

Chapter 15: Fiscal Policy

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Learning Objectives

1. Define fiscal policy.
2. Explain how fiscal policy affects aggregate demand and how the government can use fiscal policy to stabilize the economy.
3. Use the dynamic aggregate demand and aggregate supply model to analyze fiscal policy.
4. Explain how the government purchases and tax multipliers work.
5. Discuss the difficulties that can arise in implementing fiscal policy.
6. Define federal budget deficit and federal government debt and explain how the federal budget can serve as an automatic stabilizer.
7. Discuss the effects of fiscal policy in the long run.

What Fiscal Policy Is and What It Isn't

- ▶ *Fiscal policy (FP)*: Changes in *federal taxes and purchases* that are intended to achieve macroeconomic policy objectives: *high employment, price stability, and high rates of economic growth*.
- ▶ The gov. can affect the levels of *both AD and AS* through FP. Since WWII, the federal gov. has committed to intervening in the economy to promote maximum employment, production, and purchasing power.
- ▶ Restrict the term fiscal policy to refer only to the actions of the *federal* gov (NOT state and local Gov.) because they are intended to affect *the national economy*.
- ▶ *Not all actions* of the federal gov are FP actions because some of them are not intended to achieve macro policy goals.
 - ▶ E.g., the increases in the defense and homeland security (HS) spending are not FP, but part of defense and HS policy.

What is Fiscal Policy?

An Overview of Government Spending and Taxes

Figure 15-1

The Federal Government's Share of Total Government Expenditures, 1929–2008

Until the Great Depression of the 1930s, the majority of government spending in the United States occurred at the state and local levels. Since World War II, the federal government's share of total government expenditures has been between two-thirds and three-quarters.



What is Fiscal Policy?

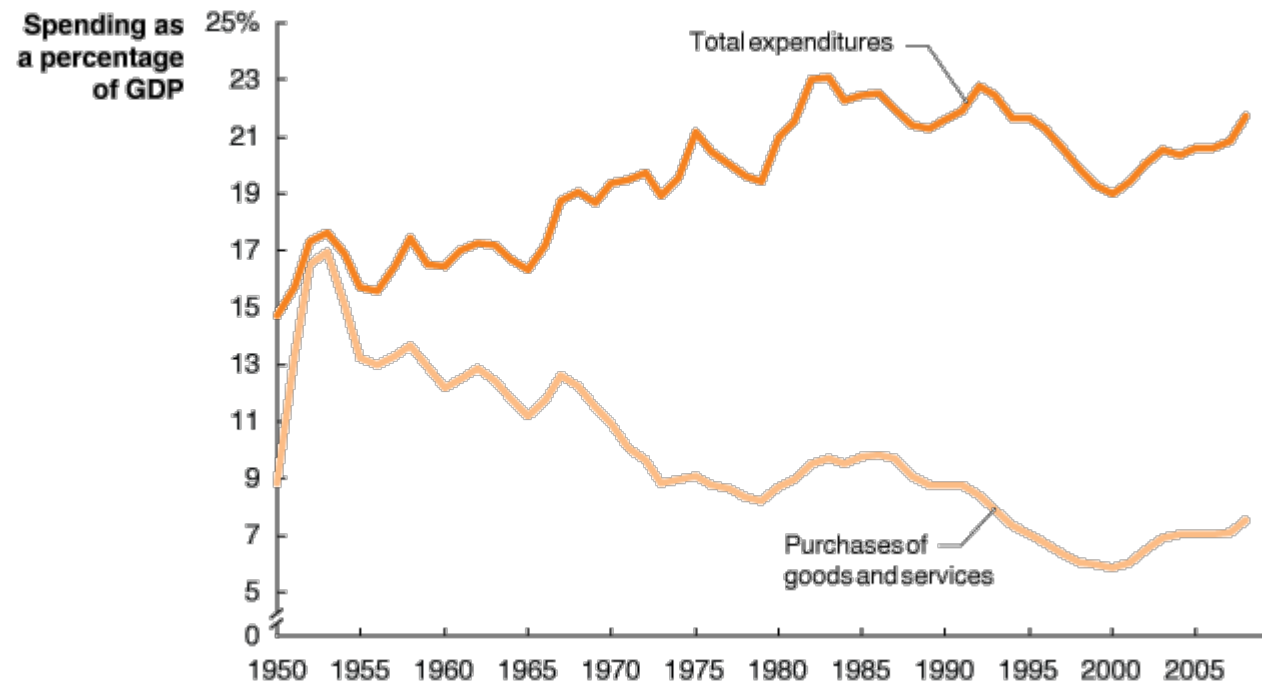
An Overview of Government Spending and Taxes

Figure 15-2

Federal Purchases and Federal Expenditures as a Percentage of GDP, 1950–2008

As a fraction of GDP, the federal government's *purchases* of goods and services have been declining since the Korean War in the early 1950s.

Total *expenditures* by the federal government—including transfer payments—as a fraction of GDP slowly rose from 1950 through the early 1990s and fell from 1992 to 2001, before rising again.



What is Fiscal Policy?

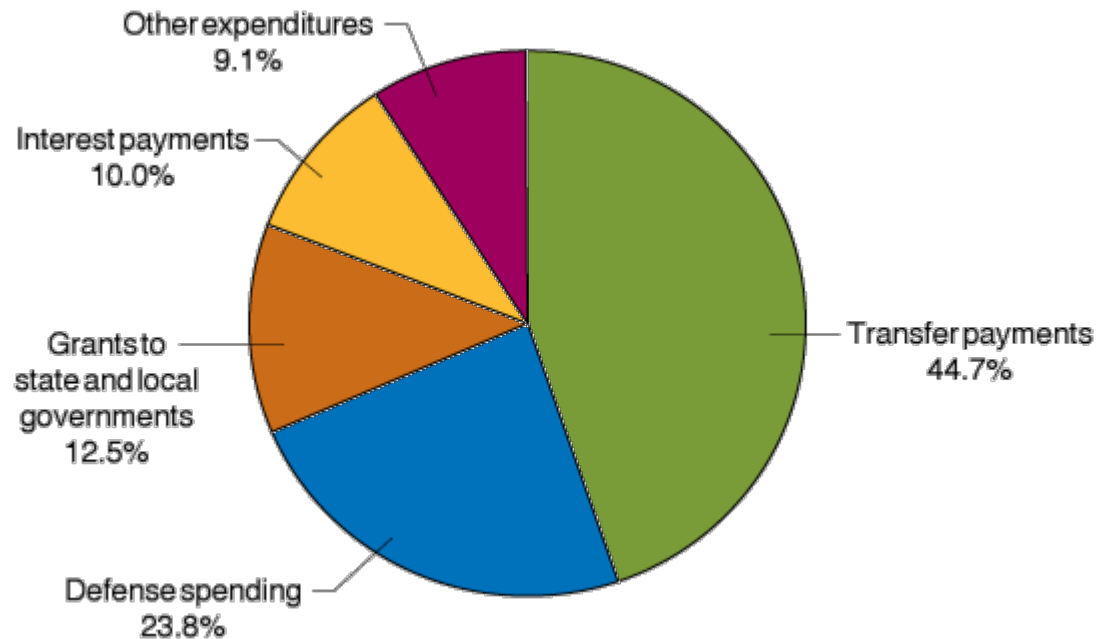
An Overview of Government Spending and Taxes

Figure 15-3

Federal Government Expenditures, 2008

Federal government *purchases* can be divided into defense spending—which makes up about 24 percent of the federal budget—and spending on everything else the federal government does—from paying the salaries of FBI agents, to operating the national parks, to supporting scientific research—which makes up about 9 percent of the budget.

In addition to purchases, there are three other categories of federal government *expenditures*: interest on the national debt, grants to state and local governments, and transfer payments. Transfer payments rose from about 25 percent of federal government expenditures in the 1960s to nearly 45 percent in 2008.



What is Fiscal Policy?

An Overview of Government Spending and Taxes

Figure 15-4

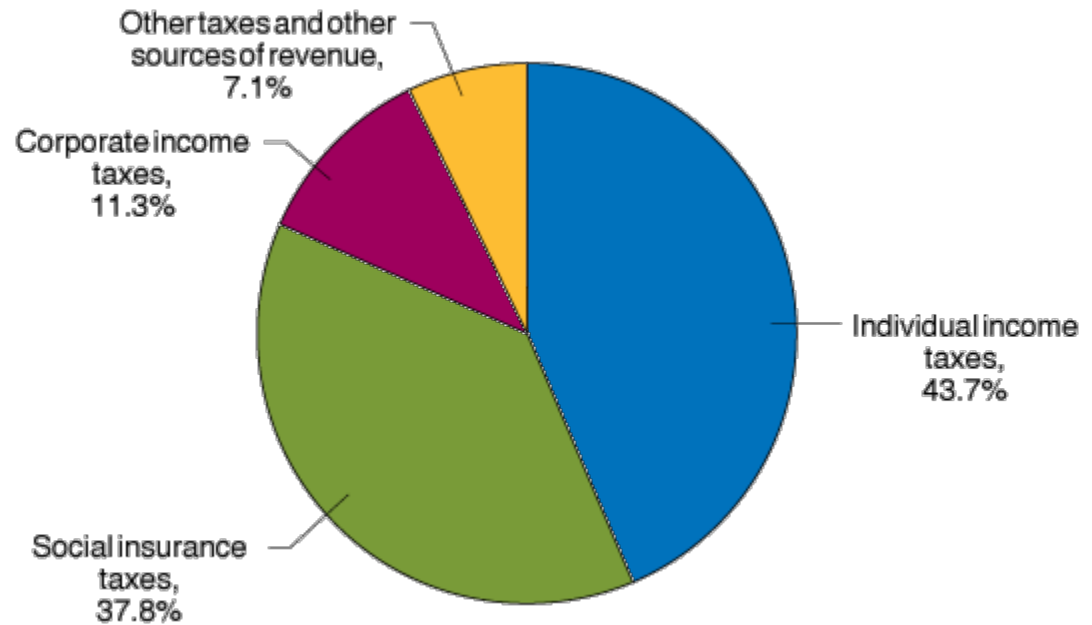
Federal Government Revenue, 2008

In 2008, individual income taxes raised about 44 percent of the federal government's revenues.

Corporate income taxes raised about 11 percent of revenue.

Payroll taxes to fund the Social Security and Medicare programs rose from less than 10 percent of federal government revenues in 1950 to almost 38 percent in 2008.

The remaining 7 percent of revenues were raised from excise taxes, tariffs on imports, and other fees.



Distinction bw. automatic stabilizers and discretionary FP

- ▶ *Automatic stabilizers*: Government spending and taxes that *automatically* increase or decrease along with the business cycle:
 - ▶ E.g., when the economy is in expansion, gov spending on UI payments to unemployed workers will automatically decrease.
 - ▶ Similarly, during the expansion, income is rising, and the amount the gov collects in taxes will increase.
- ▶ *Discretionary FP*: The gov. *takes actions* to change spending or taxes. E.g., the tax cuts passed by Congress in 2001.

- ▶ The gov can also use stabilization policy through changes in gov. spending and taxes to offset the effects of BC on the economy.
- ▶ Changes in gov. spending and taxes lead to changes in AD, so they can affect the levels of real GDP, employment, and the PL.
- ▶ When the economy is in a recession, increases in gov. purchases or decreases in taxes will increase AD *directly or indirectly*. Consequently, the inflation rate may increase when AD is increasing faster than AS.

The Effects of Fiscal Policy on Real GDP and the Price Level

Expansionary and Contractionary Fiscal Policy

15.2 LEARNING OBJECTIVE

Explain how fiscal policy affects aggregate demand and how the government can use fiscal policy to stabilize the economy.

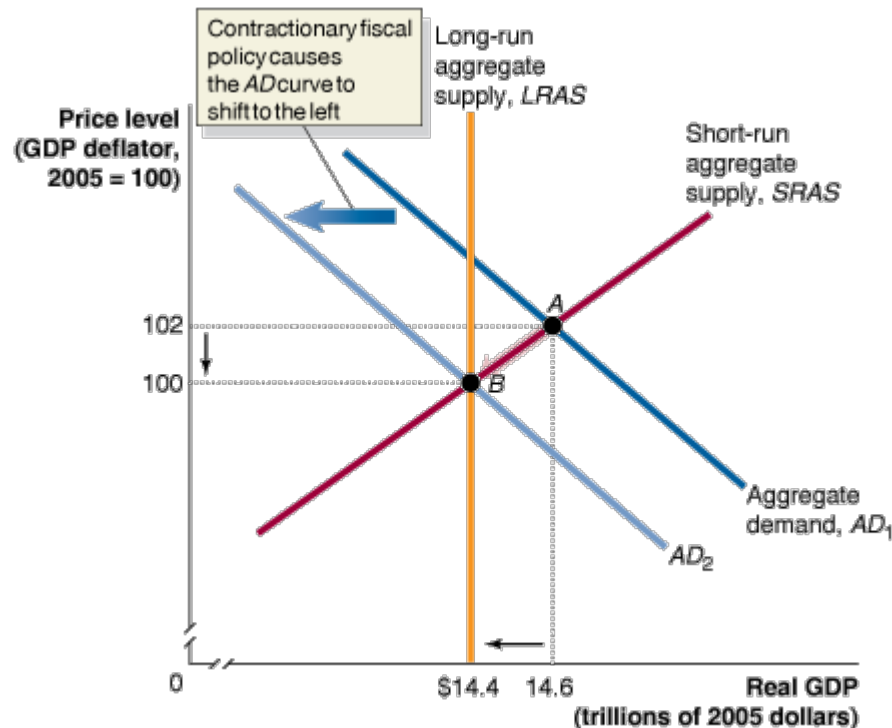
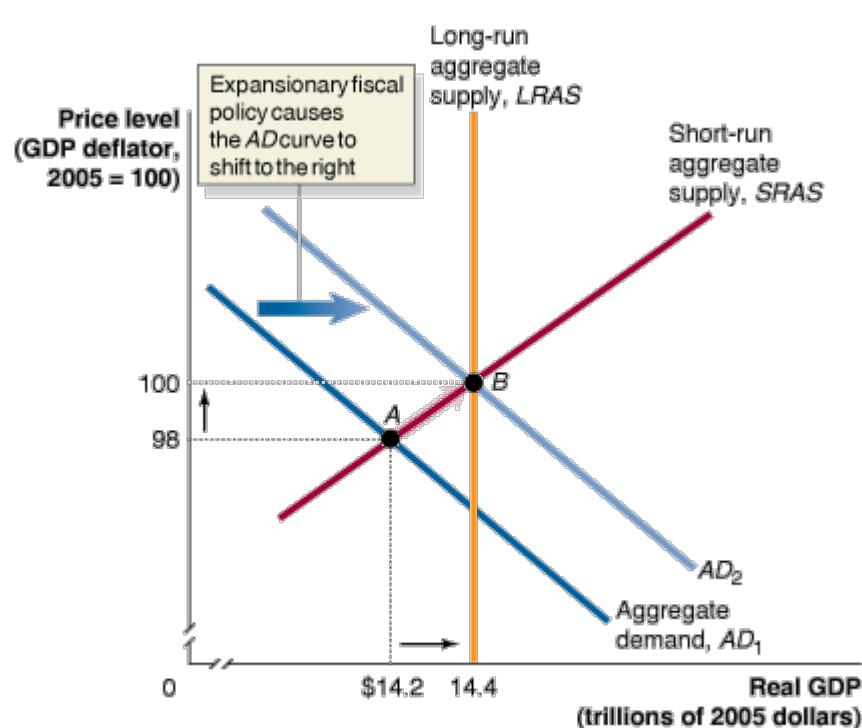


Figure 15-5 (a) Expansionary fiscal policy

(b) Contractionary fiscal policy

Fiscal Policy

In panel (a), the economy begins in recession at point A, with real GDP of \$14.2 trillion and a price level of 98. An expansionary fiscal policy will cause aggregate demand to shift to the right, from AD_1 to AD_2 , increasing real GDP from \$14.2 trillion to \$14.4 trillion and the price level from 98 to 100 (point B).

In panel (b), the economy begins at point A, with real GDP at \$14.6 trillion and the price level at 102. Because real GDP is greater than potential GDP, the economy will experience rising wages and prices. A contractionary fiscal policy will cause aggregate demand to shift to the left, from AD_1 to AD_2 , decreasing real GDP from \$14.6 trillion to \$14.4 trillion and the price level from 102 to 100 (point B).

The Effects of Fiscal Policy on Real GDP and the Price Level

A Summary of How Fiscal Policy Affects Aggregate Demand

15.2 LEARNING OBJECTIVE

Explain how fiscal policy affects aggregate demand and how the government can use fiscal policy to stabilize the economy.

Table 15-1

Countercyclical Fiscal Policy

PROBLEM	TYPE OF POLICY	ACTIONS BY CONGRESS AND THE PRESIDENT	RESULT
Recession	Expansionary	Increase government spending or cut taxes	Real GDP and the price level rise.
Rising inflation	Contractionary	Decrease government spending or raise taxes	Real GDP and the price level fall.

Don't Let This Happen to YOU!

Don't Confuse Fiscal Policy and Monetary Policy



YOUR TURN: Test your understanding by doing related problem 2.6 at the end of this chapter.

Fiscal Policy in the Dynamic Aggregate Demand and Aggregate Supply Model

15.3 LEARNING OBJECTIVE

Use the dynamic aggregate demand and aggregate supply model to analyze fiscal policy.

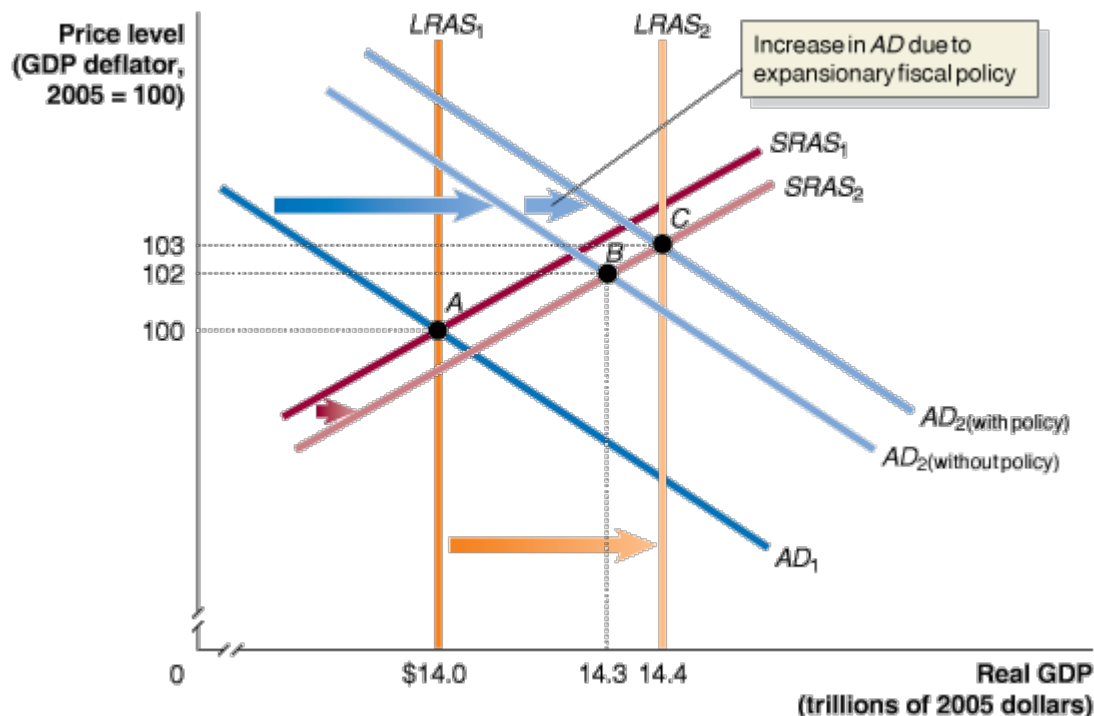
Figure 15-6

An Expansionary Fiscal Policy in the Dynamic Model

The economy begins in equilibrium at point A, at potential real GDP of \$14.0 trillion and a price level of 100.

Without an expansionary policy, aggregate demand will shift from AD_1 to $AD_{2(\text{without policy})}$, which is not enough to keep the economy at potential GDP because long-run aggregate supply has shifted from $LRAS_1$ to $LRAS_2$. The economy will be in short-run equilibrium at point B, with real GDP of \$14.3 trillion and a price level of 102.

Increasing government purchases or cutting taxes will shift aggregate demand to $AD_{2(\text{with policy})}$. The economy will be in equilibrium at point C, with real GDP of \$14.4 trillion, which is its potential level, and a price level of 103. The price level is higher than it would have been if expansionary fiscal policy had not been used.



Fiscal Policy in the Dynamic Aggregate Demand and Aggregate Supply Model

15.3 LEARNING OBJECTIVE

Use the dynamic aggregate demand and aggregate supply model to analyze fiscal policy.

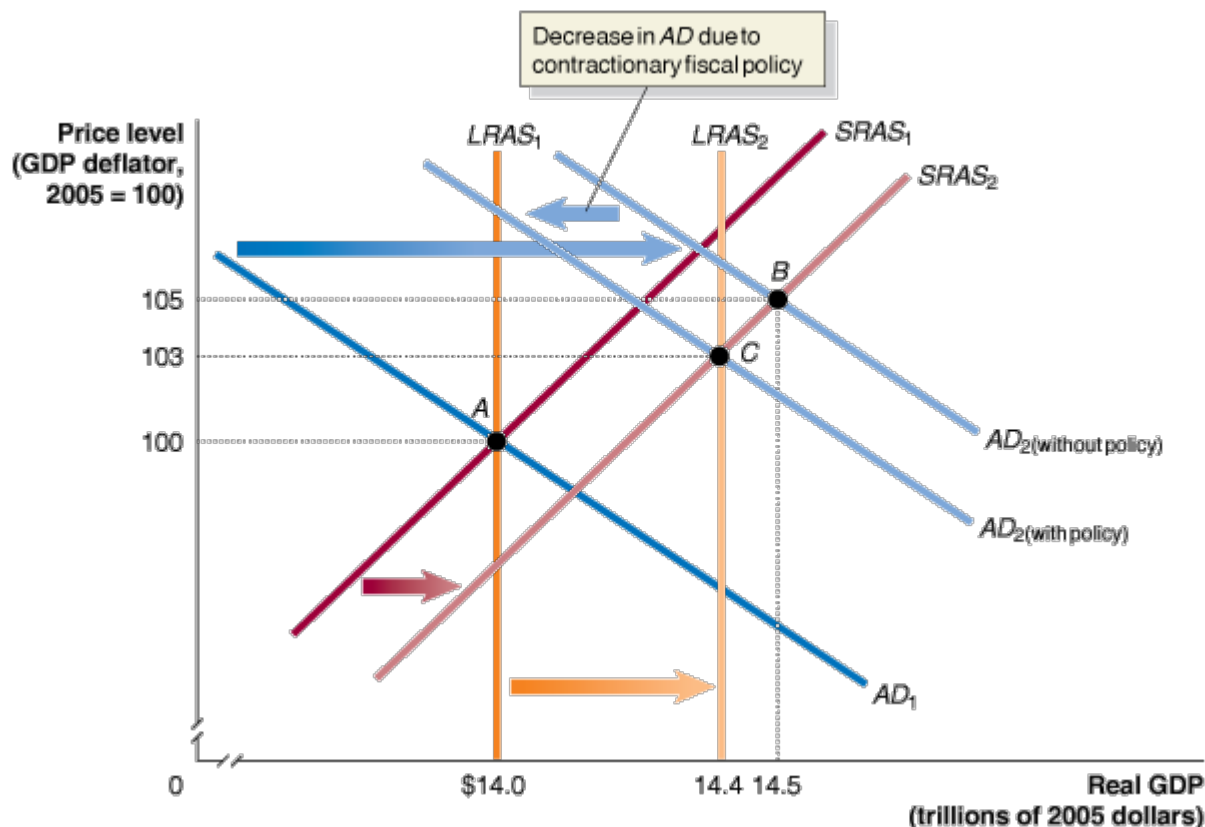
Figure 15-7

A Contractionary Fiscal Policy in the Dynamic Model

The economy begins in equilibrium at point A, with real GDP of \$14.0 trillion and a price level of 100.

Without a contractionary policy, aggregate demand will shift from AD_1 to $AD_{2(\text{without policy})}$, which results in a short-run equilibrium beyond potential GDP at point B, with real GDP of \$14.5 trillion and a price level of 105.

Decreasing government purchases or increasing taxes can shift aggregate demand to $AD_{2(\text{with policy})}$. The economy will be in equilibrium at point C, with real GDP of \$14.4 trillion, which is its potential level, and a price level of 103. The inflation rate will be 3 percent as opposed to the 5 percent it would have been without the contractionary fiscal policy.



The Government Purchases Multiplier

- ▶ The *initial increase* in gov. purchases (as a component of AD, *autonomous expenditures*) will lead to additional increases in income and spending.
 - ▶ E.g., when using \$100 billion to build subways, the gov. hires private firms. These firms will hire more workers and the newly hired workers will increase their spending on consumption goods. Sellers of these goods will increase their production and employment. At each step, real GDP and income increases, thereby increasing consumption and AD.
- ▶ *Multiplier effect* The series of induced increases in consumption spending that results from an initial increase in autonomous expenditures.

The Government Purchases and Tax Multipliers

15.4 LEARNING OBJECTIVE

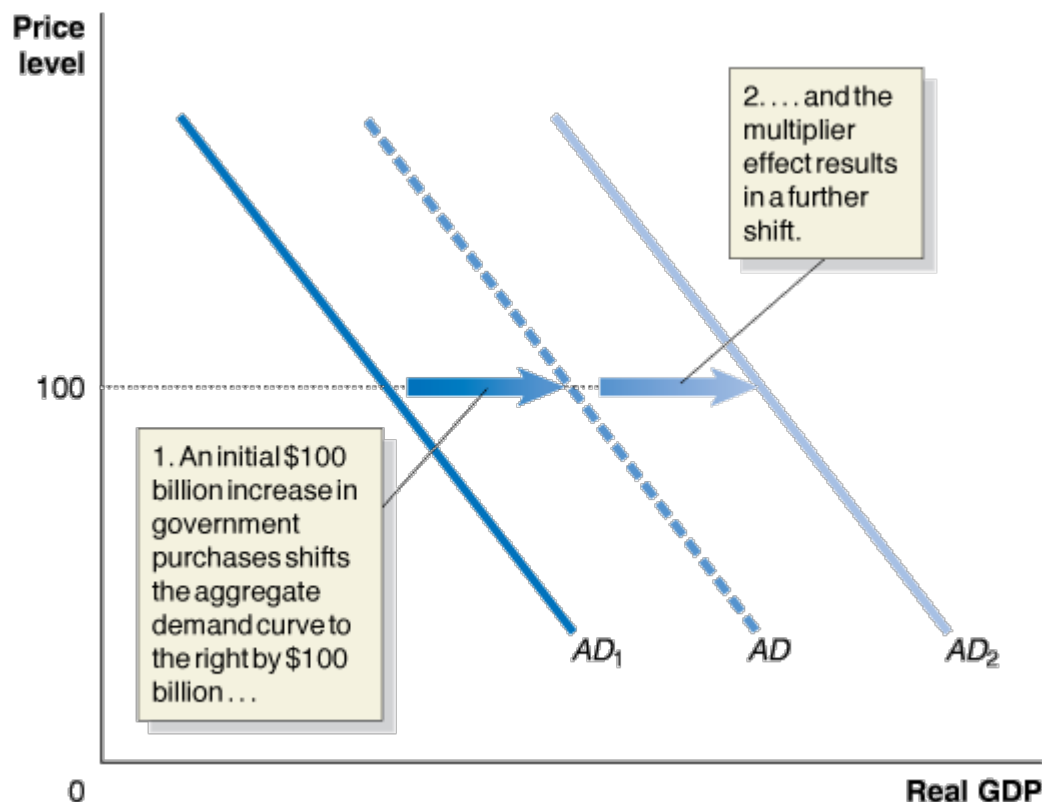
Explain how the government purchases and tax multipliers work.

Figure 15-8

The Multiplier Effect and Aggregate Demand

An initial increase in government purchases of \$100 billion causes the aggregate demand curve to shift to the right, from AD_1 to the dotted AD curve, and represents the impact of the initial increase of \$100 billion in government purchases.

Because this initial increase raises incomes and leads to further increases in consumption spending, the aggregate demand curve will ultimately shift further to the right, to AD_2 .



The Government Purchases and Tax Multipliers

15.4 LEARNING OBJECTIVE

Explain how the government purchases and tax multipliers work.

Figure 15-9

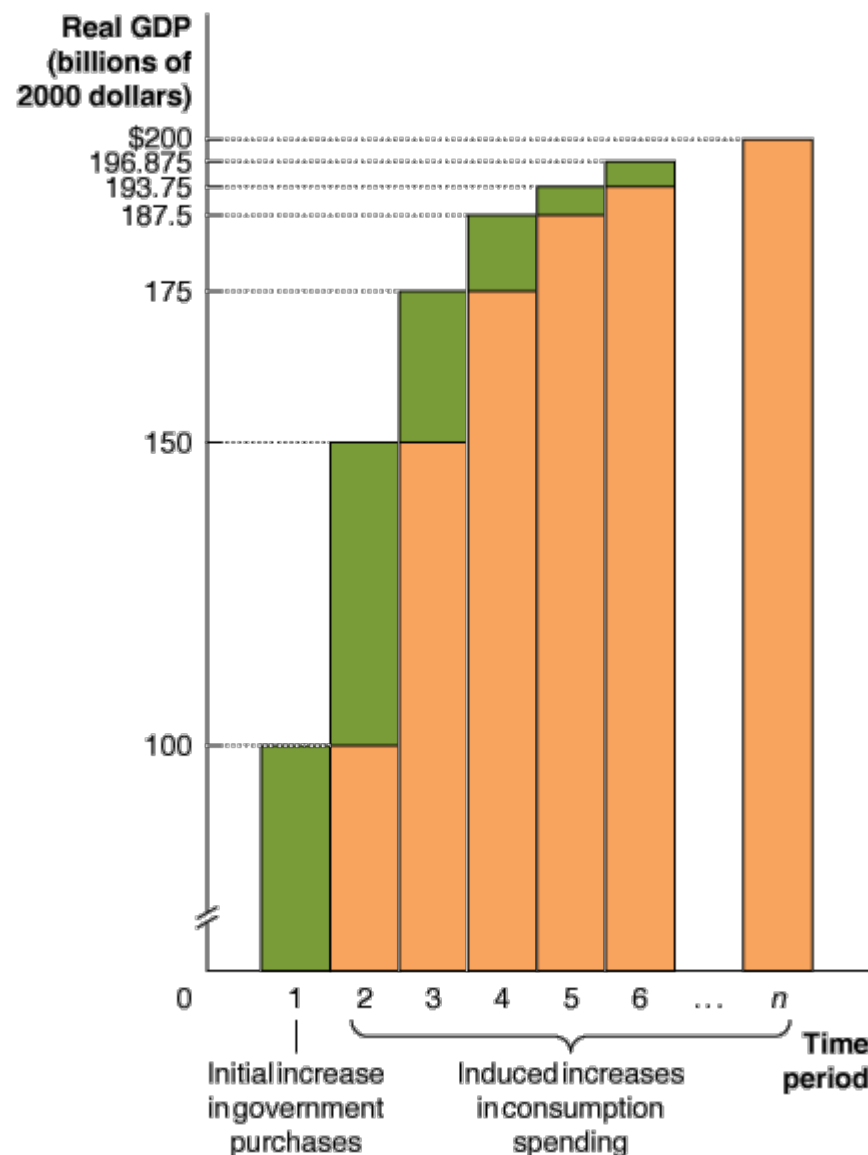
The Multiplier Effect of an Increase in Government Purchases

Following an initial increase in government purchases, spending and real GDP increase over a number of periods due to the multiplier effect.

The new spending and increased real GDP in each period is shown in green, and the level of spending from the previous period is shown in orange.

The sum of the orange and green areas represents the cumulative increase in spending and real GDP. In total, equilibrium real GDP will increase by \$200 billion as a result of an initial increase of \$100 billion in government purchases.

Period	Additional Spending this Period	Cumulative Increase in Spending and Real GDP
1	\$100 billion in government purchases	\$100 billion
2	\$50 billion in consumption spending	\$150 billion
3	\$25 billion in consumption spending	\$175 billion
4	\$12.5 billion in consumption spending	\$187.5 billion
5	\$6.25 billion in consumption spending	\$193.75 billion
6	\$3.125 billion in consumption spending	\$196.875 billion
⋮	⋮	⋮
n	0	\$200 billion



The Government Purchases and Tax Multipliers

15.4 LEARNING OBJECTIVE

Explain how the government purchases and tax multipliers work.

The ratio of the change in equilibrium real GDP to the initial change in government purchases is known as the *government purchases multiplier*.

$$\text{Government purchases multiplier} = \frac{\text{Change in equilibrium real GDP}}{\text{Change in government purchases}}$$

The expression for the tax multiplier is:

$$\text{Tax multiplier} = \frac{\text{Change in equilibrium real GDP}}{\text{Change in taxes}}$$

The Effect of Changes in Tax Rates

- ▶ A change in tax *rates* has more complicated effects on real GDP than does a tax cut of a *fixed* amount.
- ▶ The higher the tax rate, the smaller the multiplier effect. The reason is that the higher the tax rate, the smaller the available amount of any increase in income caused by an increase in gov purchases.
- ▶ A cut in tax rates affects equilibrium GDP through two channels:
 1. A cut in tax rates increases the disposable income, which increases consumption,
 2. a cut in tax rates increases the size of the multiplier effect.

The Government Purchases and Tax Multipliers

15.4 LEARNING OBJECTIVE

Explain how the government purchases and tax multipliers work.

Taking into Account the Effects of Aggregate Supply

FIGURE 15-10

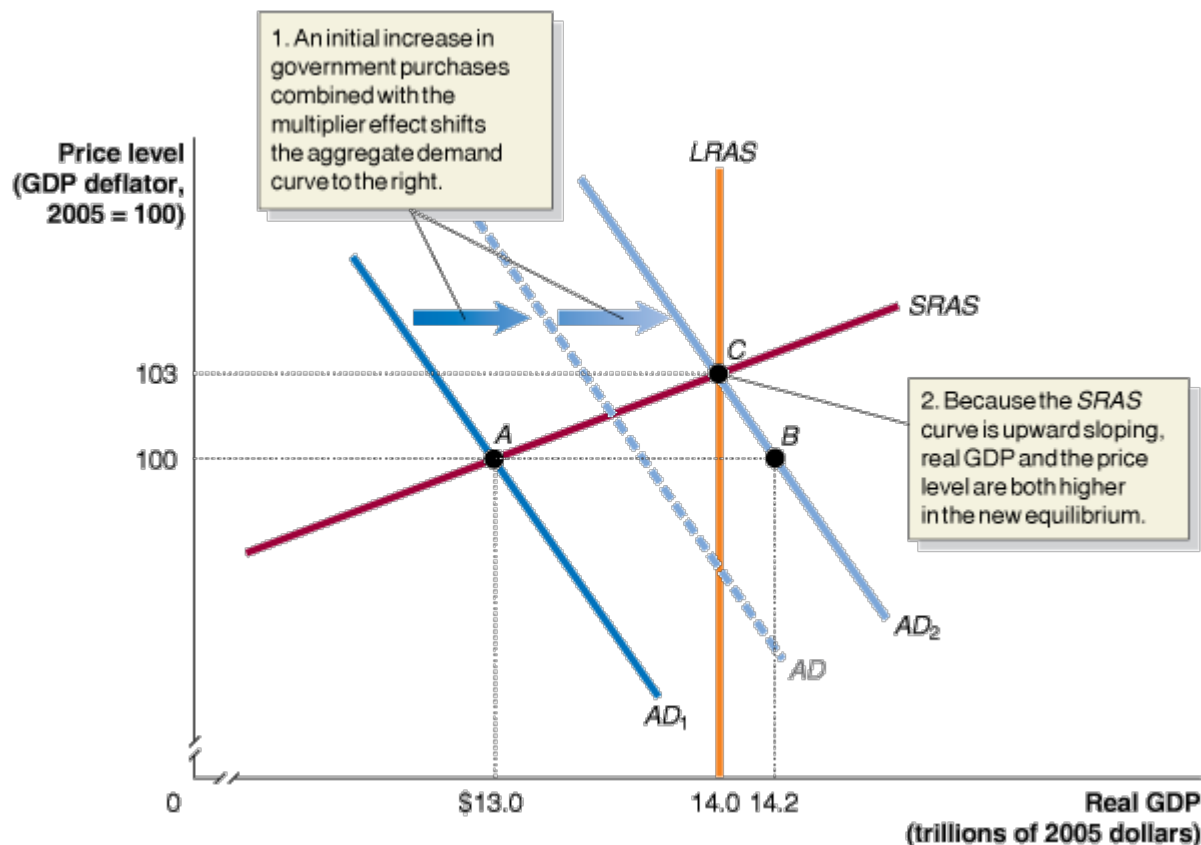
The Multiplier Effect and Aggregate Supply

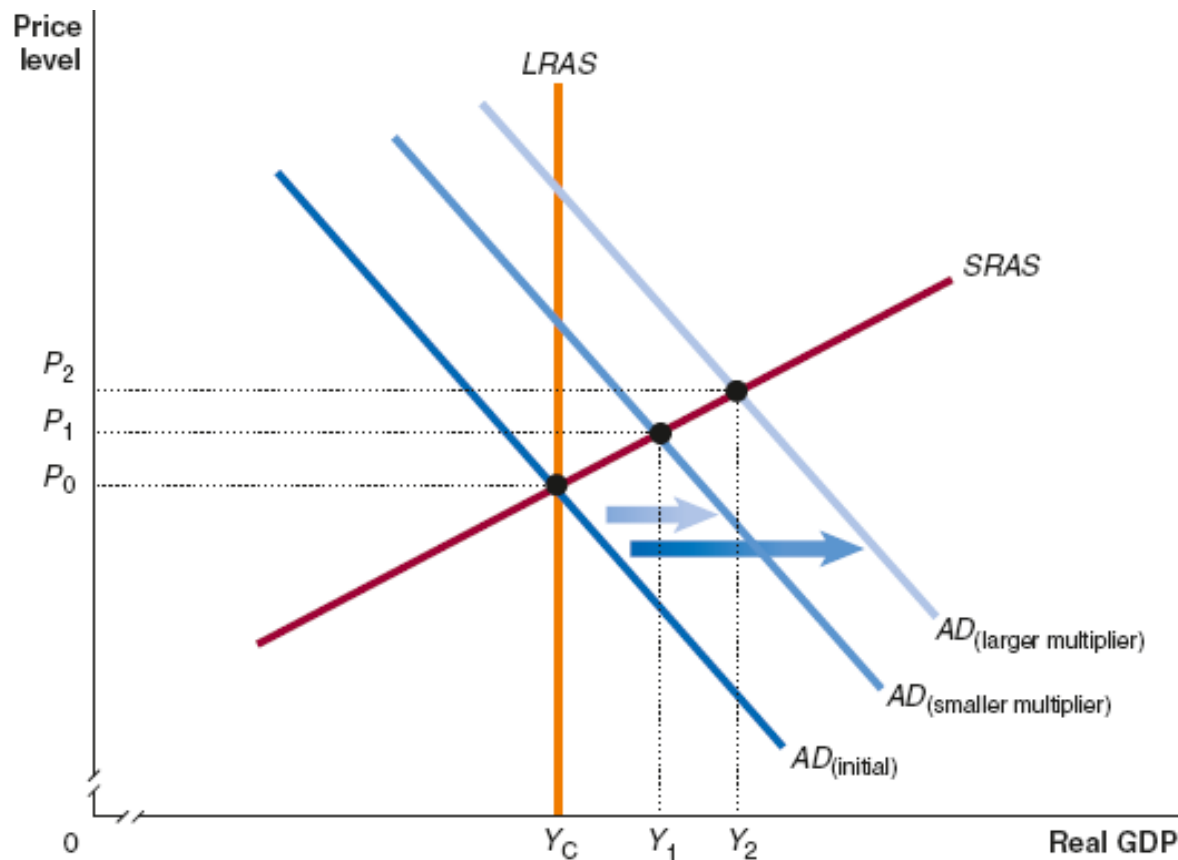
The economy is initially at point A.

An increase in government purchases causes the aggregate demand curve to shift to the right, from AD_1 to the dotted AD curve.

The multiplier effect results in the aggregate demand curve shifting further to the right, to AD_2 (point B).

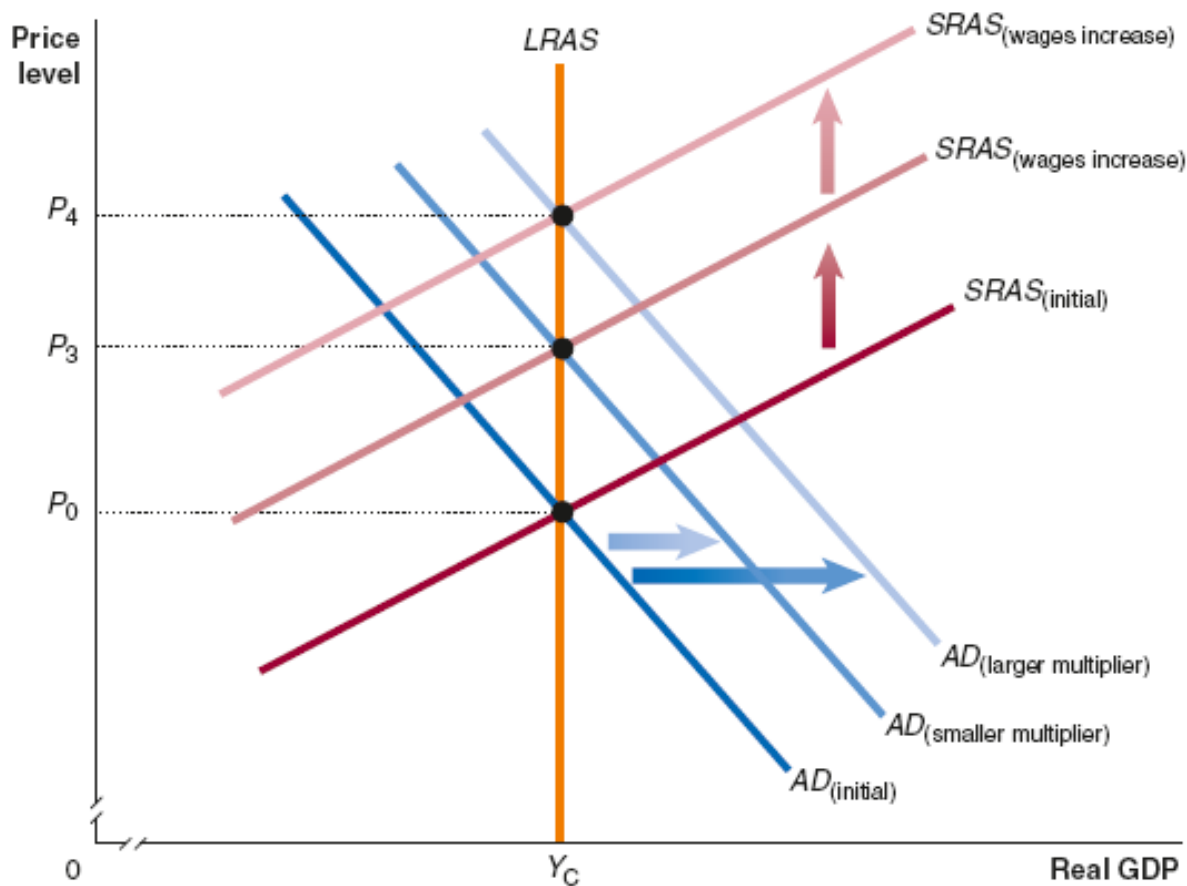
Because of the upward-sloping supply curve, the shift in aggregate demand results in a higher price level. In the new equilibrium at point C, both real GDP and the price level have increased. The increase in real GDP is less than indicated by the multiplier effect with a constant price level.



Solved Problem 15-4A**The Multiplier and Shifts in the Aggregate Demand Curve**

Solved Problem 15-4A

The Multiplier and Shifts in the Aggregate Demand Curve (continued)



YOUR TURN: For more practice, do related problem 4.6 at the end of this chapter.

The Multipliers Work in Both Directions

- ▶ Increases in government purchases and cuts in taxes have a positive multiplier effect on equilibrium real GDP.
- ▶ Decreases in government purchases and increases in taxes also have a multiplier effect on equilibrium real GDP, only in this case, the effect is negative.

The Government Purchases and Tax Multipliers

15.4 LEARNING OBJECTIVE

Explain how the government purchases and tax multipliers work.

Fiscal Policy in Action: The Obama Administration Faces the Recession of 2007-2009

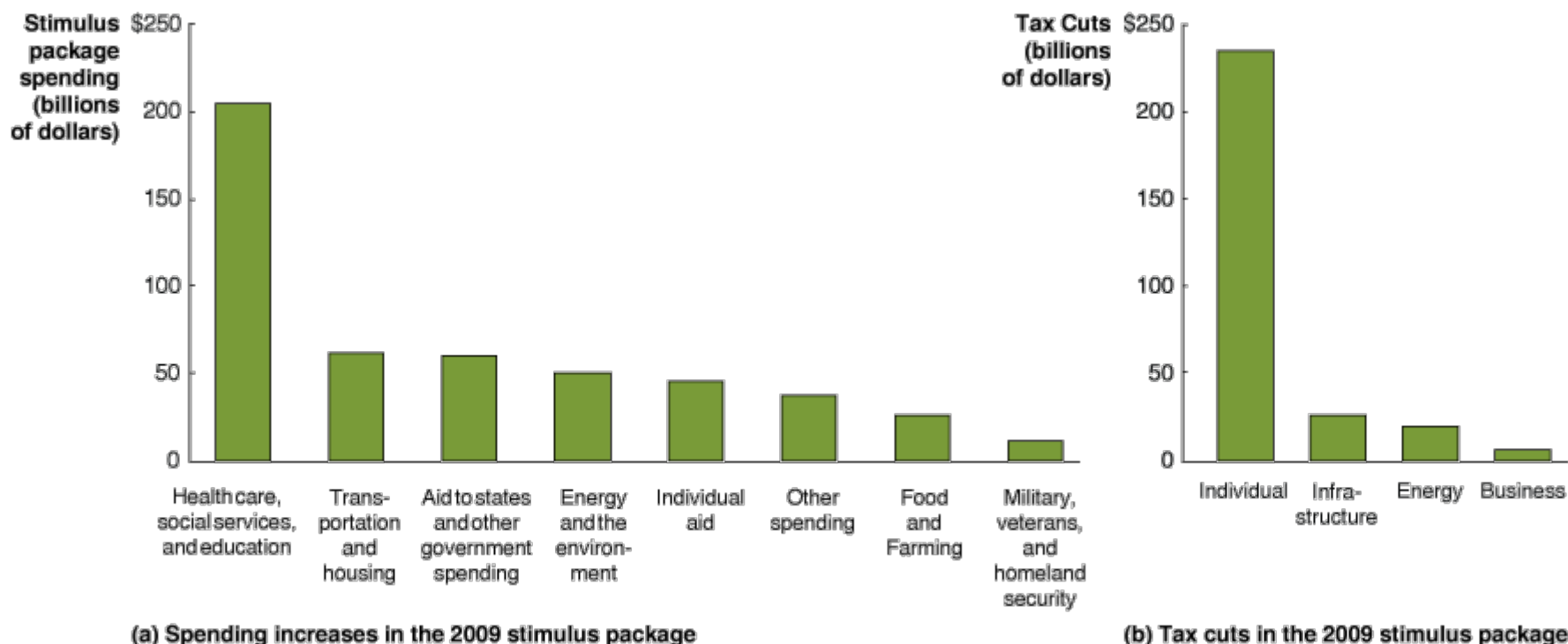


FIGURE 15-11

The 2009 Stimulus Package

Congress and President Obama intended the spending increases and tax cuts in the stimulus package to increase aggregate demand and help pull the economy out of the 2007–2009 recession. Panel (a) shows how the increases in spending were distributed, and panel (b) shows how the tax cuts were distributed.

Solved Problem | 15-4B

Fiscal Policy Multipliers

15.4 LEARNING OBJECTIVE

Explain how the government purchases and tax multipliers work.

Briefly explain whether you agree or disagree with the following statement: “Real GDP is currently \$14.2 trillion, and potential real GDP is \$14.4 trillion. If Congress and the president would increase government purchases by \$200 billion or cut taxes by \$200 billion, the economy could be brought to equilibrium at potential GDP.”

$$\text{Government purchases multiplier} = \frac{\text{Change in equilibrium real GDP}}{\text{Change in government purchases}}$$



YOUR TURN: For more practice, do related problem 4.7 at the end of this chapter.

Making the Connection

Economists in the Obama Administration Estimate the Size of the Multiplier

15.4 LEARNING OBJECTIVE

Explain how the government purchases and tax multipliers work.



As time passes, economists will be better able to assess the economic effect of the Obama administration's stimulus package and to refine their estimates of the multiplier.

By how much did real GDP increase as a result of increased federal spending on highways?



YOUR TURN: Test your understanding by doing related problems 4.3 and 4.4 at the end of this chapter.

Timing is also Important to Conduct Fiscal Policy

- ▶ If the gov. decides to increase spending or cut taxes to fight a recession that is about to end, the effect may be to increase the inflation rate.
- ▶ If the gov. decides to reduce spending or increase taxes to slow down the economy that actually already moved into recession can make the recession longer and deeper.
- ▶ Getting timing right can be more difficult with FP than with MP. The Fed then plays a larger role in stabilizing the economy because it can *quickly* change MP i.r.t. changing economic conditions.

Does Government Spending Reduce Private Spending?

- ▶ Using gov spending to increase AD cause a potential problem.
- ▶ *Crowding out*: A decline in private expenditures (consumption, investment, or net exports) as a result of an increase in government purchases.

The Limits of Using Fiscal Policy to Stabilize the Economy

15.5 LEARNING OBJECTIVE

Discuss the difficulties that can arise in implementing fiscal policy.

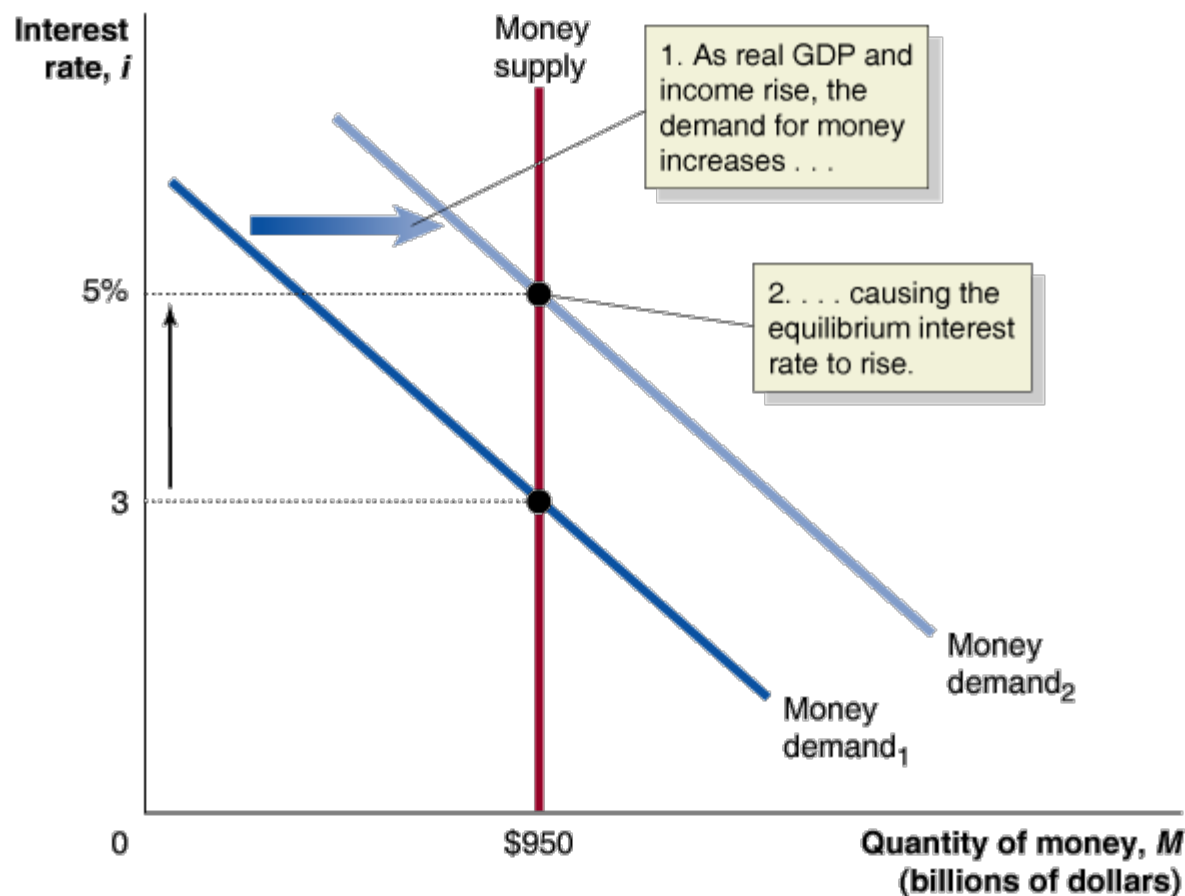
Crowding Out in the Short Run

Figure 15-12

An Expansionary Fiscal Policy Increases Interest Rates

If the federal government increases spending, the demand for money will increase from Money demand₁ to Money demand₂ as real GDP and income rise.

With the supply of money constant, at \$950 billion, the result is an increase in the equilibrium interest rate from 3 percent to 5 percent, which crowds out some consumption, investment, and net exports.



The Limits of Using Fiscal Policy to Stabilize the Economy

15.5 LEARNING OBJECTIVE

Discuss the difficulties that can arise in implementing fiscal policy.

Crowding Out in the Short Run

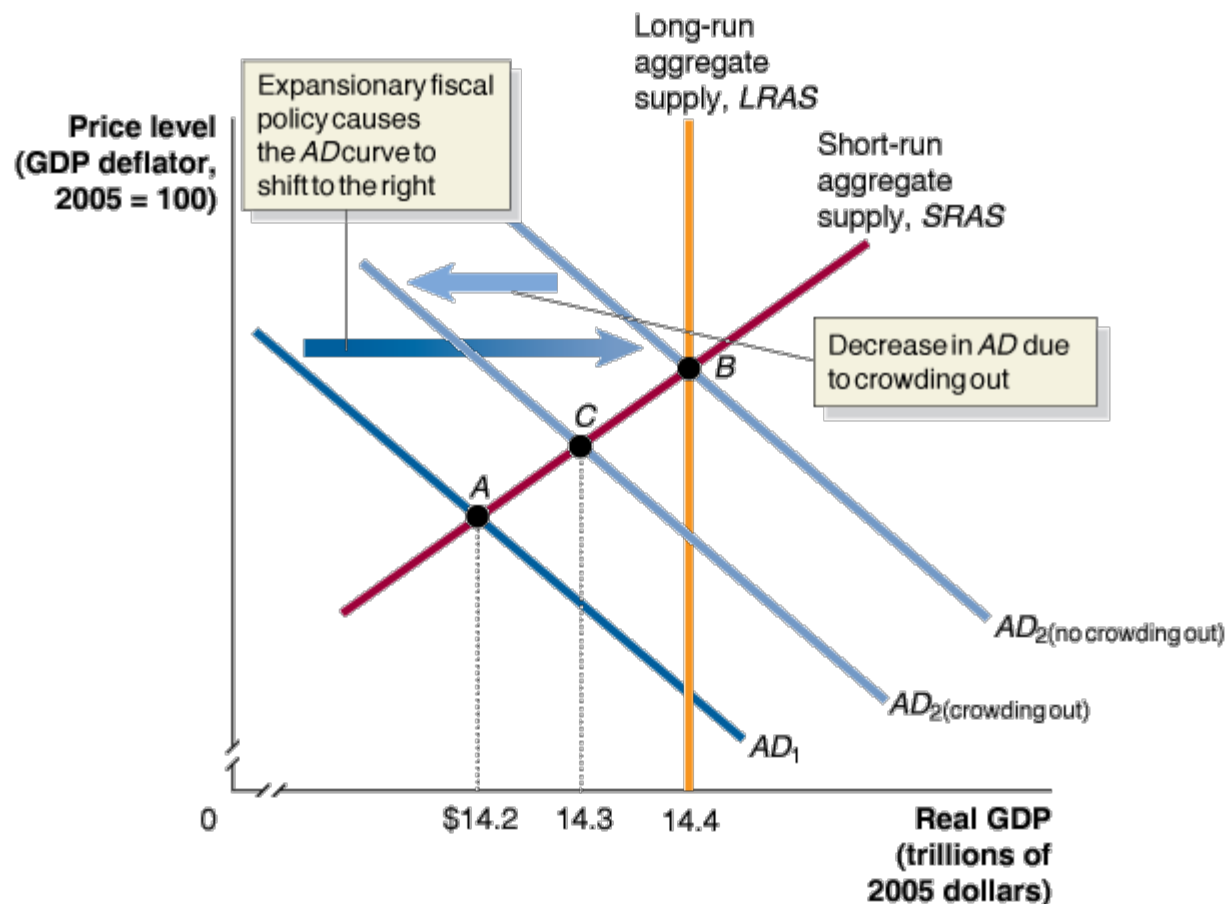
Figure 15-13

The Effect of Crowding Out in the Short Run

The economy begins in a recession, with real GDP of \$14.2 trillion (point A).

In the absence of crowding out, an increase in government purchases will shift aggregate demand to AD_2 (no crowding out) and bring the economy to equilibrium at potential real GDP of \$14.4 trillion (point B).

But the higher interest rate resulting from the increased government purchases will reduce consumption, investment, and net exports, causing aggregate demand to shift to AD_2 (crowding out). The result is a new short-run equilibrium at point C, with real GDP of \$14.3 trillion, which is \$100 billion short of potential real GDP.



Crowding Out in the Long Run

- ▶ Economists disagree on the extent of crowding out in the SR. Most economists agree that the LR crowding out effect of a *permanent* increase in gov spending is complete and the decline in C , I , and NE , exactly offsets the increases in gov. purchases, and AD remains unchanged.
- ▶ To understand crowding out in the LR, recall that in the LR, the economy returns to potential GDP. If gov purchases are increased permanently, in the LR, private expenditures must fall the same amount to keep the potential GDP at the same level.

Deficits, Surpluses, and Federal Government Debt

- ▶ The Fed gov's budget shows the relationship bw its expenditures and its tax revenue.
- ▶ *Budget deficit*: The situation in which the government's expenditures are greater than its tax revenue.
- ▶ *Budget surplus*: The situation in which the government's expenditures are less than its tax revenue.

Deficits, Surpluses, and Federal Government Debt

15.6 LEARNING OBJECTIVE

Define federal budget deficit and federal government debt and explain how the federal budget can serve as an automatic stabilizer.

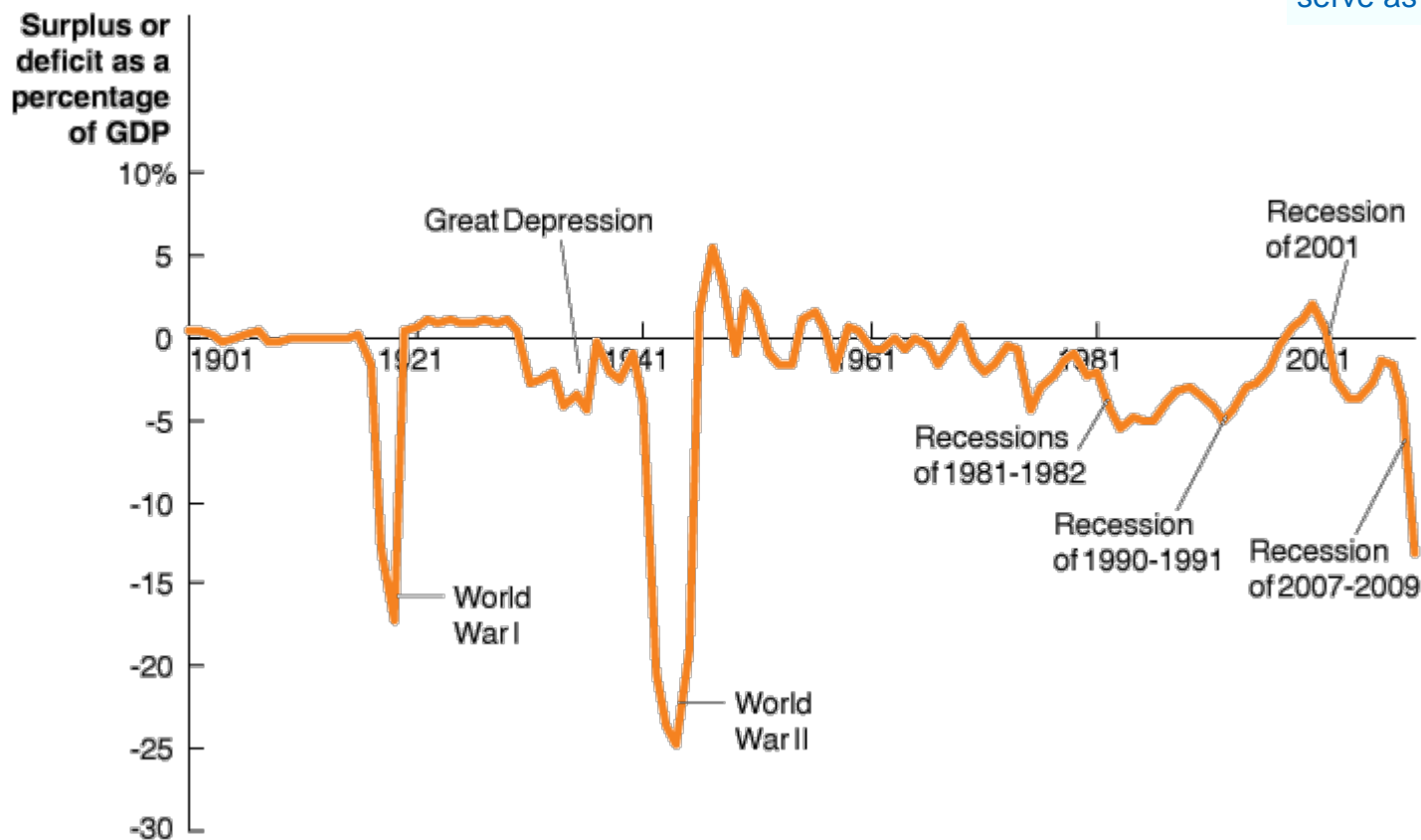


Figure 15-14

The Federal Budget Deficit, 1901–2009

During wars, government spending increases far more than tax revenues, increasing the budget deficit. The budget deficit also increases during recessions, as government spending increases and tax revenues fall.

How the Federal Budget Can Serve as an Automatic Stabilizer

- ▶ In fact, most of the increase in the federal budget deficit during recessions take places without Congress or the president taking any action because of the effect of Auto. Stabilizers.
- ▶ Because budget deficits *automatically* increase during recessions and reduce during expansions, economists often look at the *Cyclically adjusted budget deficit or surplus* which is the deficit or surplus in the federal gov's budget if the economy were at potential GDP.
- ▶ It provides a better measure of the effects of fiscal policy on the economy than the actual budget deficit or surplus.

Making the Connection

Did Fiscal Policy Fail during the Great Depression?

15.6 LEARNING OBJECTIVE

Define federal budget deficit and federal government debt and explain how the federal budget can serve as an automatic stabilizer.



Although government spending increased during the Great Depression, the cyclically adjusted budget was in surplus most years.

YEAR	FEDERAL GOVERNMENT EXPENDITURES (BILLIONS OF DOLLARS)	ACTUAL FEDERAL BUDGET DEFICIT OR SURPLUS (BILLIONS OF DOLLARS)	CYCLICALLY ADJUSTED BUDGET DEFICIT OR SURPLUS (BILLIONS OF DOLLARS)	CYCLICALLY ADJUSTED BUDGET DEFICIT OR SURPLUS AS A PERCENTAGE OF GDP
1929	\$2.6	\$1.0	\$1.24	1.20%
1930	2.7	0.2	0.81	0.89
1931	4.0	-2.1	-0.41	-0.54
1932	3.0	-1.3	0.50	0.85
1933	3.4	-0.9	1.06	1.88
1934	5.5	-2.2	0.09	0.14
1935	5.6	-1.9	0.54	0.74
1936	7.8	-3.2	0.47	0.56
1937	6.4	0.2	2.55	2.77
1938	7.3	-1.3	2.47	2.87
1939	8.4	-2.1	2.00	2.17



YOUR TURN: Test your understanding by doing related problem 6.7 at the end of this chapter.

Should the Federal Budget Always Be Balanced?

- ▶ Few economists believe that the gov should attempt to balance its budget every year:
- ▶ During a recession (expansion), the federal budget automatically moves into deficit (surplus). To bring the budget back into balance, the gov would have to increase (cut) taxes or cut (increase) spending, but these actions would reduce (increase) AD, thereby making the recession worse (raising the risk of higher inflation).

Deficits, Surpluses, and Federal Government Debt

The Federal Government Debt

15.6 LEARNING OBJECTIVE

Define federal budget deficit and federal government debt and explain how the federal budget can serve as an automatic stabilizer.

Figure 15-15

The Federal Government Debt, 1901–2009

The federal government debt increases whenever the federal government runs a budget deficit. The large deficits incurred during World Wars I and II, the Great Depression, and the 1980s and early 1990s increased the ratio of debt to GDP.

The large deficits of 2008 and, especially, 2009 caused the ratio to spike up to its highest level since 1949.



Is the Government Debt a Problem?

- ▶ Debt can be a problem for a gov for the same reasons that debt can be a problem for a HH or a firm.
- ▶ If a family is unable to make the monthly payments on its house, it will have to default on the loan and will lose its house. The fed gov. is in no danger of defaulting on its debt because the gov. can raise the funds through taxes to make the interest payments on the debt.
- ▶ Interest payments accounts for 10% of total federal expenditures. At this level, tax increases or significant cutbacks on other types of spending are not required.
- ▶ In the LR, crowding out of investment means a lower capital stock may occur if an increasing debt drives up IRs. Lower investment reduces the capacity of the economy to produce G&S.

The Long-Run Effects of Tax Policy

- ▶ Some FP actions are intended to have LR effects by expanding the productive capacity of the economy and increasing the rate of EG.
- ▶ *Tax wedge*: The difference between the pre-tax and post-tax return to an economic activity.
- ▶ We can briefly look at the effects on AS of cutting each of the following taxes:
 1. *Individual income tax*. Reducing the marginal tax rates on individual income will reduce the tax wedge faced by: (1) workers, thereby increasing the quantity of labor supply; (2) savers, thereby increasing the amount saved; (3) entrepreneurs, thereby increasing the number of new businesses.

- ▶ 2. (cont.) *Corporate income tax*. Cutting the marginal CI tax rate would encourage investment by increasing the return corporations receive from new investments. At the same time, it also increase the pace of technological process.
- 3. *Taxes on dividends and capital gains*. Lowering the tax rates on dividends and capital gains increases the supply of loanable funds from hhs to firms, increasing saving and investment and lowering the equilibrium real IR.

Tax Simplification

- ▶ There are also gains from tax *simplification* because it can:
 - ▶ reduces the resources used to deal with tax payments. E.g., some resources used by the tax preparation industry can be used to produce other G&S.
 - ▶ increase economic efficiency by reducing the number of decisions made by hhs and firms to reduce their tax payments. The decisions of HHs and firms are distorted by the complexity of the tax code.

Making the Connection

Should the United States Adopt the “Flat Tax”?

15.7 LEARNING OBJECTIVE

Discuss the effects of fiscal policy in the long run.



The flat tax would simplify tax preparation.

COUNTRY	FLAT TAX RATE	YEAR FLAT TAX WAS INTRODUCED
Estonia	26%	1994
Lithuania	33	1994
Latvia	25	1995
Russia	13	2001
Serbia	14	2003
Ukraine	13	2004
Slovakia	19	2004
Georgia	12	2005
Romania	16	2005



YOUR TURN: Test your understanding by doing related problem 7.7 at the end of this chapter.

The Effects of Fiscal Policy in the Long Run

15.7 LEARNING OBJECTIVE

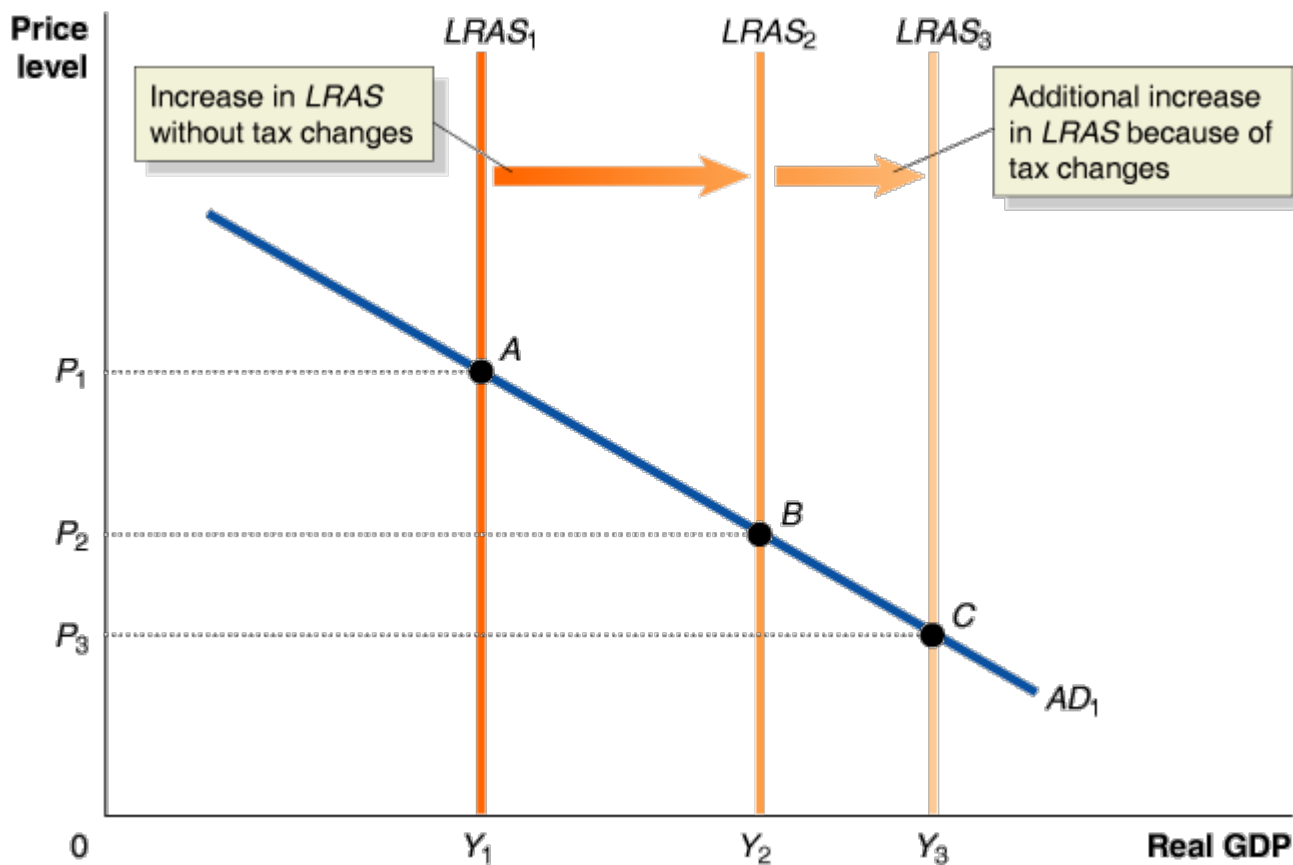
Discuss the effects of fiscal policy in the long run.

The Economic Effect of Tax Reform

Figure 15-16

The Supply-Side Effects of a Tax Change

The economy's initial equilibrium is at point *A*. With no tax change, the long-run aggregate supply curve shifts to the right, from $LRAS_1$ to $LRAS_2$. Equilibrium moves to point *B*, with the price level falling from P_1 to P_2 and real GDP increasing from Y_1 to Y_2 . With tax reductions and simplifications, the long-run aggregate supply curve shifts further to the right, to $LRAS_3$, and equilibrium moves to point *C*, with the price level falling to P_3 and real GDP increasing to Y_3 .



How Large Are Supply-Side Effects?

- ▶ Most economists would agree that there are supply-side effects to reducing taxes: Decreasing marginal income tax rates will increase the quantity of labor supplied, cutting the corporate income tax will increase investment spending, and so on.
- ▶ What is the *magnitude* of these effects? Some economists think that the effects are limited. E.g., many people work a number of hours set by their employer and can't adjust flexibly i.r.t. the changes in the tax rate. Similarly, saving and investment are affected much more by changes in income and changes in expectations of the future profitability. Some economists argue that tax changes may have larger effects on AD. Considerable debate on this issue.

Key Terms

- ▶ Fiscal policy
- ▶ Multiplier effect
- ▶ Automatic stabilizers
- ▶ Budget deficit; Budget surplus
- ▶ Crowding out
- ▶ Cyclically adjusted budget deficit or surplus
- ▶ Tax wedge

A Closer Look at the Multiplier

An Expression for Equilibrium Real GDP

$$(1) \quad C = 1,000 + 0.75 (Y - T)$$

Consumption function

$$(2) \quad I = 1,500$$

Planned investment function

$$(3) \quad G = 1,500$$

Government purchases function

$$(4) \quad T = 1,000$$

Tax function

$$(5) \quad Y = C + I + G$$

Equilibrium condition

A Closer Look at the Multiplier

An Expression for Equilibrium Real GDP

The letters with “bars” represent fixed or *autonomous* values that do not depend on the values of other variables. So, \bar{C} represents autonomous consumption, which had a value of 1,000 in our original example. Now, solving for equilibrium we get:

$$Y = \bar{C} + MPC(Y - \bar{T}) + \bar{I} + \bar{G}$$

or:

$$Y - MPC(Y) = \bar{C} - (MPC \times \bar{T}) + \bar{I} + \bar{G}$$

or:

$$Y(1 - MPC) = \bar{C} - (MPC \times \bar{T}) + \bar{I} + \bar{G}$$

or:

$$Y = \frac{\bar{C} - (MPC \times \bar{T}) + \bar{I} + \bar{G}}{1 - MPC}$$

A Closer Look at the Multiplier

A Formula for the Government Purchases Multiplier

$$\Delta Y = \frac{\Delta \bar{C} - (MPC \times \Delta \bar{T}) + \Delta \bar{I} + \Delta \bar{G}}{1 - MPC}$$

$$\Delta Y = \frac{\Delta \bar{G}}{1 - MPC}$$

$$\text{Government purchases multiplier} = \frac{\Delta Y}{\Delta G} = \frac{1}{1 - MPC}$$

A Closer Look at the Multiplier

A Formula for the Tax Multiplier

$$\Delta Y = \frac{\Delta \bar{C} - (MPC \times \Delta \bar{T}) + \Delta \bar{I} + \Delta \bar{G}}{1 - MPC}$$

$$\Delta Y = \frac{-MPC \times \Delta T}{1 - MPC}$$

Or:

$$\text{The tax multiplier} = \frac{\Delta Y}{\Delta T} = \frac{-MPC}{1 - MPC}$$

A Closer Look at the Multiplier

The “Balanced Budget” Multiplier

$$\text{The balanced budget multiplier} = \left(\frac{1 - MPC}{1 - MPC} \right), \text{ or } 1$$

A Closer Look at the Multiplier

The Effects of Changes in Tax Rates on the Multiplier

$$C = \bar{C} + MPC(1 - t)Y$$

$$\text{Government purchases multiplier} = \frac{\Delta Y}{\Delta G} = \frac{1}{1 - MPC(1 - t)}$$

A Closer Look at the Multiplier

The Multiplier in an Open Economy

We can define the *marginal propensity to import (MPI)* as the fraction of an increase in income that is spent on imports. So, our expression for imports is:

$$\text{Imports} = MPI \times Y$$

We can substitute our expressions for exports and imports into the expression we derived earlier for equilibrium real GDP:

$$Y = \bar{C} + MPC(1 - t)Y + \bar{I} + \bar{G} + \left[\left(\overline{\text{Exports}} - (MPI \times Y) \right) \right]$$

where the expression $\overline{\text{Exports}} - MPI \times Y$ represents net exports. We can now find an expression for the government purchases multiplier by using the same method we used previously:

$$\text{Government purchases multiplier} = \frac{\Delta Y}{\Delta G} = \frac{1}{1 - [MPC(1 - t) - MPI]}$$