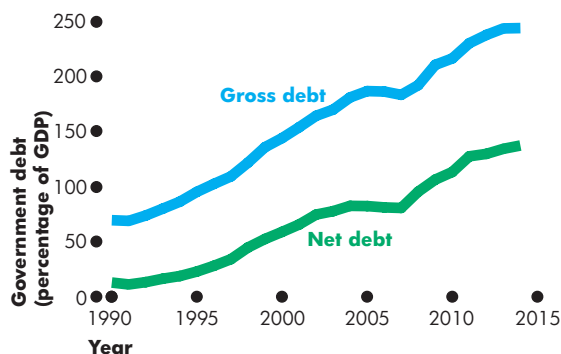


Figure 1 Japan's Government Debt

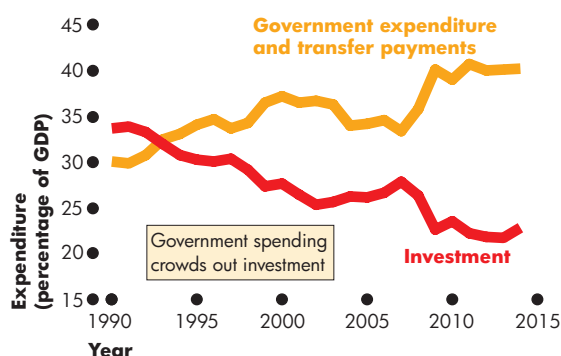


Figure 2 Crowding Out

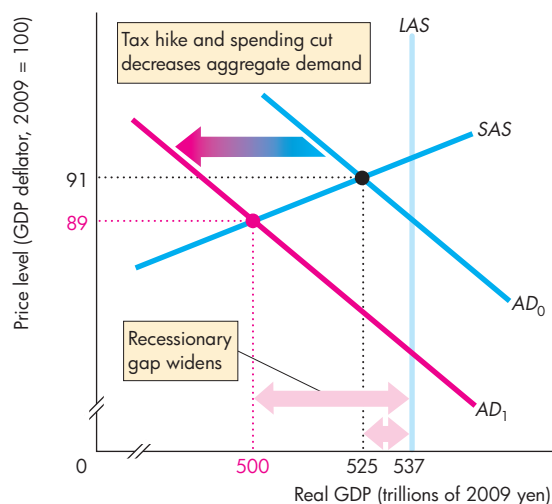


Figure 3 Short-Run Effects of Budget Cuts

- Like Japan, the United States has an aging population that will bring persistently increasing government expenditure on healthcare and Social Security.
- The United States' challenge is to contain these expenditures and avoid crowding out investment and stopping growth.



## SUMMARY

### Key Points

#### The Federal Budget (pp. 768–774)

- The federal budget is used to achieve macroeconomic objectives.
- Tax revenues can exceed, equal, or fall short of outlays—the budget can be in surplus, balanced, or in deficit.
- Budget deficits create government debt.

Working Problems 1 and 2 will give you a better understanding of the federal budget.

#### Supply-Side Effects of Fiscal Policy (pp. 775–779)

- Fiscal policy has supply-side effects because taxes weaken the incentive to work and decrease employment and potential GDP.
- The U.S. labor market tax wedge is large, but it is small compared to those of other industrialized countries.
- Fiscal policy has supply-side effects because taxes weaken the incentive to save and invest, which lowers the growth rate of real GDP.
- The Laffer curve shows the relationship between the tax rate and the amount of tax revenue collected.

Working Problems 3 to 5 will give you a better understanding of the supply-side effects of fiscal policy.

#### Generational Effects of Fiscal Policy (pp. 780–782)

- Generational accounting measures the lifetime tax burden and benefits of each generation.
- A major study estimated the U.S. fiscal imbalance to be \$68 trillion—4 times the value of one year's production.
- Future generations will pay for 17 percent of the benefits of the current generation.
- About 48 percent of U.S. government debt is held by the rest of the world.

Working Problem 6 will give you a better understanding of the generational effects of fiscal policy.

#### Fiscal Stimulus (pp. 782–787)

- Fiscal policy can be automatic or discretionary.
- Automatic fiscal policy might moderate the business cycle by stimulating demand in recession and restraining demand in a boom.
- Discretionary fiscal stimulus influences aggregate demand *and* aggregate supply.
- Discretionary changes in government expenditure or taxes have multiplier effects of uncertain magnitude but the tax multiplier is likely the larger one.
- Fiscal stimulus policies are hampered by uncertainty about the multipliers and by time lags (law-making lags and the difficulty of correctly diagnosing and forecasting the state of the economy).

Working Problems 7 to 11 will give you a better understanding of fiscal stimulus.

### Key Terms

Automatic fiscal policy, 782  
 Balanced budget, 770  
 Budget deficit, 770  
 Budget surplus, 770  
 Council of Economic Advisers, 769  
 Cyclical surplus or deficit, 783

Discretionary fiscal policy, 782  
 Federal budget, 768  
 Fiscal imbalance, 780  
 Fiscal policy, 768  
 Fiscal stimulus, 782  
 Generational accounting, 780  
 Generational imbalance, 781

Government debt, 772  
 Government expenditure multiplier, 785  
 Laffer curve, 779  
 Structural surplus or deficit, 783  
 Tax multiplier, 785  
 Tax wedge, 776

### MyEconLab Key Terms Quiz

## WORKED PROBLEM

**MyEconLab** You can work this problem in Chapter 30 Study Plan.

The economy is at full employment, the inflation rate is 2 percent a year, and the federal budget deficit is 3.5 percent of GDP. Congress wants to make real GDP grow faster and is debating whether to spend more on infrastructure or to cut income taxes.

### Questions

1. What would be the short-run effects of new infrastructure expenditure?
2. What would be the long-run effects of new infrastructure expenditure?
3. How would lower income taxes change the macroeconomic variables?
4. Which policy would increase the economic growth rate?

### Solutions

1. With no change in government receipts, the infrastructure expenditure will increase government outlays and the budget deficit. To fund the infrastructure work the government goes to the loanable funds market. The demand for loanable funds increases and, with no change in the supply of loanable funds, the real interest rate rises. A higher real interest rate increases private saving and decreases private investment. The increased government expenditure crowds out some private investment.

Aggregate demand increases by an amount equal to the infrastructure expenditure minus the crowded-out private investment plus the induced increase in consumption expenditure. With no change in aggregate supply, real GDP increases to above full employment and creates an inflationary gap.

**Key Point:** In the short run, a change in government expenditure changes the budget balance, the real interest rate, the quantities of private saving and private investment, aggregate demand, real GDP, and the output gap.

2. Two further things change in the long run. (1) An inflationary gap makes the money wage rate rise, and (2) the increase in infrastructure capital increases potential GDP.

The higher money wage rate decreases short-run aggregate supply and the increase in potential GDP lessens that decrease. The price level rises,

and real GDP decreases to its new, higher, full-employment level.

**Key Point:** An output gap brings changes in the labor market and the goods market, and increased capital increases potential GDP. In the long run, real GDP is at a higher full-employment equilibrium.

3. A cut in the tax rate on wage income increases the supply of labor, increases the quantity of labor employed, and increases potential GDP. A cut in the tax rate on interest income increases saving and investment, increases the quantity of capital, and increases potential GDP.

Lower tax receipts increase the budget deficit, which sends the government to the loanable funds market. The demand for loanable funds increases, which lessens the effect of the cut in the tax on interest income.

In the short run, the tax cut increases aggregate demand and brings an inflationary gap, which increases the money wage rate and decreases short-run aggregate supply.

In the long run, the economy returns to full-employment equilibrium, but one in which more people are employed and real GDP is larger.

**Key Point:** A change in the income tax rate changes the labor market equilibrium and the loanable funds market equilibrium. Employment, private investment, and potential GDP change.

4. A change in the real GDP growth rate is a long-run effect.

In the long run, an increase in infrastructure capital increases potential GDP and crowds out private investment, which decreases potential GDP. If the crowding out is incomplete, a larger capital stock increases potential GDP. To make real GDP grow faster, capital must keep increasing at a faster pace. A one-shot expenditure on new infrastructure does not have this effect.

A lower tax rate on interest income increases private investment, which increases the rate of capital accumulation and increases the growth rate of real GDP.

**Key Point:** A one-shot investment in infrastructure increases real GDP but not economic growth. A cut in the tax rate on interest income increases investment, which increases the rate of capital accumulation and the real GDP growth rate.

## STUDY PLAN PROBLEMS AND APPLICATIONS

**MyEconLab** You can work Problems 1 to 11 in Chapter 30 Study Plan and get instant feedback.

### The Federal Budget (Study Plan 30.1)

Use the following news clip to work Problems 1 and 2.

#### Economy Needs Treatment

It's the debt, stupid! Only when the government sets out a credible business plan will confidence and hiring rebound.

Source: *The Wall Street Journal*, October 7, 2010

1. How has the U.S. government debt changed since 2008? What are the sources of the change in U.S. government debt?
2. What would be a "credible business plan" for the government to adopt?

### Supply-Side Effects of Fiscal Policy (Study Plan 30.2)

3. The government is considering raising the tax rate on labor income. Explain the supply-side effects of such an action and use appropriate graphs to show the *directions* of change, not exact magnitudes. What will happen to
  - a. The supply of labor and why?
  - b. The demand for labor and why?
  - c. Equilibrium employment and why?
  - d. The equilibrium before-tax wage rate and why?
  - e. The equilibrium after-tax wage rate and why?
  - f. Potential GDP?
4. What fiscal policy action might increase investment and speed economic growth? Explain how the policy action would work.
5. Suppose that instead of taxing *nominal* capital income, the government taxed *real* capital income. Use appropriate graphs to explain and illustrate the effect that this change would have on
  - a. The tax rate on capital income.
  - b. The supply of and demand for loanable funds.
  - c. Investment and the real interest rate.

### Generational Effects of Fiscal Policy (Study Plan 30.3)

6. Under current policies, a plausible projection is that U.S. public debt will reach 250 percent of GDP in 30 years and 500 percent in 50 years.
  - a. What is a fiscal imbalance? How might the U.S. government reduce the fiscal imbalance?
  - b. How would your answer to part (a) influence the generational imbalance?

### Fiscal Stimulus (Study Plan 30.4)

7. The economy is in a recession, and the recessionary gap is large.
  - a. Describe the discretionary and automatic fiscal policy actions that might occur.
  - b. Describe a discretionary fiscal stimulus package that could be used that would *not* bring an increase in the budget deficit.
  - c. Explain the risks of discretionary fiscal policy in this situation.
8. An economy is in a recession with a large recessionary gap and a government budget deficit.
  - a. Is the government budget deficit a structural deficit or a cyclical deficit? Explain.
  - b. Explain how automatic fiscal policy is changing the output gap.
  - c. If the government increases its discretionary expenditure, explain how the structural deficit might change.

Use the following news clip and fact to work Problems 9 to 11.

#### Senate Approves Obama Tax Cut Plan

The U.S. Senate has passed legislation to extend the Bush-era tax cuts for high-income earners to middle-class Americans earning up to \$250,000 per year.

Source: *Financial Times*, July 26, 2012

**Fact:** Middle and low-income earners spend almost all their disposable incomes. High-income earners save a significant part of their disposable incomes.

9.
  - a. Explain the intended effect of extending tax cuts to middle-class Americans but not for high-income families. Draw a graph to illustrate the intended effect.
  - b. Explain why the effect of tax cuts depends on who receives them.
10. What would have a larger effect on aggregate demand: extending the Bush-era tax cuts to everyone; extending them to the middle-class only; or extending them for high-income earners only? How would each alternative compare with no tax cuts but an equivalent increase in government expenditure?
11. Compare the impact on equilibrium real GDP of a same-sized decrease in taxes and increase in government expenditure on goods and services.

## ADDITIONAL PROBLEMS AND APPLICATIONS

**MyEconLab** You can work these problems in MyEconLab if assigned by your instructor.

### The Federal Budget

#### 12. 2012 Deficit: Smaller, But Still Big

The Congressional Budget Office said the budget deficit was about \$1.1 trillion in fiscal year 2012. That is about \$200 billion smaller than in 2011, but still ranks as the fourth-largest deficit since World War II.

Source: The Congressional Budget Office, October 5, 2012

Of the components of government outlays and receipts, which have changed most to contribute to the huge budget deficits in 2011 and 2012?

### Supply-Side Effects of Fiscal Policy

Use the following news clip to work Problems 16 and 17.

Suppose that investment is \$1,600 billion, saving is \$1,400 billion, government expenditure on goods and services is \$1,500 billion, exports are \$2,000 billion, and imports are \$2,500 billion.

13. Calculate the amount of tax revenue and the government budget balance.
14. a. Explain the impact of the government budget balance on investment.  
b. What fiscal policy action might increase investment and speed economic growth? Explain how the policy action would work.
15. Suppose that capital income taxes are based (as they are in the United States) on nominal interest rates. If the inflation rate increases by 5 percent a year, explain and use appropriate graphs to illustrate the effect of the rise in inflation on
  - a. The tax rate on capital income.
  - b. The supply of loanable funds.
  - c. The demand for loanable funds.
  - d. Equilibrium investment.
  - e. The equilibrium real interest rate.

Use the following data to work Problems 16 and 17.

#### Singapore Budget 2015: Parliament Passes Record \$79.9 Billion Budget

New schemes announced by the budget statement include ten new hawker centers by 2027, a third desalination plant, SkillsFuture initiative to support lifelong learning for adults, and a second edition of Construction Productivity Roadmap to boost the industry's capabilities.

Source: *The Straits Times*, March 13, 2015

16. Explain the supply-side effects of building ten new hawker centers and a third desalination plant.
17. a. Explain the potential supply-side and demand-side effects of SkillsFuture initiative.  
b. Explain the potential supply-side and demand-side effects of adopting new technologies to boost productivity in the construction industry.  
c. Draw a graph to illustrate the combined demand-side and supply-side effect of the fiscal policy measures in part (a).

Use the following news clip to work Problems 18 and 19.

#### China pulls back tax breaks for foreign companies

Incentives such as lower land prices and tax breaks have helped Chinese cities attract multinational firms in the recent years. In 2014 alone, it secured foreign investment worth \$120 billion. Now, the central government is ordering municipalities to pull back the incentives to curb the country's growing debt and local spending.

Source: CNN Money, March 27, 2015

18. Explain the potential supply-side effects of China's plan to pull back tax breaks?
19. How does withdrawing tax breaks that were granted to foreign firms curb the country's debt? Explain your answer with the aid of the Laffer curve.

### Generational Effects of Fiscal Policy

#### 20. Hong Kong Launches Rainy-day Fund Despite Prediction Of HK\$950b Reserves By 2020

By 2019-20, the fiscal reserves are predicted to reach HK\$950 billion, enough to cover 22 months of the government's projected expenditure. However, Finance Secretary John Tsang's working group on long-term fiscal planning has warned that HK could face a structural deficit by 2022-23 due to an ageing population. The group proposes to set up a "future fund" for a rainy day, to be used if HK's reserves drops to a critical level.

Source: *South China Morning Post*, Feb 26, 2015

What is the difference between structural deficit and cyclical deficit? Explain how an ageing population may lead to a structural deficit. If the source of the future fund is the existing fiscal reserves,