

# Aggregate Demand and Aggregate Supply

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In this chapter, we develop the aggregate demand and aggregate supply model. The AD/AS model is a variable price model; that is, it allows us to see changes in the price level and changes in real GDP simultaneously. We explain changes in the price level and real GDP in both the short run and long run. This model will help us understand such key macroeconomic variables as inflation, unemployment, and economic growth. In the following chapters, we will also use this model to help us understand how stabilization policies can help with problems that result from recession and inflationary expansion.

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# The Determinants of Aggregate Demand

22.1

What is aggregate demand?

What are government purchases?

What is consumption?

What are net exports?

What is investment?

## What Is Aggregate Demand?

**Aggregate demand (AD)** is the sum of the demand for all final goods and services in the economy. It can also be seen as the quantity of real gross domestic product demanded at different price levels. The four major components of aggregate demand are consumption ( $C$ ), investment ( $I$ ), government purchases ( $G$ ), and net exports ( $X - M$ ). Aggregate demand, then, is equal to  $C + I + G + (X - M)$ .

**aggregate demand (AD)**  
the total demand for all the final goods and services in the economy

## Consumption ( $C$ )

Consumption is by far the largest component in aggregate demand. Expenditures for consumer goods and services typically absorb almost 70 percent of total economic activity, as measured by GDP. Understanding the determinants of consumption, then, is critical to an understanding of the forces leading to changes in aggregate demand, which, in turn, changes total output and income.



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*What are four major components of aggregate demand?*

## Investment ( $I$ )

Because investment spending (purchases of investment goods) is an important component of aggregate demand, which in turn is a determinant of the level of GDP, changes in investment spending are often responsible for changes in the level of economic activity. If consumption is determined largely by the level of disposable income, what determines the level of investment expenditure? As you may recall, investment expenditure is the most unstable category of GDP; it is sensitive to changes in economic, social, and political variables.



*What is the most unstable component of GDP?*

Many factors are important in determining the level of investment. Good business conditions “induce” firms to invest because a healthy growth in demand for products in the future seems likely, based on current experience. We will consider the key variables that influence investment spending in the next section.

## Government Purchases ( $G$ )

Government purchases, another component of aggregate demand, include spending by federal, state, and local governments for the purchase of new goods and services produced. For example, an increase in highway or other transportation projects will increase aggregate demand, holding other factors like interest rates and taxes constant.

## Net Exports ( $X - M$ )

The interaction of the U.S. economy with the rest of the world is becoming increasingly important. Up to this point, for simplicity, we have not included the foreign sector. However, international trade must be incorporated into the framework. Models that include the effects of international trade are called **open economy** models.

**open economy**  
a type of model that includes international trade effects

**net exports**

the difference between the value of exports and the value of imports

Remember, exports are goods and services that we sell to foreign customers, such as movies, wheat, and Ford Mustangs; imports are goods and services that we buy from foreign companies, such as BMWs, French wine, and Sony TVs. Exports and imports can alter aggregate demand. Exports minus imports is what we call **net exports**. If exports are greater than imports ( $X > M$ ), we have positive net exports. If imports are greater than exports ( $X < M$ ), net exports are negative.

The impact of net exports ( $X - M$ ) on aggregate demand is similar to the impact of government purchases on aggregate demand. Suppose that the United States has no trade surplus and no trade deficit—zero net exports. What would happen if foreign consumers started buying more U.S. goods and services, while U.S. consumers continued to buy imports at roughly the same rate? The result would be *positive net exports* ( $X > M$ ) and greater demand for U.S. goods and services—a higher level of aggregate demand. What if a country has a trade deficit? Assuming, again, that the economy initially has zero net exports, a trade deficit, or *negative net exports* ( $X < M$ ), would lower U.S. aggregate demand, *ceteris paribus*.

**SECTION QUIZ**

1. The largest component of aggregate demand is
  - a. government purchases.
  - b. net exports.
  - c. consumption.
  - d. investment.
2. A reduction in personal income taxes, other things being equal, will
  - a. leave consumers with less disposable income.
  - b. decrease aggregate demand.
  - c. leave consumers with more disposable income.
  - d. increase aggregate demand.
  - e. do both (c) and (d).
3. Aggregate demand is the sum of \_\_\_\_\_.
  - a.  $C + I + G$
  - b.  $C + I + G + X$
  - c.  $C + I + G + (X - M)$
  - d.  $C + I + G + (X + M)$
4. Empirical evidence suggests that consumption \_\_\_\_\_ with any \_\_\_\_\_.
  - a. decreases; increase in income
  - b. decreases; tax cut
  - c. increases; decrease in consumer confidence
  - d. increases; increase in income
  - e. Both (a) and (b) are true.
5. Investment ( $I$ ) includes
  - a. the amount spent on new factories and machinery.
  - b. the amount spent on stocks and bonds.
  - c. the amount spent on consumer goods that last more than one year.
  - d. the amount spent on purchases of art.
  - e. all of the above.

(continued)

## SECTION QUIZ (Cont.)



6. If our exports of final goods and services increase more than our imports, other things being equal, aggregate demand will
- increase.
  - be negative.
  - decrease by the change in net exports.
  - stay the same.
  - do none of the above.

- What are the major components of aggregate demand?
- How would an increase in personal taxes or a decrease in transfer payments affect consumption?
- What would an increase in exports do to aggregate demand, other things being equal? An increase in imports? An increase in both imports and exports, where the change in exports was greater in magnitude?

Answers: 1. c 2. e 3. c 4. d 5. a 6. a

## The Aggregate Demand Curve

### 22.2

How is the aggregate demand curve different from the demand curve for a particular good?

Why is the aggregate demand curve downward sloping?

The **aggregate demand curve** reflects the total amount of real goods and services that all groups together want to purchase in a given period. In other words, it indicates the quantities of real gross domestic product demanded at different price levels. Note that this is different from the demand curve for a particular good presented in Chapter 4, which looked at the relationship between the relative price of a good and the quantity demanded. Because we are dealing with the economy as a whole, we need an explanation for why the aggregate demand curve is downward sloping and why the short-run aggregate supply curve is upward sloping.

#### aggregate demand curve

graph that shows the inverse relationship between the price level and RGDP demanded



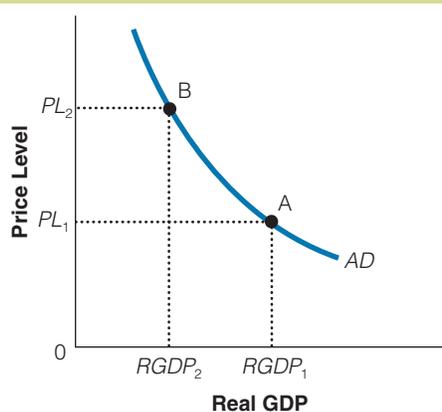
*How is the aggregate demand curve different than the demand curve for a particular good?*

### How Is the Quantity of Real GDP Demanded Affected by the Price Level?

The aggregate demand curve slopes downward, which means an inverse (or opposite) relationship exists between the price level and real gross domestic product (RGDP) demanded. Exhibit 1 illustrates this relationship, where the quantity of RGDP demanded is measured on the horizontal axis and the overall price level is measured on the vertical axis. As we move from point A to point B on the aggregate demand curve, we see that an increase in the price level causes RGDP demanded to fall. Conversely, if a reduction in the price level occurs—a movement from B to A—RGDP demanded increases. Why do purchasers in the economy demand less real output when the price level rises and more real output when the price level falls?

section 22.2  
exhibit 1

### The Aggregate Demand Curve



The aggregate demand curve slopes downward, reflecting an inverse relationship between the overall price level and the quantity of real GDP demanded. When the price level increases, the quantity of RGDP demanded decreases; when the price level decreases, the quantity of RGDP demanded increases.

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## Why Is the Aggregate Demand Curve Negatively Sloped?

Three complementary explanations exist for the negative slope of the aggregate demand curve: the wealth effect, the interest rate effect, and the open economy effect.

### The Wealth Effect: Changes in Consumer Spending

If you had \$1,000 in cash stashed under your bed while the economy suffered a serious bout of inflation, the purchasing power of your cash would be eroded by the extent of the inflation. That is, an increase in the price level reduces the real value of money and makes consumers poorer, encouraging them to spend less. A decrease in consumer spending means a decrease in quantity of RGDP demanded.

In the event that the price level falls, the reverse would hold true. A falling price level increases the real value of money and makes consumers wealthier, encouraging them to spend more. An increase in consumer spending means an increase in the quantity of RGDP demanded. This is called the wealth effect of a change in the price level. Because of the wealth effect, consumer spending,  $C$ , falls (rises) when the price level increases (decreases).



*What is the wealth effect of a price level change?*



*How does a lower price level lead to lower interest rates?*

### The Interest Rate Effect: A Change in Investment

If the price level falls, households and firms will need to hold less money to conduct their day-to-day activities. Firms will need to hold less money for such inputs as wages and taxes; households will need to hold less money for such purchases as food, rent, and clothing. At a lower price level, households and firms will shift their “excess” money into interest-earning assets such as bonds or savings accounts. This will increase the supply of funds to the loanable funds market, leading to lower interest rates. As interest rates fall, households and firms will borrow more and buy more goods and services—thus, the quantity of RGDP demanded will increase.

If the price level rises, households and firms will need to hold more money to buy goods and services and conduct their daily activities. Households and firms will need to borrow money, and this increased demand for loanable funds will result in higher interest rates. At higher interest rates, consumers may give up plans to buy new cars or houses, and firms may delay investments in plant and equipment.

In sum, a higher price level raises the interest rate and discourages investment spending and decreases the quantity of RGDP demanded. A lower price level reduces the interest rate and encourages investment spending causing RGDP demanded to rise.

### The Open Economy Effect

Many goods and services are bought and sold in global markets. If the price level in the United States rises relative to the price level in other countries, U.S. exports will become relatively more expensive and foreign imports will become relatively less expensive. Some U.S. consumers will shift from buying domestic goods to buying foreign goods (imports). Some foreign consumers will stop buying U.S. goods. U.S. exports will fall and U.S. imports will rise. Thus, net exports will fall, thereby reducing the amount of RGDP purchased in

the United States. A lower price level makes U.S. exports less expensive and foreign imports more expensive. So U.S. consumers will buy more domestic goods, and foreign consumers will buy more U.S. goods. This will increase net exports, thereby increasing the amount of RGDP purchased in the United States.

## SECTION QUIZ



1. The aggregate demand curve
  - a. is negatively sloped.
  - b. demonstrates an inverse relationship between the price level and real gross domestic product demanded.
  - c. shows how real gross domestic product demanded changes with the changes in the price level.
  - d. All of the above are correct.
2. As the price level increases, other things being equal,
  - a. aggregate demand decreases.
  - b. the quantity of real gross domestic product demanded increases.
  - c. the quantity of real gross domestic product demanded decreases.
  - d. aggregate demand increases.
  - e. both (a) and (c) occur.
3. According to the real wealth effect, if you are living in a period of falling price levels on a fixed income (that is, not indexed), the cost of the goods and services you buy \_\_\_\_\_ and your real income \_\_\_\_\_.
  - a. decreases; decreases
  - b. increases; increases
  - c. decreases; remains the same
  - d. decreases; increases
4. As the price level decreases, real wealth \_\_\_\_\_, purchasing power \_\_\_\_\_, and the quantity of RGDP demanded \_\_\_\_\_.
  - a. increases; decreases; increases
  - b. increases; increases; increases
  - c. decreases; decreases; decreases
  - d. decreases; decreases; increases
  - e. increases; decreases; decreases
5. As the price level increases, interest rates \_\_\_\_\_, investments \_\_\_\_\_, and the quantity of RGDP demanded \_\_\_\_\_.
  - a. decrease; increase; decreases
  - b. increase; increase; decreases
  - c. decrease; decrease; increases
  - d. decrease; increase; increases
  - e. increase; decrease; decreases
6. What is the open economy effect?
  - a. If prices of the goods and services in the domestic market rise relative to those in global markets as a result of a higher domestic price level, consumers and businesses will buy less from foreign producers and more from domestic producers.
  - b. People are allowed to trade with anyone, anywhere, anytime.
  - c. It is the ability of firms to enter or leave the marketplace—easy entry and exit with low entry barriers.
  - d. If prices of the goods and services in the domestic market rise relative to those in global markets as a result of a higher domestic price level, consumers and businesses will buy more from foreign producers and less from domestic producers, other things being equal.

(continued)

## SECTION QUIZ (Cont.)



7. Which of the following helps explain the downward slope of the aggregate demand curve?
  - a. the real wealth effect
  - b. the interest effect
  - c. the open economy effect
  - d. all of the above
  - e. none of the above
8. Which of the following will result as part of the interest rate effect when the price level rises?
  - a. Money demand will increase.
  - b. Interest rates will increase.
  - c. The dollar amount of investment will decrease.
  - d. A lower quantity of real GDP will be demanded.
  - e. All of the above will result.

1. Why is the aggregate demand curve downward sloping?
2. How does an increased price level reduce the quantities of investment goods and consumer durables demanded?
3. What is the wealth effect, and how does it imply a downward-sloping aggregate demand curve?
4. What is the interest rate effect, and how does it imply a downward-sloping aggregate demand curve?
5. What is the open economy effect, and how does it imply a downward-sloping aggregate demand curve?

Answers: 1. d 2. c 3. d 4. b 5. e 6. d 7. d 8. e

## 22.3

## Shifts in the Aggregate Demand Curve

What is the difference between a movement along and a shift in the aggregate demand curve?

What variables shift the aggregate demand curve to the right?

What variables shift the aggregate demand curve to the left?

## Shifts versus Movements along the Aggregate Demand Curve

Like the supply and demand curves described in Chapter 4, the aggregate demand curve may experience both shifts and movements. In the previous section, we discussed three factors—the real wealth effect, the interest rate effect, and the open economy effect—that result in the downward slope of the aggregate demand curve. Each of these factors, then, generates a movement *along* the aggregate demand curve in reaction to changes in the general price level. In this section, we will discuss some of the many factors that can cause the aggregate demand curve to shift to the right or left.

The whole aggregate demand curve can shift to the right or left, as shown in Exhibit 1. Put simply, if some nonprice-level determinant causes total spending to increase, the aggregate demand curve will shift to the right. If a nonprice-level determinant causes the level of total spending to decline, the aggregate demand curve will shift to the left. Let's look at some specific factors that could cause the aggregate demand curve to shift.

## Aggregate Demand Curve Shifters

Anything that changes the amount of total spending in the economy (holding price levels constant) will affect the aggregate demand curve. An increase in any component of GDP ( $C$ ,  $I$ ,  $G$ , or  $X - M$ ) will cause the aggregate demand curve to shift rightward. Conversely, decreases in  $C$ ,  $I$ ,  $G$ , or  $X - M$  will shift aggregate demand leftward.

### Changing Consumption ( $C$ )

A whole host of changes could alter consumption patterns. For example, an increase in consumer confidence, an increase in wealth (not the wealth effect caused by the change in the price level), or a tax cut can increase consumption and shift the aggregate demand curve to the right. An increase in population will also increase the aggregate demand because more consumers will be spending more money on goods and services. A lower interest rate can also spur consumption spending.

Of course, the aggregate demand curve could shift to the left as a result of decreases in consumption demand. For example, if consumers sense that the economy is headed for a recession, if the government imposes a tax increase or if interest rates rise, the result will be a leftward shift of the aggregate demand curve. Because saving more is consuming less, an increase in saving, *ceteris paribus*, will shift aggregate demand to the left. Consumer debt may also cause some consumers to put off additional spending.

### Changing Investment ( $I$ )

Investment is also an important determinant of aggregate demand. Increases in the demand for investment goods occur for a variety of reasons. For example, if business confidence increases or real interest rates fall, business investment will increase and aggregate demand will shift to the right. A reduction in business taxes would also shift the aggregate demand curve to the right, because businesses would now retain more of their profits to invest. However, if interest rates or business taxes rise, we would expect to see a leftward shift in aggregate demand.

### Changing Government Purchases ( $G$ )

Government purchases are another part of total spending and therefore must have an impact on aggregate demand. An increase in government purchases, other things being equal, shifts the aggregate demand curve to the right, while a reduction shifts aggregate demand to the left. If state governments start building new highways, this will lead to a rightward shift in aggregate demand, too.

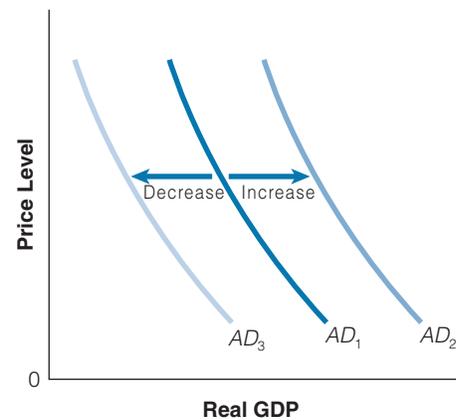
### Changing Net Exports ( $X - M$ )

Global markets are also important in a domestic economy. For example, when major trading partners experience economic slowdowns, they will demand fewer U.S. imports. This causes U.S. net exports ( $X - M$ ) to fall, shifting aggregate demand to the left. Alternatively, an economic boom in the economies of major trading partners may lead to an increase in our exports to them, causing net exports ( $X - M$ ) to rise and aggregate demand to increase.

In addition, changes in the exchange rate can shift the aggregate demand curve. Suppose financial speculators lose confidence in foreign economies and want to put their wealth in the U.S. economy. As foreigners convert their wealth into dollars, the dollar appreciates. This makes U.S. goods more expensive compared to foreign goods, which decreases net exports and shifts the aggregate demand curve to the left. Of course, speculation could also lead to a depreciation of the dollar. This would stimulate net exports and shift the aggregate demand curve to the right.

#### section 22.3 exhibit 1

#### Shifts in the Aggregate Demand Curve



An increase in aggregate demand shifts the curve to the right (from  $AD_1$  to  $AD_2$ ). A decrease in aggregate demand shifts the curve to the left (from  $AD_1$  to  $AD_3$ ).

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*Do wealth increases and/or tax cuts increase the consumption component of aggregate demand?*



*How do foreign economies' growth rates affect a country's domestic aggregate demand?*

# Use

what you've learned

## Changes in Aggregate Demand

**Q** Any aggregate demand category that has the ability to change total purchases in the economy will shift the aggregate demand curve. That is, changes in consumption purchases, investment purchases, government purchases, or net export purchases shift the aggregate demand curve. For each component

of aggregate demand ( $C$ ,  $I$ ,  $G$ , and  $X - M$ ), list some changes that can increase aggregate demand. Then list some changes that can decrease aggregate demand.

**A** The following are some aggregate demand curve shifters.

### INCREASES IN AGGREGATE DEMAND (RIGHTWARD SHIFT)

#### Consumption ( $C$ )

- lower personal taxes
- a rise in consumer confidence
- greater stock market or real estate wealth
- an increase in transfer payments or lower real interest rates

#### Investment ( $I$ )

- lower real interest rates
- optimistic business forecasts
- lower business taxes

#### Government purchases ( $G$ )

- an increase in government purchases

#### Net exports ( $X - M$ )

- income increases abroad, which will likely increase the sale of domestic goods (exports)
- speculation that causes a depreciation of the dollar and stimulates net exports

### DECREASES IN AGGREGATE DEMAND (LEFTWARD SHIFT)

#### Consumption ( $C$ )

- higher personal taxes
- a fall in consumer confidence
- reduced stock market or real estate wealth
- a reduction in transfer payments or higher real interest rates

#### Investment ( $I$ )

- higher real interest rates
- pessimistic business forecasts
- higher business taxes

#### Government purchases ( $G$ )

- a reduction in government purchases

#### Net exports ( $X - M$ )

- income falls abroad, which leads to a reduction in the sale of domestic goods (exports)
- speculation that causes an appreciation of the dollar and depresses net exports

## SECTION QUIZ

1. An economic bust or severe downturn in the Japanese economy will likely result in a(n)
  - a. decrease in U.S. exports and U.S. aggregate demand.
  - b. increase in U.S. exports and U.S. aggregate demand.
  - c. decrease in U.S. imports and U.S. aggregate demand.
  - d. increase in U.S. imports and U.S. aggregate demand.
2. Which of the following will cause consumption and, as a result, aggregate demand to decrease?
  - a. a tax increase
  - b. a fall in consumer confidence
  - c. reduced stock market wealth
  - d. rising levels of consumer debt
  - e. all of the above
3. A massive increase in interstate highway construction will affect aggregate demand through which sector? Will this change increase or decrease aggregate demand?
  - a. investment; increase
  - b. government purchases; increase
  - c. government purchases; decrease
  - d. consumption; decrease



(continued)

## SECTION QUIZ (Cont.)



4. An increase in government purchases, combined with a decrease in investment, would have what effect on aggregate demand?
  - a. *AD* would increase.
  - b. *AD* would decrease.
  - c. *AD* would stay the same.
  - d. *AD* could either increase or decrease, depending on which change was of greater magnitude.
5. An increase in consumption, combined with an increase in exports, would have what effect on aggregate demand?
  - a. *AD* would increase.
  - b. *AD* would decrease.
  - c. *AD* would stay the same.
  - d. *AD* could either increase or decrease, depending on which change was of greater magnitude.
6. What would happen to aggregate demand if the federal government increased military purchases and state and local governments decreased their road-building budgets at the same time?
  - a. *AD* would increase because only federal government purchases affect *AD*.
  - b. *AD* would decrease because only state and local government purchases affect *AD*.
  - c. *AD* would increase if the change in federal purchases was greater than the change in state and local purchases.
  - d. *AD* would decrease if the change in federal purchases was greater than the change in state and local purchases.
7. If exports and imports both decrease, but exports decrease more than imports,
  - a. *AD* would decrease.
  - b. *AD* would increase.
  - c. *AD* would be unaffected.
  - d. *AD* could either increase or decrease.

- 
1. How is the distinction between a change in demand and a change in quantity demanded the same for aggregate demand as for the demand for a particular good?
  2. What happens to aggregate demand if the demand for consumption goods increases, *ceteris paribus*?
  3. What happens to aggregate demand if the demand for investment goods falls, *ceteris paribus*?

Answers: 1. a 2. e 3. b 4. d 5. a 6. c 7. a

## The Aggregate Supply Curve

### 22.4

☞ What does the aggregate supply curve represent?

☞ Why do producers supply more as the price level increases in the short run?

☞ Why is the long-run aggregate supply curve vertical at the natural rate of real output?

### What Is the Aggregate Supply Curve?

The **aggregate supply (AS) curve** is the relationship between the total quantity of final goods and services that suppliers are *willing* and *able* to produce and the overall price level. The aggregate supply curve represents how much RGDP suppliers are willing to produce

**aggregate supply (AS) curve** the total quantity of final goods and services suppliers are willing and able to supply at a given price level



*What is the difference between the short-run aggregate supply curve and the long-run aggregate supply curve?*

### short-run aggregate supply (SRAS) curve

the graphical relationship between RGDP and the price level when output prices can change but input prices are unable to adjust

### long-run aggregate supply (LRAS) curve

the graphical relationship between RGDP and the price level when output prices and input prices can fully adjust to economic changes



*How do rising output prices change a firm's profit margins in the short run?*

at different price levels. In fact, the two aggregate supply curves are a **short-run aggregate supply (SRAS) curve** and a **long-run aggregate supply (LRAS) curve**. The short-run relationship refers to a period when output can change in response to supply and demand, but input prices have not yet been able to adjust. For example, wages are assumed to adjust slowly in the short run. The long-run relationship refers to a period long enough for the prices of outputs and all inputs to fully adjust to changes in the economy.

Because the effects of the price level on aggregate supply is very different in the short run versus the long run, we have two aggregate supply curves—one for the long run and one for the short run.

## Why Is the Short-Run Aggregate Supply Curve Positively Sloped?

In the short run, the aggregate supply curve is upward sloping, as shown in Exhibit 1. At a higher price level, then, producers are willing to supply more real output, and at lower price levels, they are willing to supply less real output. Why would producers be willing to supply more output just because the price level increases? Two possible explanations are the profit effect and the misperception effect.

### The Profit Effect

For many firms, input costs—wages and rents, for example—are relatively constant in the short run. Workers and other material input suppliers often enter into long-term contracts with firms at prearranged prices. Thus, the slow adjustments of input prices are due to contracts that do not adjust quickly to output overall price level changes. So when the overall price level rises, output prices rise relative to input prices (costs), raising producers' short-run profit margins. That is, a higher price level leads to a higher profit per unit of output and higher RGDP supplied because wages and other input prices can be slow to adjust in the short run. With this short-run profit effect, the increased profit margins make it in producers' self-interest to expand production and sales at higher price levels.

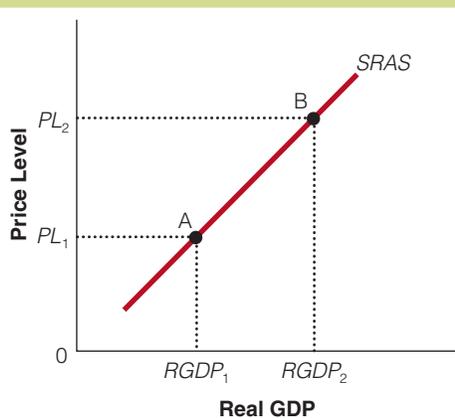
If the price level falls, output prices fall and producers' profits tend to fall. That is, a lower price level leads to a lower profit per unit of output and lower RGDP supplied because wages and other input prices can be slow to adjust in the short run. Again, this is because many input costs, such as wages and other contracted costs, are relatively constant in the short run. When output price levels fall, producers find it more difficult to cover their input costs and, consequently, reduce their levels of output.

### The Misperception Effect

The second explanation for the upward-sloping short-run aggregate supply curve is that producers can be fooled by price changes in the short run. That is, changes in the overall price level can temporarily mislead producers about what is taking place in their particular market. For example, suppose a wheat farmer sees the price of wheat rising. Thinking that the *relative price* of wheat is rising (i.e., that wheat is becoming more valuable in real terms), the wheat farmer supplies more. Suppose, however, that wheat was not the

#### section 22.4 exhibit 1

### The Short-Run Aggregate Supply Curve



The short-run aggregate supply (SRAS) curve is upward sloping. Suppliers are willing to supply more RGDP at higher price levels and less at lower price levels, other things being equal.

only thing for which prices were rising. What if the prices of many other goods and services that the farmer consumes were rising at the same time as a result of an increase in the price level? The relative price of wheat, then, was not actually rising, although it appeared so in the short run. In this case, the farmer was fooled into supplying more based on his *short-run misperception* of relative prices. In other words, producers can be fooled into thinking that the relative prices of the items they are producing are rising and mistakenly increase production.

Similarly, if the overall price level falls, many wheat farmers may mistakenly believe the relative price of wheat has fallen. This could fool these farmers into temporarily producing less wheat.

Workers can also be fooled. If the price level is rising, the first thing they may notice is that their nominal wages—expressed in current dollars—are rising. So they may mistakenly believe that the reward for working has risen and increase the quantity of labor they supply. Only later do they realize that the price of the goods and services they buy are also rising; that is, their real wages (wages that are adjusted for inflation) have not risen. They have been fooled into supplying more of their labor into the market.

The key in all of these cases is that their short-run misperceptions about relative prices temporarily fools the supplier into producing more as the overall price level rises and produces less as the overall price level falls. This leads to an upward-sloping short-run aggregate supply curve.

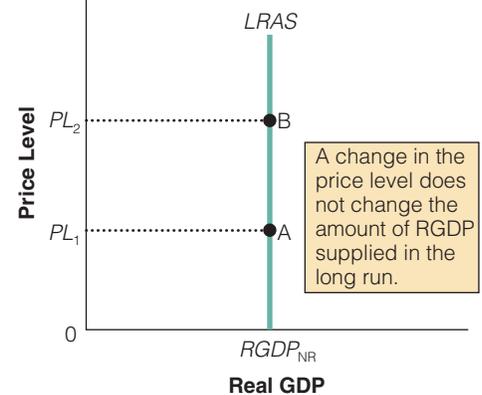
## Why Is the Long-Run Aggregate Supply Curve Vertical?

Along the short-run aggregate supply curve, we assume that wages and other input prices are constant. This assumption is not the case in the long run, which is a period long enough for the price of all inputs to fully adjust to changes in the economy. When we move along the long-run supply curve, we are looking at the relationship between RGDP produced and the price level, once input prices have been able to respond to changes in output prices. Along the long-run aggregate supply (*LRAS*) curve, two sets of prices are changing: the price of outputs and the price of inputs. That is, along the *LRAS* curve, a 10 percent increase in the price of goods and services is matched by a 10 percent increase in the price of inputs. The long-run aggregate supply curve is thus insensitive to the price level. As we can see in Exhibit 2, the *LRAS* curve is drawn as perfectly vertical, reflecting the fact that the level of RGDP producers are willing to supply is not affected by changes in the price level. Note that the vertical long-run aggregate supply curve will always be positioned at the natural rate of real output, where all resources are fully employed ( $RGDP_{NR}$ ). That is, in the long run, firms will always produce at the maximum level allowed by their capital, labor, and technological inputs, regardless of the price level.

The long-run equilibrium level is where the economy will settle when undisturbed and when all resources are fully employed. Remember that the economy will always be at the intersection of aggregate supply and aggregate demand, but that point will not always be at the natural rate of real output,  $RGDP_{NR}$ . Long-run equilibrium will only occur where the aggregate supply and aggregate demand curves intersect along the long-run aggregate supply curve at the natural, or potential, rate of real output.

### section 22.4 exhibit 2

### The Long-Run Aggregate Supply Curve



Along the long-run aggregate supply curve, the level of RGDP does not change with a change in the price level. The position of the *LRAS* curve is determined by the natural rate of output,  $RGDP_{NR}$ , which reflects the levels of capital, land, labor, and technology in the economy.

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*Why is the long-run aggregate supply curve vertical at the natural rate of unemployment?*

## SECTION QUIZ



1. The short-run aggregate supply curve slopes
  - a. downward because firms can sell more, and hence, will produce more when prices are lower.
  - b. downward because firms find it costs less to purchase labor and other inputs when prices are lower, and hence they produce more.
  - c. upward because when the price level rises, output prices rise relative to input prices (costs), raising profit margins and increasing production and sales.
  - d. upward because firms find that it costs more to purchase labor and other inputs when prices are higher, and hence they must produce and sell more in order to make a profit.
2. If the price level rises, what happens to the level of real GDP supplied?
  - a. It will increase in both the short run and long run.
  - b. It will increase in the short run but not in the long run.
  - c. It will decrease in both the short run and long run.
  - d. It will decrease in the short run but not in the long run.
  - e. It will usually decrease, but not always.
3. The short run is
  - a. a time period in which the prices of output cannot change but in which the prices of inputs have time to adjust.
  - b. a time period in which output prices can change in response to supply and demand but in which all input prices have not yet been able to completely adjust.
  - c. a time period in which neither the prices of output nor the prices of inputs are able to change.
  - d. any time period of less than a year.
4. The profit effect is explained in the text as follows:
  - a. When the price level decreases, output prices rise relative to input prices (costs), raising producers' short-run profit margins.
  - b. At equilibrium prices, when costs rise, profit margins are able to float with them and be passed along.
  - c. The profit effect is only a long-run phenomenon.
  - d. When the price level rises, output prices rise relative to input prices (costs), raising producers' short-run profit margins.
5. The text's explanation of the misperception effect for an upward-sloping short-run aggregate supply curve is based on
  - a. falling profit margins as the price level rises.
  - b. rising costs of production as the price level rises.
  - c. fixed-wage labor contracts.
  - d. the fact that producers may be fooled into thinking that the relative price of the item they are producing is rising and as a result increase production.

- 
1. What relationship does the short-run aggregate supply curve represent?
  2. What relationship does the long-run aggregate supply curve represent?
  3. Why is focusing on producers' profit margins helpful in understanding the logic of the short-run aggregate supply curve?
  4. Why is the short-run aggregate supply curve upward sloping, while the long-run aggregate supply curve is vertical at the natural rate of output?
  5. What would the short-run aggregate supply curve look like if input prices always changed instantaneously as soon as output prices changed? Why?
  6. If the price of cotton increased 10 percent when cotton producers thought other prices were rising 5 percent over the same period, what would happen to the quantity of RGDP supplied in the cotton industry? What if cotton producers thought other prices were rising 20 percent over the same period?

Answers: 1. c 2. b 3. b 4. d 5. d

# Shifts in the Aggregate Supply Curve

22.5

Which factors of production affect the short-run and long-run aggregate supply curves?

What factors shift the short-run aggregate supply curve exclusively?

## Shifting Short-Run and Long-Run Supply Curves

We will now examine the determinants that can shift the short-run and long-run aggregate supply curves, as shown in Exhibit 1. Any change in the quantity of any factor of production available—capital, land, labor, or technology—can cause a shift in both the long-run and short-run aggregate supply curves. We will now see how these factors can change the positions of both types of aggregate supply curves.

### How Capital Affects Aggregate Supply

Changes in the stock of capital will alter the amount of goods and services the economy can produce. Investing in capital improves the quantity and quality of the capital stock, which lowers the cost of production in the short run. This change in turn shifts the short-run aggregate supply curve rightward and firms will supply more output at every price level. It also allows output to be permanently greater than before, shifting the long-run aggregate supply curve rightward, *ceteris paribus*.

Changes in human capital can also alter the aggregate supply curve. Investments in human capital include educational or vocational programs and on-the-job training. All these investments in human capital cause productivity to rise. As a result, the short-run aggregate supply curve shifts to the right, because a more skilled workforce lowers the cost of production. The *LRAS* curve also shifts to the right, because greater output is achievable on a permanent, or sustainable, basis, *ceteris paribus*.

### Technology and Entrepreneurship

Bill Gates of Microsoft, the late Steve Jobs of Apple Computer, and Larry Ellison of Oracle are just a few examples of entrepreneurs who, through inventive activity, developed innovative technology. Computers and specialized software led to many cost savings—ATMs, bar-code scanners, biotechnology, and increased productivity across the board. These activities shifted both the short-run and long-run aggregate supply curves rightward by lowering costs and expanding real output possibilities.

### Land (Natural Resources)

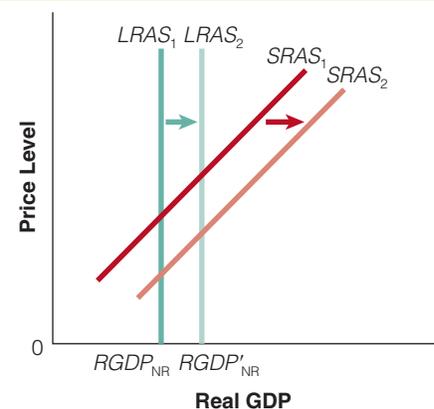
Remember that, in economics, *land* has an all-encompassing definition that includes all natural resources. An increase in natural resources, such as successful oil exploration, would presumably lower the costs of production and expand the economy's sustainable rate of output, shifting both the short-run and long-run aggregate supply curves to the right. Likewise, a decrease in available natural resources would result in a leftward shift of both the short-run and long-run aggregate supply curves. For example, in the 1970s and early 1980s, when the OPEC cartel was strong and effective at raising world oil prices, both short-run and long-run aggregate supply curves shifted to the left, as the members of the cartel deliberately reduced the production of oil.



The potential level of RGDP for a nation is determined by such things as the size and skills of its labor force, the size and quality of its stock of capital goods, the quantity and quality of its natural resources, its technological capabilities, and its legal and cultural institutions.

#### section 22.5 exhibit 1

#### Shifts in Both Short-Run and Long-Run Aggregate Supply



Increases in any of the factors of production—capital, land, labor, or technology—can shift both the *LRAS* and *SRAS* curves to the right. Of course, changes that result in decreases in *SRAS* or *LRAS* will shift the respective curves to the left.

## The Labor Force

The addition of workers to the labor force, *ceteris paribus*, can increase aggregate supply. For example, during the 1960s, women and baby boomers entered the labor force in large numbers. This increase tended to depress wages and increase short-run aggregate supply, *ceteris paribus*. The expanded labor force also increased the economy's potential output, increasing long-run aggregate supply. Japan's aging population is causing a decrease in the labor force in recent years—a leftward shift in the long-run aggregate supply curve, *ceteris paribus*.

## Government Regulations

Increases in government regulations can make it more costly for producers. This increase in production costs results in a leftward shift of the short-run aggregate supply curve, and a reduction in society's potential output shifts the long-run aggregate supply curve to the left as well. Likewise, a reduction in government regulations on businesses would lower the costs of production and expand potential real output, causing both the SRAS and LRAS curves to shift to the right.

## What Factors Shift the Short-Run Aggregate Supply Curve Only?



What factors just shift the SRAS curve?

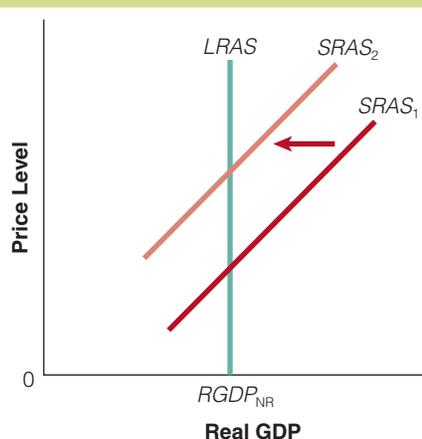
Some factors shift the short-run aggregate supply curve but do not change the long-run aggregate supply curve. The most important of these factors are wages and other input prices, changes in the expected future price level, and unexpected supply shocks. Exhibit 2 illustrates the effect of these factors on short-run aggregate supply.

### Wages and Other Input Prices

The price of factors, or inputs, that go into producing outputs will affect only the short-run aggregate supply curve if they do not reflect permanent changes in the supplies of some factors of production. For example, if money or nominal wages increase without a corresponding increase in labor productivity, it will become more costly (less profitable) for suppliers to produce goods and services at every price level, causing the SRAS curve to shift to the left. As Exhibit 3 shows, long-run aggregate supply will not shift because, with the same supply of labor as before, potential output does not change.

#### section 22.5 exhibit 2

### Shifts in Short-Run Aggregate Supply but Not Long-Run Aggregate Supply



A change in input prices that does not reflect a permanent change in the supply of those inputs will shift the SRAS curve but not the LRAS curve. Likewise, adverse supply shocks, such as those caused by natural disasters, may cause a temporary change that will only impact short-run aggregate supply.

### Nonlabor Input Prices

A decrease in the price of a nonlabor input, like oil, will lower production costs (making firms more profitable), and they will be more willing to increase supply at every given price level, shifting the SRAS curve to the right.

For example, a decrease in an input price (such as oil) will shift the SRAS curve to the right. If the price of steel or oil rises, automobile producers will find it more expensive to do business because their production costs will rise, again resulting in a leftward shift in the short-run aggregate supply curve. The LRAS curve will not shift, however, as long as the capacity to make steel has not been reduced.

### Changes in the Expected Future Price Level

If workers and firms believe that the price level is going to increase in the near future, they will try to adjust their wages and other input prices to compensate for the price level increase. For example, labor unions might fight to get a

3 percent increase in wages for their members if they anticipate the price level to rise 3 percent next year. If they are successful in getting the wage increase for their members, this will cause the short-run aggregate supply curve to shift to the left.

Of course, firms and workers can make incorrect predictions about the future price level. For example, if workers expect a small increase in the price level and it turns out to be much larger, they will negotiate for even higher wages in the next contract—this will shift the *SRAS* curve leftward. The higher wages will increase the firm’s costs, and it will need higher prices now to produce the same level of output. If most firms and workers are making the adjustment to a higher than expected price level, then the *SRAS* curve will shift left. If they are adjusting to the price level being lower than expected, then the *SRAS* curve will shift right.

### Supply Shocks

**Supply shocks** are unexpected temporary events that can either increase or decrease the short-run aggregate supply. For example, negative supply shocks like major widespread flooding, earthquakes, droughts, and other natural disasters can increase the costs of production, causing the short-run aggregate supply curve to shift to the left, *ceteris paribus*. However, once the temporary effects of these disasters have been felt, no appreciable change in the economy’s productive capacity has occurred, so the long-run aggregate supply doesn’t shift as a result. Other temporary supply shocks, such as disruptions in trade due to war or labor strikes, will have similar effects on short-run aggregate supply. However, positive supply shocks such as favorable weather conditions or temporary price reductions of imported resources like oil can lower production costs and shift the short-run aggregate supply curve rightward. During the mid- to late 1990s, the United States experienced a positive supply shock as the Internet, and information technology in general, gave a huge boost to productivity.

**supply shocks**  
unexpected temporary events that can either increase or decrease aggregate supply

Exhibit 4 presents a table that summarizes the factors that can shift the short-run aggregate supply curve, the long-run aggregate supply curve, or both, depending on whether the effects are temporary or permanent.

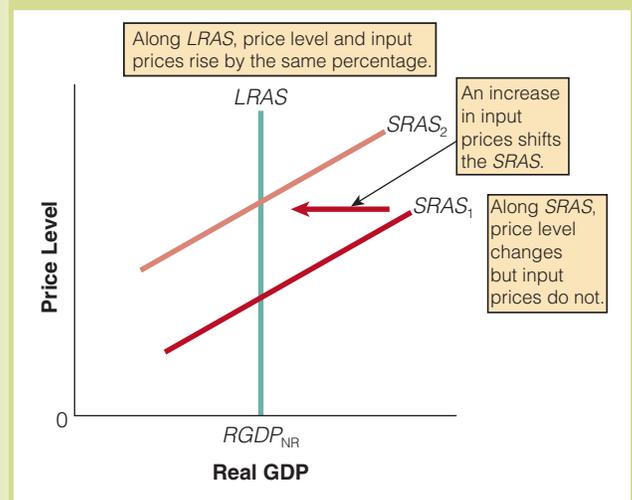
## Use what you’ve learned Shifts in the Short-Run Aggregate Supply Curve

**Q** Why do wage increases (and other input prices) affect the short-run aggregate supply but not the long-run aggregate supply?

**A** Remember, in the short run, wages and other input prices are assumed to be constant along the *SRAS* curve. If the firm has to pay more for its workers or any other input, its costs will rise. That is, the *SRAS* curve will shift to the left. This shift from *SRAS*<sub>1</sub> to *SRAS*<sub>2</sub> is shown in Exhibit 3. The reason the *SRAS* curve will not shift is that unless these input prices reflect permanent changes in input supply, those changes will only be temporary, and output will not be permanently or sustainably different as a result. Other things being equal, if an input price is to be permanently higher, relative to other goods, its supply must have decreased; but

section 22.5  
exhibit 3

Supply Shifts



that would mean that potential real output, and hence long-run aggregate supply, would also shift left.

section 22.5  
exhibit 4

## Factors That May Shift the Aggregate Supply

### An Increase in Aggregate Supply Curve (Rightward Shift)

#### Lower costs

- lower wages
- other input prices fall

#### Government policy

- tax cuts
- deregulation
- lower trade barriers

#### Economic growth

- improvements in human and physical capital
- technological advances
- an increase in labor

#### Favorable weather

#### A fall in the future expected price level

These factors can shift the short-run aggregate supply curve, the long-run aggregate supply curve, or both, depending on whether the effects are temporary or permanent.

### A Decrease in Aggregate Supply Curve (Leftward Shift)

#### Higher costs

- higher wages
- other input prices rise

#### Government policy

- overregulation
- waste and inefficiency
- higher trade barriers
- stagnation
- a decline in labor productivity
- capital deterioration

#### Unfavorable weather

#### Natural disasters and war

#### A rise in the future expected price level

## SECTION QUIZ

- The short-run aggregate supply curve will shift to the left, other things being equal, if
  - energy prices fall.
  - technology and productivity increase in the nation.
  - an increase in input prices occurs.
  - the capital stock of the nation increases.
- An increase in input prices causes
  - the short-run aggregate supply curve to shift outward, which means the quantity supplied at any price level declines.
  - the short-run aggregate supply curve to shift inward, which means the quantity supplied at any price level declines.
  - the short-run aggregate supply curve to shift inward, which means the quantity supplied at any price level increases.
  - the short-run aggregate supply curve to shift outward, which means the quantity supplied at any price level increases.
- Which of the following could be expected to shift the short-run aggregate supply curve rightward?
  - a rise in the price of oil
  - a natural disaster
  - wage increases without increases in labor productivity
  - all of the above
- An unusual series of rainstorms washes out the grain crop in the upper plains states, severely curtailing the supply of corn and wheat, as well as soybeans. What effect would this situation have on aggregate supply?
  - It would shift the *SRAS* left, but not the *LRAS*.
  - It would shift both the *SRAS* and the *LRAS* left.
  - It would shift the *SRAS* right, but not the *LRAS*.
  - It would shift both the *SRAS* and the *LRAS* right.

(continued)

 SECTION QUIZ (Cont.)


5. Any permanent increase in the quantity of any of the factors of production—capital, land, labor, or technology—available will cause
  - a. the *SRAS* to shift to the left and *LRAS* to remain constant.
  - b. the *SRAS* to shift to the right and *LRAS* to remain constant.
  - c. both *SRAS* and *LRAS* to shift to the right.
  - d. both *SRAS* and *LRAS* to shift to the left.
6. Which of the following could be expected to shift the short-run aggregate supply curve upward?
  - a. a rise in the price of oil
  - b. a natural disaster
  - c. wage increases without increases in labor productivity
  - d. all of the above
7. A temporary positive supply shock will shift \_\_\_\_\_; a permanent positive supply shock will shift \_\_\_\_\_.
  - a. *SRAS* and *LRAS* right; *SRAS* and *LRAS* right
  - b. *SRAS* but not *LRAS* right; *SRAS* and *LRAS* right
  - c. *SRAS* and *LRAS* right; *SRAS* but not *LRAS* right
  - d. *SRAS* but not *LRAS* right; *SRAS* but not *LRAS* right
8. A year of unusually good weather for agriculture would
  - a. increase *SRAS* but not *LRAS*.
  - b. increase *SRAS* and *LRAS*.
  - c. decrease *SRAS* but not *LRAS*.
  - d. decrease *SRAS* and *LRAS*.
9. When the price of oil experiences a temporary sharp increase, which curve(s) will shift left?
  - a. *SRAS*
  - b. *LRAS*
  - c. neither *SRAS* nor *LRAS*
  - d. both *SRAS* and *LRAS*

1. Which of the aggregate supply curves will shift in response to a change in the expected price level? Why?
2. Why do lower input costs increase the level of RGDP supplied at any given price level?
3. What would discovering huge new supplies of oil and natural gas do to the short- and long-run aggregate supply curves?
4. What would happen to short- and long-run aggregate supply curves if the government required every firm to file explanatory paperwork each time a decision was made?
5. What would happen to the short- and long-run aggregate supply curves if the capital stock grew and available supplies of natural resources expanded over the same period of time?
6. How can a change in input prices change the short-run aggregate supply curve but not the long-run aggregate supply curve? How could it change both long- and short-run aggregate supply?
7. What would happen to short- and long-run aggregate supply if unusually good weather led to bumper crops of most agricultural produce?
8. If OPEC temporarily restricted the world output of oil, what would happen to short- and long-run aggregate supply? What would happen if the output restriction was permanent?

Answers: 1. c 2. b 3. d 4. a 5. c 6. d 7. b 8. a 9. a

## 22.6

# Macroeconomic Equilibrium: The Short Run and the Long Run

- ✎ What is short-run macroeconomic equilibrium?
- ✎ What is the long-run macroeconomic equilibrium?
- ✎ What are recessionary and inflationary gaps?
- ✎ What is demand-pull inflation?
- ✎ What is cost-push inflation?
- ✎ How does the economy self-correct?
- ✎ What is wage and price inflexibility?

## ECS

economic content standards

Fluctuations of real GDP around its potential level occur when overall spending declines, as in a recession, or when overall spending increases rapidly, as in recovery from a recession or in an expansion.

### recessionary gap

the output gap that occurs when the actual output is less than the potential output

### inflationary gap

the output gap that occurs when the actual output is greater than the potential output

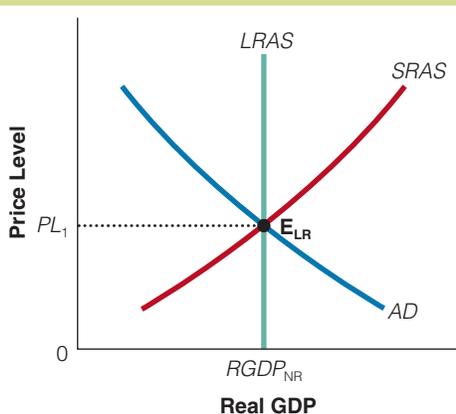
## Determining Macroeconomic Equilibrium

The short-run equilibrium level of real output and the price level are given by the intersection of the aggregate demand curve and the short-run aggregate supply curve. When this equilibrium occurs at the potential output level, the economy is operating at full employment on the long-run aggregate supply curve, as shown in Exhibit 1. Only a short-run equilibrium that is at potential output is also a long-run equilibrium. Short-run equilibrium can change when the aggregate demand curve or the short-run aggregate supply curve shifts rightward or leftward; the long-run equilibrium level of RGDP only changes when the LRAS curve shifts. Sometimes, these supply or demand changes are anticipated; at other times, however, the shifts occur unexpectedly. As we have seen, economists call these unexpected shifts *shocks*.

The economy can be either at a point where actual and potential RGDP are equal at  $RGDP_{NR}$  or the economy can be at a point where the potential RGDP and actual RGDP are not equal. In Exhibit 2, we see that it is rare that actual and potential RGDP are equal. In other words, the economy can be in a boom, where actual RGDP is greater than potential RGDP, or in a recession, where actual RGDP is less than potential RGDP. However, notice that the economy does not often stray too far from potential RGDP—of course, the recent exception is the financial crisis of 2008.

### section 22.6 exhibit 1

### Long-Run Macroeconomic Equilibrium



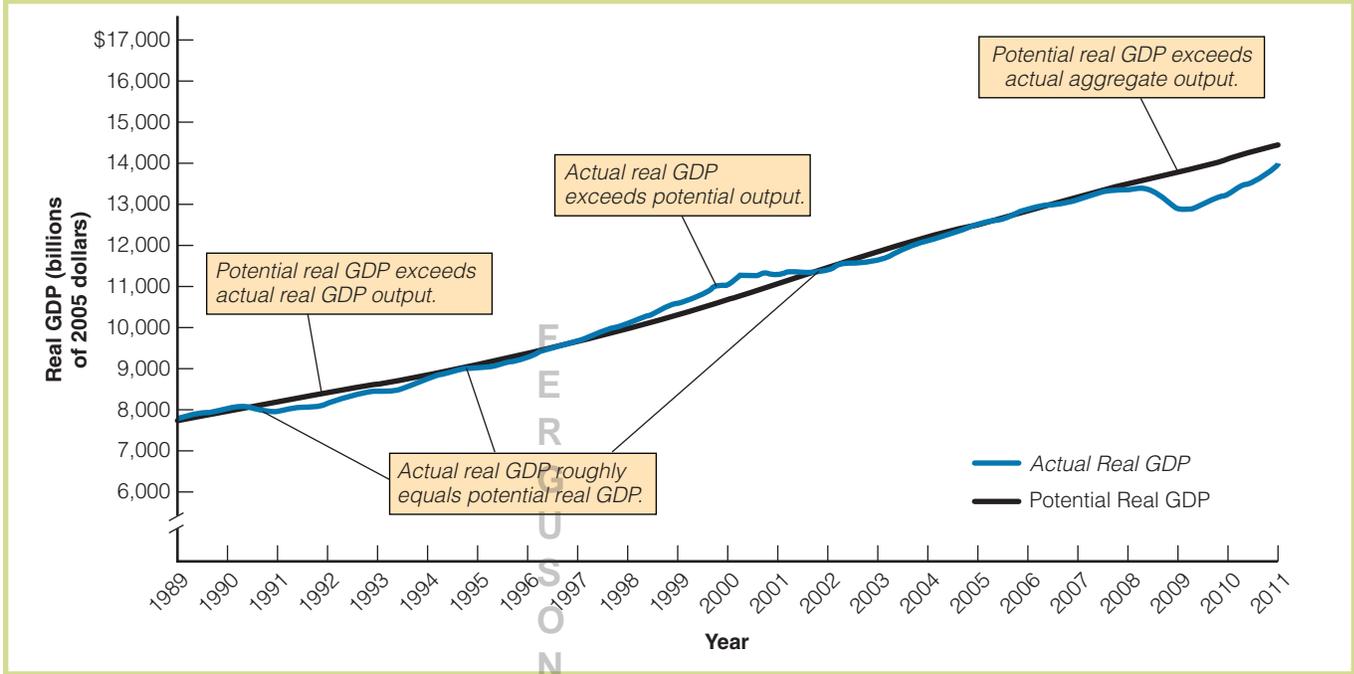
Long-run macroeconomic equilibrium occurs at the level where short-run aggregate supply and aggregate demand intersect at a point on the long-run aggregate supply curve. At this level, real GDP will equal potential GDP at full employment ( $RGDP_{NR}$ ).

## Recessionary and Inflationary Gaps

As we have just seen, equilibrium will not always occur at full employment. In fact, equilibrium can occur at less than the potential output of the economy,  $RGDP_{NR}$  (a **recessionary gap**), temporarily beyond  $RGDP_{NR}$  (an **inflationary gap**), or at potential GDP. Exhibit 3 shows these three possibilities. In (a), we have a recessionary gap at the short-run equilibrium,  $E_{SR}$ , at  $RGDP_1$ . When RGDP is less than  $RGDP_{NR}$ , the result is a recessionary gap—aggregate demand is insufficient to fully employ all of society's resources, so unemployment will be above the normal rate. In (c), we have an inflationary gap at the short-run equilibrium,  $E_{SR}$ , at  $RGDP_3$ , where aggregate demand is so high that the economy is temporarily operating beyond full capacity ( $RGDP_{NR}$ ); this gap will lead to inflationary pressure, and unemployment will be below the normal rate. In (b), the economy is just right where  $AD_2$  and  $SRAS$  intersect at  $RGDP_{NR}$ —the long-run equilibrium position.

section 22.6  
exhibit 2

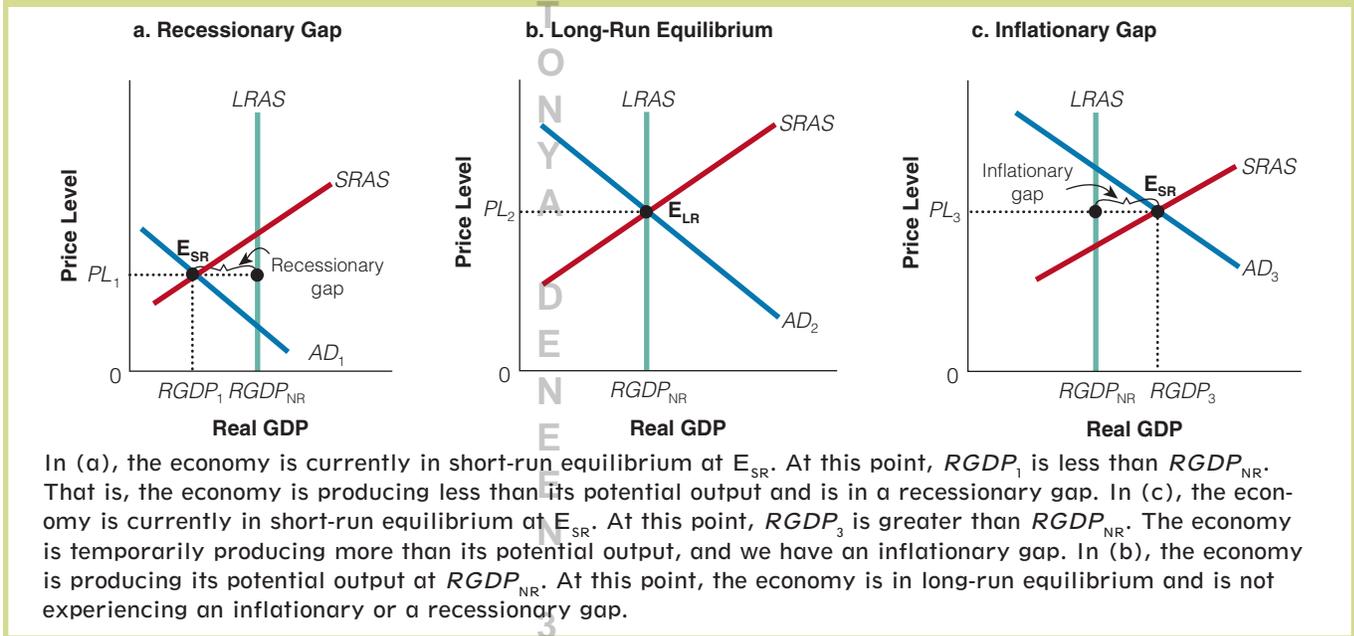
Actual and Potential Real GDP from 1989 to 2011



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section 22.6  
exhibit 3

Recessionary and Inflationary Gaps



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## Demand-Pull Inflation

**Demand-pull inflation** occurs when the price level rises as a result of an increase in aggregate demand. Consider the case in which an increase in consumer optimism results in a corresponding increase in aggregate demand. Exhibit 4 shows that an increase in aggregate demand causes an increase in the price level and an increase in real output. The movement



What causes a recessionary gap?  
 What causes an inflationary gap?

**demand-pull inflation**  
 a price-level increase due to an increase in aggregate demand

## ECS

economic content standards

When real GDP rises above its potential, there is a tendency for inflation to rise. When real GDP is below its potential (as in a recession), there is a tendency for inflation to fall.

### stagflation

a situation in which lower growth and higher prices occur together

### cost-push inflation

a price-level increase due to a negative supply shock or increases in input prices



How can an economy operate beyond its potential output?

is along the *SRAS* curve from point  $E_1$  to point  $E_2$  and causes an inflationary gap. Recall that an increase in output occurs as a result of the increase in the price level in the short run, because firms have an incentive to increase real output when the prices of the goods they are selling are rising faster than the costs of the inputs they use in production.

Note that  $E_2$  in Exhibit 4 is positioned beyond  $RGDP_{NR}$ —an inflationary gap. It seems strange that the economy can operate beyond its potential, but it is possible—temporarily—as firms encourage workers to work overtime, extend the hours of part-time workers, hire recently retired employees, reduce frictional unemployment through more extensive searches for employees, and so on. However, this level of output and employment *cannot* be sustained in the long run.

## Cost-Push Inflation

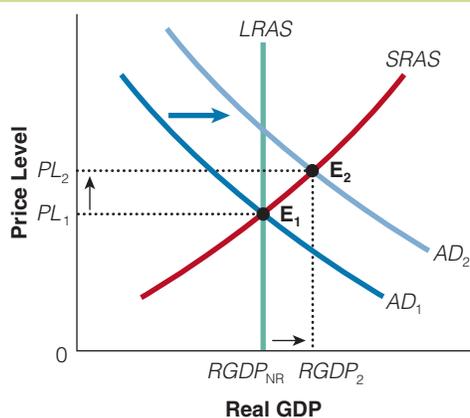
The 1970s and early 1980s witnessed a phenomenon known as **stagflation**, where lower growth and higher prices occurred together. Some economists believe that this situation was caused by a leftward shift in the short-run aggregate supply curve, as shown in Exhibit 5. If the aggregate demand curve did not increase significantly but the price level did, then the inflation was caused by supply-side forces, which is called **cost-push inflation**.

The increase in oil prices was the primary culprit responsible for the leftward shift in the aggregate supply curve. As we discussed in the last section, an increase in input prices can cause the short-run aggregate supply curve to shift to the left, and this spelled big trouble for the U.S. economy—higher price levels, lower output, and higher rates of unemployment. The impact of cost-push inflation is illustrated in Exhibit 5.

In Exhibit 5, we see that the economy is initially at full-employment equilibrium at point  $E_1$ . A negative supply shock like a sudden increase in input prices, such as an increase in the price of oil, shifts the *SRAS* curve to the left—from  $SRAS_1$  to  $SRAS_2$ . A negative supply shock like as a result of the shift in short-run aggregate supply, the price level rises to  $PL_2$ , and real output falls from  $RGDP_{NR}$  to  $RGDP_2$  (point  $E_2$ ). Firms demand fewer workers as a result of higher input costs that cannot be passed on to consumers. This lower demand, in turn, leads to higher prices, lower real output, and more unemployment—and a recessionary gap. In the United States, these negative supply shocks occurred in 1974, 1979, 1990, 2005, and 2007–2008. These supply shocks can change *RGDP* significantly, but temporarily, away from

### section 22.6 exhibit 4

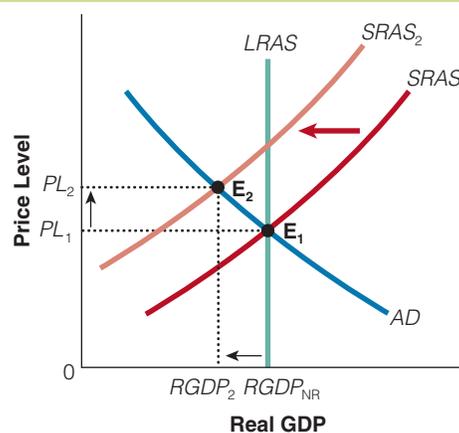
#### Demand-Pull Inflation



Demand-pull inflation occurs when the aggregate demand curve shifts to the right along the short-run aggregate supply curve.

### section 22.6 exhibit 5

#### Cost-Push Inflation



Cost-push inflation is caused by a leftward shift in the short-run aggregate supply curve, from  $SRAS_1$  to  $SRAS_2$ .

potential aggregate output at  $RGDP_{NR}$ . In 2007, the price of many raw materials shot up globally—a global negative supply shock. Many countries around the world felt the effects of the negative supply shock.

However, recessions are not all bad—they can at least slow the rate of inflation. Two periods of serious inflation, 1974–1975 and 1979–1981, were followed by recessions and a slower rate of inflation.

## What Helped the United States Recover in the 1980s?

Oil prices fell during the 1980s when OPEC lost some of its clout because of internal problems. In addition, many non-OPEC oil producers increased production. The net result in the short run was a rightward shift in the aggregate supply curve. Holding aggregate demand constant, this rightward shift in the aggregate supply curve leads to a lower price level, greater output, and lower rates of unemployment—moving the economy back toward  $E_1$  in Exhibit 5.

## A Decrease in Aggregate Demand and Recessions

Just as cost-push inflation may cause a recessionary gap, so may a decrease in aggregate demand. For example, consider the case in which consumer confidence plunges and the stock market “tanks.” As a result, aggregate demand falls, shown in Exhibit 6 as the shift from  $AD_1$  to  $AD_2$ , leaving the economy in a new short-run equilibrium at point  $E_2$ . Households, firms, and governments buy fewer goods and services at every price level. In response to this drop in demand, output falls from  $RGDP_{NR}$  to  $RGDP_2$ , and the price level falls from  $PL_1$  to  $PL_2$ . Therefore, in the short run, this fall in aggregate demand causes higher unemployment and a reduction in output—and it, too, can lead to a recessionary gap.

The recession of 2001 and the slow recovery that followed can be attributed to three shocks that affected aggregate demand: the end of the stock market boom, the terrorist attacks of September 11 (which had an impact on both stock market wealth and consumer confidence), and a series of corporate scandals that rocked the stock market. Corrective stabilizing measures were taken following these events to prevent even further damage. For example, the Federal Reserve continued to lower interest rates. Lower interest rates stimulate the economy by encouraging investment and consumption spending. Other stabilizing measures included a tax cut passed by Congress in 2001 and increased government spending to help rebuild New York City and provide financial assistance to the ailing airline industry. Both the 2001 tax cut and the war on terrorism led to an increase in government spending. Both of these policies shifted the aggregate demand curve to the right, reducing the magnitude of the 2001 recession. The recovery did not pick up steam until 2003.

Most of the post war recessions have been caused by negative demand shocks. Negative supply shocks have been relatively few, but quite severe, in terms of unemployment rates. The 2007–2008 recession appears to be the product of both negative demand and supply shocks.

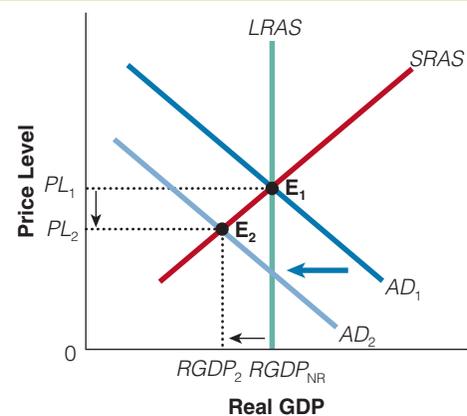
During the financial crisis of 2008, both consumers and firms reduced their spending, and this caused the aggregate demand curve to shift to the left, in turn leading to a recessionary gap. In short, real estate and financial market wealth decreased, precautionary saving by consumers increased as confidence fell, obtaining credit became more difficult, and both households and firms adopted a wait and see attitude.



*What kind of shocks have caused most recessions?*

### section 22.6 exhibit 6

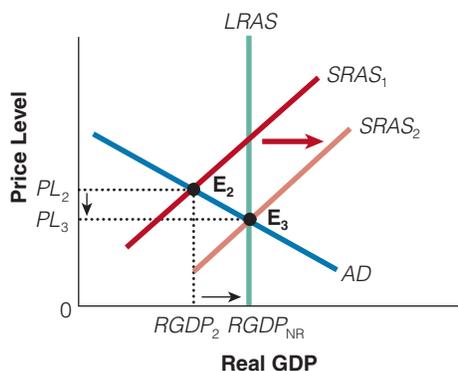
### Short-Run Decrease in Aggregate Demand



A fall in aggregate demand due to a drop in consumer confidence can cause a short-run change in the economy. The decrease in aggregate demand (shown in the movement from  $E_1$  to  $E_2$ ) causes lower output and higher unemployment in the short run.

section 22.6  
exhibit 7

### Adjusting to a Recessionary Gap



At point  $E_2$ , the economy is in a recessionary gap. However, the economy may self-correct because laborers and other input suppliers are willing to accept lower wages and prices for the use of their resources, resulting in a reduction in production costs that shifts the short-run supply curve from  $SRAS_1$  to  $SRAS_2$ . Eventually, the economy returns to a long-run equilibrium at point  $E_3$ , the intersection of  $RGDP_{NR}$  and a lower price level,  $PL_3$ . However, if wages and other input prices are sticky, the economy's adjustment mechanism might take many months to totally self-correct.

The rate of inflation slowed and GDP fell over 2 percent in a year. It began with a boom-to-bust story in the housing market and then rippled into the stock market. In order to prop up aggregate demand, the Federal Reserve increased the money supply and lowered interest rates. In addition, Congress enacted a number of measures to stimulate consumption, investment, and government spending. This helped to shift the aggregate demand curve to the right and RGDP and the price level rose by the end of 2009. We will discuss this in much more detail in our chapters on monetary and fiscal policy.

## Adjusting to a Recessionary Gap

Many recoveries from a recessionary gap occur because of increases in aggregate demand—perhaps consumer and business confidence picks up, or the government lowers taxes and/or lowers interest rates to stimulate the economy. That is, an eventual rightward shift in the aggregate demand curve takes the economy back to potential output— $RGDP_{NR}$ .

However, it is possible for the economy to *self-correct* through declining wages and prices. In Exhibit 7, at point  $E_2$ , the intersection of  $PL_2$  and  $RGDP_2$ , the economy is in a recessionary gap—that is, the economy is producing less than its potential output. At this lower level of output, firms lay off workers to avoid inventory accumulation. In addition, firms may cut prices to increase demand for their products. Unemployed workers and other input suppliers may also bid

down wages and prices. That is, laborers and other input suppliers are now willing to accept lower wages and prices for the use of their resources, and the resulting reduction in production costs shifts the short-run supply curve from  $SRAS_1$  to  $SRAS_2$ . Eventually, the economy returns to a long-run equilibrium at point  $E_3$ , the intersection of  $RGDP_{NR}$  and a lower price level,  $PL_3$ .



How can an economy self-correct if it is in a recessionary gap?

### wage and price inflexibility

the tendency for prices and wages to only adjust slowly downward to changes in the economy

## Slow Adjustments to a Recessionary Gap

Many economists believe that wages and prices may be slow to adjust, especially downward. This downward **wage and price inflexibility** may prolong the duration of a recessionary gap.

For example, in Exhibit 7 we see that the economy is in a recession at  $E_2$  and  $RGDP_2$ . The economy will eventually self-correct to  $RGDP_{NR}$  at  $E_3$ , as workers and other input owners accept lower wages and prices for their inputs, shifting the  $SRAS$  curve to the right from  $SRAS_1$  to  $SRAS_2$ . However, if wages and other input prices are sticky, the economy's adjustment mechanism might take many months to totally self-correct.

Japan witnessed several recessionary gaps in the 1990s and even experienced deflation as the self-adjustment mechanism predicts. However, the adjustment out of the recessionary gap was slow and painful.



How can sticky prices (wages and other input prices) slow the economy's recovery from a recessionary gap?

## What Causes Wages and Prices to Be Sticky Downward?

Empirical evidence supports several explanations for the downward stickiness of wages and prices. Firms may not be able to legally cut wages because of long-term labor contracts

(particularly with union workers) or a legal minimum wage. Efficiency wages may also limit a firm’s ability to lower wage rates. Menu costs may cause price inflexibility as well.

### Efficiency Wages

In economics, it is generally assumed that as productivity rises, wages will rise, and that workers can raise their productivity through investments in human capital such as education and on-the-job training. However, some economists believe that in some cases, *higher wages will lead to greater productivity*.

In the efficiency wage model, employers pay their employees more than the equilibrium wage as a means to increase efficiency. Proponents of this theory suggest that higher-than-equilibrium wages might attract the most productive workers, lower job turnover and training costs, and improve morale. Because the efficiency wage rate is greater than the equilibrium wage rate, the quantity of labor that would be willingly supplied is greater than the quantity of labor demanded, resulting in greater amounts of unemployment.

However, aside from creating some additional unemployment, the efficiency wage could also cause wages to be inflexible downward. For example, if aggregate demand decreases, firms that pay efficiency wages may be reluctant to cut wages, fearing that cuts could lead to lower morale, greater absenteeism, and general productivity losses. In short, if firms are paying efficiency wages, they may be reluctant to lower wages in a recession, leading to downward wage inflexibility.



How can efficiency wages slow wage adjustments due to a recessionary gap?

### Menu Costs

Some costs are associated with changing prices in an inflationary environment. Thus, the higher price level in an inflationary environment is often reflected slowly, as restaurants, mail-order houses, and department stores change their prices gradually so as to incur fewer *menu costs* (the costs of changing posted prices) in printing new catalogs, new mailers, new advertisements, and so on. Because businesses are not likely to change all their prices immediately, we can say that some prices are sticky, or slow to change. For example, many outputs, such as steel, are inputs in the production of other products, such as automobiles. As a result, these prices are slow to change.

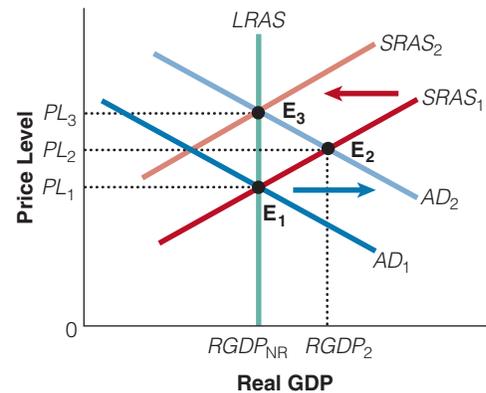
Suppose aggregate demand unexpectedly decreases. This change could lower the price level. Some firms may adjust to the change quickly. Others, however, may move more slowly because of menu costs, causing their prices to become too high (above equilibrium). Ultimately, the sales and outputs will fall, potentially causing a recession. Firms not responding quickly to changes in demand fail to do so for a reason; and to some economists, menu costs are at least part of that reason.

## Adjusting to an Inflationary Gap

In Exhibit 8, the economy is in an inflationary gap at  $E_2$ , where  $RGDP_2$  is greater than  $RGDP_{NR}$ . Because the price level,  $PL_2$ , is higher than the one workers anticipated,  $PL_1$ , workers become disgruntled with wages that have not adjusted to the new price level (if prices have risen but wages have not risen as much, real wages have fallen). Recall that along the  $SRAS$  curve, wages and other input prices are assumed to

section 22.6  
exhibit 8

### Adjusting to an Inflationary Gap



The economy is in an inflationary gap at  $E_2$ , where  $RGDP_2$  is greater than  $RGDP_{NR}$ . Because the price level is higher than workers anticipated (that is, it is  $PL_2$  rather than  $PL_1$ ), workers become disgruntled with wages that have not adjusted to the new price level. Consequently, workers and other nonlabor input suppliers demand higher prices to be willing to supply their inputs. As input prices respond to the higher level of output prices, the short-run aggregate supply curve shifts to the left, from  $SRAS_1$  to  $SRAS_2$ . Suppliers will continually seek higher prices for their inputs until they reach long-run equilibrium, at point  $E_3$ . At that point, input suppliers’ purchasing power is restored to the natural rate,  $RGDP_{NR}'$  at a new higher price level,  $PL_3$ .

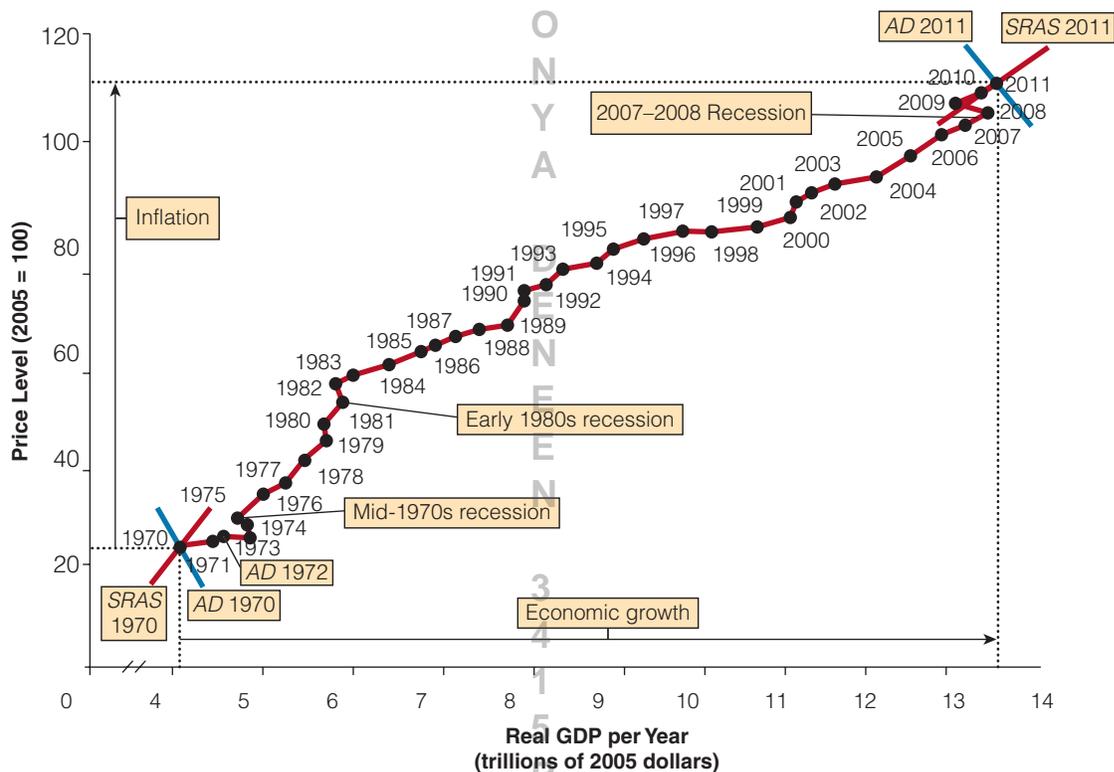
be constant. Therefore, workers' and input suppliers' purchasing power falls as output prices rise. Real (adjusted for inflation) wages have fallen. Consequently, workers and other suppliers demand higher prices if they are to be willing to supply their inputs. As input prices respond to the higher level of output prices, the short-run aggregate supply curve shifts to the left, from  $SRAS_1$  to  $SRAS_2$ . Suppliers will continue to seek higher prices for their inputs until they reach the long-run equilibrium, at point  $E_3$  in Exhibit 8. At point  $E_3$ , input suppliers' purchasing power is restored at the long-run equilibrium, at  $RGDP_{NR}$  and a new higher price level,  $PL_3$ .

## Price Level and RGDP over Time

In Exhibit 9, we traced out the pattern of RGDP versus the price level. According to the Bureau of Economic Analysis, both the price level and RGDP have been rising over the last 38 years. So what is responsible for the changes? The answer is both aggregate demand and aggregate supply. Aggregate demand has risen because of growing population (which impacts consumption and investment spending), rising income, increases in government purchases, and increases in the money supply. Aggregate supply has been generally increasing as well, including increases in the labor force and improvements in labor productivity and technology.

section 22.6  
exhibit 9

U.S. Price Level and RGDP: 1970 to the Present



This figure has the same axis as the  $AD/AS$  model. The United States has experienced economic growth and inflation over the last 41 years.

SOURCE: Bureau of Economic Analysis.

## in the news **Recession Can Change a Way of Life**

As job losses mount and bailout costs run into the trillions, the social costs of the economic downturn become clearer. The primary question, to be sure, is what can be done to shorten or alleviate these bad times. But there is also a broader set of questions about how this downturn is changing our lives, in ways beyond strict economics.

All recessions have cultural and social effects, but in major downturns the changes can be profound. The Great Depression, for example, may be regarded as a social and cultural era as well as an economic one. And the current crisis is also likely to enact changes in various areas, from our entertainment habits to our health.

First, consider entertainment. Many studies have shown that when a job is harder to find or less lucrative, people spend more time on self-improvement and relatively inexpensive amusements. During the Depression of the 1930s, that meant listening to the radio and playing parlor and board games, sometimes in lieu of a glamorous night on the town. These stay-at-home tendencies persisted through at least the 1950s.

In today's recession, we can also expect to turn to less expensive activities—and maybe to keep those habits for years. They may take the form of greater interest in free content on the Internet and the simple pleasures of a daily walk, instead of expensive vacations and N.B.A. box seats.

In any recession, the poor suffer the most pain. But in cultural influence, it may well be the rich who lose the most in the current crisis. This downturn is bringing a larger-than-usual decline in consumption by the wealthy.

The shift has been documented by Jonathan A. Parker and Annette Vissing-Jorgenson, finance professors at Northwestern University, in their recent paper, "Who Bears Aggregate Fluctuations and How? Estimates and Implications for Consumption Inequality." Of course, people who held much wealth in real estate or stocks have taken heavy losses. But most important, the paper says, the labor incomes of high earners have declined more than in past recessions, as seen in the financial sector.

Popular culture's catering to the wealthy may also decline in this downturn. We can expect a shift

away from the lionizing of fancy restaurants, for example, and toward more use of public libraries. Such changes tend to occur in downturns, but this time they may be especially pronounced.

Recessions and depressions, of course, are not good for mental health. But it is less widely known that in the United States and other affluent countries, physical health seems to improve, on average, during a downturn. Sure, it's stressful to miss a paycheck, but eliminating the stresses of a job may have some beneficial effects. Perhaps more important, people may take fewer car trips, thus lowering the risk of accidents, and spend less on alcohol and tobacco. They also have more time for exercise and sleep, and tend to choose home cooking over fast food.

In a 2003 paper, "Healthy Living in Hard Times," Christopher J. Ruhm, an economist at the University of North Carolina at Greensboro, found that the death rate falls as unemployment rises. In the United States, he found, a 1 percent increase in the unemployment rate, on average, decreases the death rate by 0.5 percent.

David Potts studied the social history of Australia in the 1930s in his 2006 book, "The Myth of the Great Depression." Australia's suicide rate spiked in 1930, but overall health improved and death rates declined; after 1930, suicide rates declined as well.

While he found in interviews that many people reminisced fondly about those depression years, we shouldn't rush to conclude that depressions are happy times.

Many of their reports are likely illusory, as documented by the Harvard psychologist Daniel Gilbert in his best-selling book "Stumbling on Happiness." According to Professor Gilbert, people often have rosy memories of very trying periods, which may include extreme poverty or fighting in a war.

In today's context, we are also suffering fear and anxiety for the rather dubious consolation of having some interesting memories for the distant future.

But this downturn will likely mean a more prudent generation to come. That is implied by the work of two professors, Ulrike Malmendier of the

(continued)

## in the news **Recession Can Change a Way of Life (Cont.)**

University of California, Berkeley, and Stefan Nagel of the Stanford Business School, in a 2007 paper, “Depression Babies: Do Macroeconomic Experiences Affect Risk-Taking?”

A generation that grows up in a period of low stock returns is likely to take an unusually cautious approach to investing, even decades later, the paper found. Similarly, a generation that grows up with high inflation will be more cautious about buying bonds decades later.

In other words, today’s teenagers stand less chance of making foolish decisions in the stock market down the road. They are likely to forgo some good business opportunities, but also to make fewer mistakes.

When all is said and done, something terrible has happened in the U.S. economy, and no one

should wish for such an event. But a deeper look at the downturn, and the social changes it is bringing, shows a more complex picture.

In addition to trying to get out of the recession—our first priority—many of us will be making do with less and relying more on ourselves and our families. The social changes may well be the next big story of this recession.

Tyler Cowen is a professor of economics at George Mason University.

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### SECTION QUIZ

1. Cost-push inflation occurs when
  - a. the aggregate demand curve shifts right at a faster rate than short-run aggregate supply.
  - b. the short-run aggregate supply curve shifts left, while aggregate demand is fixed.
  - c. the aggregate demand curve shifts left and aggregate supply is fixed.
  - d. the short-run aggregate supply curve shifts right.
2. Starting from long-run equilibrium, an increase in aggregate demand will cause
  - a. an inflationary gap in the short run.
  - b. a recessionary gap in the short run.
  - c. an inflationary gap in the short run and long run.
  - d. a recessionary gap in the short run and long run.
  - e. neither an inflationary nor a recessionary gap in the short run or the long run.
3. When a recessionary gap occurs,
  - a. real output exceeds the natural level of output, and unemployment exceeds its natural rate.
  - b. real output exceeds the natural level of output, and unemployment is less than its natural rate.
  - c. real output is less than the natural level of output, and unemployment exceeds its natural rate.
  - d. real output is less than the natural level of output, and unemployment is less than its natural rate.
4. Which of the following could begin an episode of demand-pull inflation?
  - a. an increase in consumer optimism
  - b. a faster rate of economic growth for a major trading partner country
  - c. expectations of higher rates of return in investment
  - d. any of the above
  - e. none of the above

(continued)

## SECTION QUIZ (Cont.)



5. In the short run, demand-pull inflation
    - a. increases both unemployment and the price level.
    - b. increases unemployment but not the price level.
    - c. increases the price level but not unemployment.
    - d. decreases unemployment and increases the price level.
  6. In a stagflation situation,
    - a. unemployment increases and the price level increases.
    - b. unemployment increases and the price level decreases.
    - c. unemployment decreases and the price level increases.
    - d. unemployment decreases and the price level decreases.
  7. During the self-correction process after a fall in aggregate demand,
    - a. the price level increases and real output increases.
    - b. the price level increases and real output decreases.
    - c. the price level decreases and real output increases.
    - d. the price level decreases and real output decreases.
- 
1. What is a recessionary gap?
  2. What is an inflationary gap?
  3. What is demand-pull inflation?
  4. What is cost-push inflation?
  5. Starting from long-run equilibrium on the long-run aggregate supply curve, what happens to the price level, real output, and unemployment as a result of cost-push inflation?
  6. How would a drop in consumer confidence impact the short-run macroeconomy?
  7. What would happen to the price level, real output, and unemployment in the short run if world oil prices fell sharply?
  8. What are *sticky prices* and *wages*?
  9. How does the economy self-correct?

Answers: 1. b 2. a 3. c 4. d 5. d 6. a 7. c

## The Classical and the Keynesian Macroeconomic Model

22.7

- |   |   |
|---|---|
| 1. What is the classical school?                        | 1. What is the full-employment classical school model?  |
| 2. What is Say's law?                                   | 2. What is the Keynesian short-run supply curve?        |
| 3. What was Keynes's criticism of the classical school? | 3. What is the modern Keynesian short-run supply curve? |

### The Classical School and Say's Law

Historically, the two primary approaches to macroeconomics have been the classical school and the Keynesian school. Let's begin with the classical school. The classical school of thought believed that wages and prices adjust quickly to changes in supply and demand.

Writing at the beginning of the nineteenth century, the French economist Jean Baptiste Say formulated a notion since dubbed Say's law, which in its simplest form states that



What did the classical school believe about wages and prices?



What is Say's law?

“supply creates its own demand.” More precisely, the production of goods and services creates income for owners of inputs (land, labor, capital, and entrepreneurship) used in production, which in turn creates a demand for goods. According to Say's law, we need not worry about output not being utilized; production creates income, which creates demand for goods, which leads to still more production. That is, Say's law establishes that full employment can be maintained because total spending will be great enough for firms to sell all the output a fully employed economy can produce. Say's ideas were incorporated into the teaching of economists of the late nineteenth century who were considered classical economists.

Before the 1930s, the problem of unemployment was considered one that could be analyzed using microeconomic analysis; indeed, macroeconomics as we know it today did not exist. The theory that evolved to analyze unemployment suggested that joblessness could be eliminated by market forces, in the same way that shortages and surpluses of goods and services are eliminated by movement in the relative prices of those goods, as we discussed in Chapter 5.

### The Full-Employment Classical School Model

The macroeconomic models presented in this text draw from both the classical and Keynesian schools of thought and emphasize the commonality between the two schools. The classical school focuses on the economy at full employment, because both schools agree that in the long run both wages and prices adjust freely to changes in demand and supply and the economy moves back naturally to its potential, full-employment output level. That is, eventually (in the long run) all markets adjust to their equilibrium values. Recall that full employment does not mean zero unemployment; rather, it refers to zero cyclical unemployment. Some structural and frictional unemployment occurs naturally in a dynamic and vibrant economy.

The actual output that the economy produces need not be the same as potential output—what the economy can produce without leading to inflation. If the economy is producing at less than its potential output, unemployment is greater than the natural rate; if the economy is producing at greater than its potential output, unemployment is less than the natural rate, causing inflationary pressures. That is, it is possible on the peak of a business cycle that actual RGDP can exceed potential RGDP, but only for a short period of time. The problem is that the causal observer often confuses potential and actual output. When the economy is accelerating at a fast clip, some observers believe we are on a new growth trajectory. And when the economy slows, some observers confuse this change with doom and gloom.

Earlier in this chapter we discussed monetary and fiscal policy, using the *AS/AD* model to examine business cycles and short-run policy prescriptions that involve government intervention to help the economy get back to its long-run growth trajectory.

## Changes in Aggregate Demand in the Classical Model

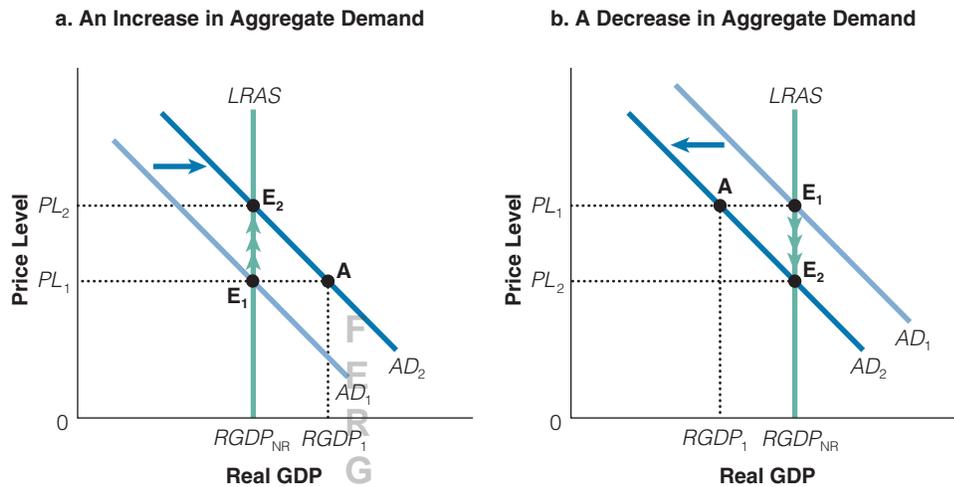
In Exhibit 1, we see the impact of either an increase or a decrease in aggregate demand in the classical model. According to Say's law, prolonged unemployment is impossible in the long-run classical model. Prices, wages, and interest rates all adjust quickly, which keeps workers and resources fully employed at the natural rate of real output,  $RGDP_{NR}$ . The classical school made very little distinction between the short run and the long run, so the only aggregate supply curve is the vertical long-run aggregate supply curve, *LRAS* in Exhibit 1. That is, there is no separate short-run aggregate supply curve in the classical model. Prices and wages adjust so quickly that the economy seldom remains far from  $RGDP_{NR}$ .

In Exhibit 1(a), if prices, wages, and interest rates were not completely and quickly flexible, an increase in aggregate demand from  $AD_1$  to  $AD_2$  might cause the economy to move toward point A beyond  $RGDP_{AD}$ . However, when the price level rises, input suppliers bid up input prices and the economy quickly adjusts to the new price level at  $PL_2$ , moving along the *LRAS*.

In Exhibit 1(b), there is a decrease in aggregate demand that could cause the economy to move toward point A, where resources (labor, factories, and other inputs) would be unemployed.

section 22.7  
exhibit 1

## Changes in Aggregate Demand in the Classical Model



In the classical model, wages, prices, and interest rates are completely and quickly flexible so the economy will quickly adjust to an increase in  $AD$  moving from  $E_1$  to  $E_2$  as seen in 1(a) and quickly adjust to a decrease in  $AD$  moving from  $E_1$  to  $E_2$  as seen in 1(b). If wages and prices were not completely flexible the economy could move toward point  $A$  from  $E_1$ .

However, because input suppliers will compete against each other, it will drive input prices down. If this occurs quickly, as predicted in the classical model, the economy will not experience prolonged unemployment and will adjust to the new price level,  $PL_2$ , along the  $LRAS$ .

### Keynes's Criticism of the Classical School

In 1936, John Maynard Keynes's book, *The General Theory of Employment, Interest and Money*, was published. Along with Adam Smith's *The Wealth of Nations* in the eighteenth century, *The General Theory of Employment, Interest and Money* was one of the most influential books in economics. In his book, Keynes attacked the classical economic theory. He pointed out the naiveté of Say's law: Not all income generated from output need be used to buy goods and services; it can also be saved, hoarded, or taxed away. Supply does not automatically create an adequate demand. Keynes's severest attacks were against classical ideas about unemployment. With unemployment rates at that time in the double digits, where did the classicists go wrong?

To begin with, when a recession begins, wages rarely fall quickly to a new equilibrium level consistent with full employment. Long-term labor contracts with unions, minimum wage laws, and other factors often prevent wages from falling as quickly as the classical model suggests. Thus, wage inflexibility prevents the market solution from working rapidly enough to avert a prolonged recession.

## The Keynesian Short-Run Aggregate Supply Curve—Sticky Prices and Wages

Keynes and his followers argued that wages and price are inflexible downward. As we just discussed, wage stickiness can arise as a result of long-term labor and raw material contracts, unions, and minimum wage laws. If wages and prices are sticky and the economy has sufficient excess capacity, then the short-run aggregate supply curve is flat. That is, with so many resources idle, producers will not have to compete with each other for machinery or labor and input prices will tend to stay flat.

In Exhibit 2(a), we see what is called the Keynesian aggregate supply curve. When  $RGDP(Y)$  is below potential  $GDP$  and firms are operating with excess capacity, the short-run



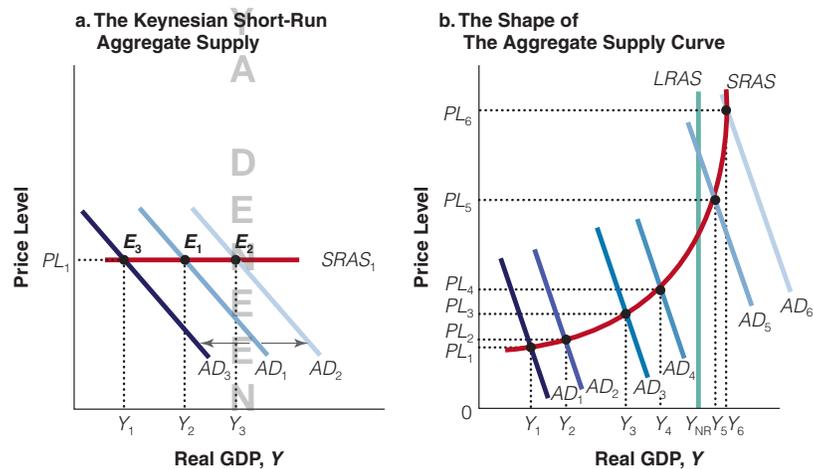
*What would make the short-run aggregate supply curve flat?*

aggregate supply curve is horizontal over this range of output. For example, in Exhibit 2(a), we see that in the horizontal range of the  $SRAS$  curve an increase in  $AD$  from  $AD_1$  to  $AD_2$  has no impact on the price level but considerable impact on RGDP and employment. When  $AD_1$  increases to  $AD_2$ , we see an increase in real gross domestic product from  $RGDP_1$  to  $RGDP_2$ —a new equilibrium where resources are more fully utilized. Similarly, a reduction in  $AD$ , from  $AD_1$  to  $AD_3$ , in this region will also leave the price level unchanged. Specifically, it means that the price level does not rise or fall in this situation, but RGDP does. This price and wage inflexibility when  $AD$  is falling played a significant part in the Keynesian theory. With stickiness of wages and other input costs, a reduction in aggregate demand will not lead to a lower price level if the economy has sufficient excess capacity—say at  $RGDP_1$ . Historically, the mid- to late 1930s seems to fit the Keynesian short-run aggregate supply curve quite well—increases in RGDP without simultaneous increases in the price level. It was a period of high unemployment of resources and double-digit unemployment—that is, sufficient level of excess capacity and little competition to bid up input prices.

However, most macroeconomists now believe that price and wages are not completely inflexible downward. Wages and prices tend to be less flexible when excess capacity is available—the slope of the  $SRAS$  is flatter the further it is below full employment. When the economy is temporarily operating beyond  $RGDP_{NR}$ , the  $SRAS$  is steep because higher output prices are necessary if firms are expanding output in this unsustainable region beyond full employment. That is, the firm can increase output by working labor and capital more intensively. When resources are idle, output will be more responsive to changes in  $AD$ , and the price level will not be as responsive—the  $SRAS$  is flatter—as it moves from  $AD_1$  to  $AD_2$  in Exhibit 2(b). And when resources are at full capacity, output is less responsive to changes in  $AD$  and the price level is highly responsive—the  $SRAS$  is steeper—as it moves from  $AD_5$  to  $AD_6$ , as seen in Exhibit 2(b). That is, the steeper the  $SRAS$  curve, the greater the price level effect and the smaller the RGDP effect.

section 22.7  
exhibit 2

The Shape of the Aggregate Supply Curve



In Exhibit(a), we see the Keynesian AS curve. When RGDP is well below potential output, an increase or decrease in aggregate demand has no impact on the price level but considerable impact on RGDP and employment. In Exhibit(b), we see the more usual case, the  $SRAS$  curve has an upward slope. Over the flatter range of the  $SRAS$  curve, a change in aggregate demand leads to a small change in the price level and a large change in RGDP( $Y$ )—a move from  $AD_1$  to  $AD_2$ . In the middle range of the  $SRAS$  curve, a change in aggregate demand leads to a appreciable change in both the price level and RGDP( $Y$ )—a move from  $AD_3$  to  $AD_4$ . In the steep portion of the  $SRAS$  curve, very little additional output can be produced as the economy is at, or temporarily beyond, capacity—a move from  $AD_5$  to  $AD_6$ . Any change in aggregate demand in this range will lead to sharp changes in the price level and little or no change in RGDP( $Y$ ).

Economists continue to debate the actual shape of the short-run aggregate supply curve because the shape of the SRAS has important implications for changes in aggregate demand, as seen in Exhibit 2(b). Over the flatter range of the short-run aggregate supply curve, a change in aggregate demand leads to a small change in the price level and a large change in RGDP(Y)—AD<sub>1</sub> to AD<sub>2</sub>. In the middle range, a change in aggregate demand leads to an appreciable change in both the price level and RGDP(Y)—AD<sub>3</sub> to AD<sub>4</sub>. In the steep portion of the SRAS curve, very little additional output can be produced as the economy is at, or temporarily beyond, full capacity—AD<sub>5</sub> to AD<sub>6</sub>. Any change in aggregate demand in this steep range will lead to sharp changes in the price level and little or no change in RGDP(Y).

In the chapters to come we will see that when the government uses expansionary monetary or fiscal policy to stimulate aggregate demand, it must be careful to assess where it is on the SRAS curve—if the economy is on the flat portion of the SRAS curve, stimulus works better than on the steep part.

## SECTION QUIZ

- If the economy was operating on a completely flat segment of the short-run aggregate supply curve, an increase in aggregate demand would
  - increase real output and increase the price level.
  - increase real output and decrease the price level.
  - decrease real output and increase the price level.
  - decrease real output and decrease the price level.
  - do none of the above.
- "In the long run, both wages and prices adjust freely to changes in demand and supply, and the economy will be at its full-employment level of real output."
  - Classical economists but not Keynesian economists would accept this statement.
  - Keynesian economists but not classical economists would accept this statement.
  - Both classical economists and Keynesian economists would accept this statement.
  - Neither classical economists nor Keynesian economists would accept this statement.
- Which of the following statements is true?
  - The classical short-run aggregate supply curve gets steeper as real output increases.
  - The Keynesian short-run aggregate supply curve gets steeper as real output increases.
  - The classical long-run aggregate supply curve gets steeper as real output increases.
  - The Keynesian long-run aggregate supply curve gets steeper as real output increases.
- Which of the following is true?
  - The extended high unemployment rate of the Great Depression was inconsistent with the conclusions of the classical economists.
  - The extended high unemployment rate of the Great Depression was consistent with the conclusions of the Keynesian model.
  - The degree of wage and price flexibility decreases with the extent of excess capacity in the modern Keynesian model.
  - All of the above are true.

- 
- What are the two primary approaches to macroeconomics?
  - Which school of thought emphasized that markets can rapidly adjust to changes?
  - Why was the double-digit unemployment of the Great Depression when Keynes wrote *The General Theory of Employment, Interest and Money* helpful in leading to its general acceptance?
  - What would keep wages from falling quickly in a recession?
  - If wages are sticky downward, why will a decrease in aggregate demand primarily reduce real output?

Answers: 1. e 2. c 3. b 4. d

## Interactive Summary

### Fill in the blanks:

- Aggregate demand ( $AD$ ) refers to the quantity of \_\_\_\_\_ at different price levels.
- \_\_\_\_\_ is by far the largest component of  $AD$ .
- Government purchases tend to be a(n) \_\_\_\_\_ volatile category of aggregate demand than investment.
- Models that include international trade effects are called \_\_\_\_\_ models.
- Exports minus imports equals \_\_\_\_\_.
- The  $AD$  curve slopes \_\_\_\_\_, which means a(n) \_\_\_\_\_ relationship between the price level and real gross domestic product (RGDP) demanded.
- Three complementary explanations exist for the negative slope of the aggregate demand curve: the \_\_\_\_\_ effect, the \_\_\_\_\_ effect, and the \_\_\_\_\_ effect.
- As the price level decreases, the real value people's money \_\_\_\_\_ so that their planned purchases of goods and services \_\_\_\_\_.
- The wealth effect can be summarized as follows:  
A higher price level  $\rightarrow$  \_\_\_\_\_ the real value of money  $\rightarrow$  \_\_\_\_\_ consumer spending  $\rightarrow$  \_\_\_\_\_ RGDP demanded.
- At higher interest rates, the opportunity cost of borrowing \_\_\_\_\_; and \_\_\_\_\_ interest-sensitive investments will be profitable, which will result in a(n) \_\_\_\_\_ quantity of RGDP demanded.
- The interest rate effect process can be summarized as follows: A higher price level  $\rightarrow$  \_\_\_\_\_ the demand for loanable funds  $\rightarrow$  \_\_\_\_\_ the interest rate  $\rightarrow$  \_\_\_\_\_ investments  $\rightarrow$  \_\_\_\_\_ RGDP demanded.
- If the prices of goods and services in the domestic market rise relative to those in global markets as a result of a higher domestic price level, consumers and businesses will buy \_\_\_\_\_ from foreign producers and \_\_\_\_\_ from domestic producers.
- If the price level in the United States rises, U.S. exports will become \_\_\_\_\_ expensive, imports will become \_\_\_\_\_ expensive, and net exports will \_\_\_\_\_.
- The real wealth effect, the interest rate effect, and the open economy effect all contribute to the \_\_\_\_\_ slope of the  $AD$  curve.
- An increase in any component of GDP ( $C, I, G,$  or  $X - M$ ) can cause the  $AD$  curve to shift \_\_\_\_\_.
- If consumers sensed that the economy was headed for a recession or the government imposed a tax increase, this would result in a(n) \_\_\_\_\_ shift of the  $AD$  curve.
- Because consuming less is saving more, an increase in savings, *ceteris paribus*, would shift  $AD$  to the \_\_\_\_\_.
- A reduction in business taxes would shift  $AD$  to the \_\_\_\_\_, while an increase in real interest rates or business taxes would shift  $AD$  to the \_\_\_\_\_.
- An increase in government purchases, other things being equal, shifts  $AD$  to the \_\_\_\_\_.
- If major trading partners are experiencing economic slowdowns, then they will demand \_\_\_\_\_ imports from the United States, shifting  $AD$  to the \_\_\_\_\_.
- The \_\_\_\_\_ curve is the relationship between the total quantity of final goods and services that suppliers are willing and able to produce and the overall price level.
- The two aggregate supply curves are a(n) \_\_\_\_\_ aggregate supply curve and a(n) \_\_\_\_\_ aggregate supply curve.
- The short-run relationship refers to a period when \_\_\_\_\_ can change in response to supply and demand, but \_\_\_\_\_ prices have not yet been able to adjust.
- In the short run, the aggregate supply curve is \_\_\_\_\_ sloping.
- In the short run, at a higher price level, producers are willing to supply \_\_\_\_\_ real output, and at lower price levels, they are willing to supply \_\_\_\_\_ real output.
- The two explanations for why producers would be willing to supply more output when the price level increases are the \_\_\_\_\_ effect and the \_\_\_\_\_ effect.
- When the price level rises in the short run, output prices \_\_\_\_\_ relative to input prices (costs), \_\_\_\_\_ producers' short-run profit margins.
- If the price level falls, output prices \_\_\_\_\_, producers' profits will \_\_\_\_\_, and producers will \_\_\_\_\_ their level of output.

29. If the overall price level is rising, producers can be fooled into thinking that the \_\_\_\_\_ price of their output is rising and as a result supply \_\_\_\_\_ in the short run.
30. The long run is a period long enough for the price of \_\_\_\_\_ to fully adjust to changes in the economy.
31. Along the *LRAS* curve, two sets of prices are changing: the prices of \_\_\_\_\_ and the prices of \_\_\_\_\_.
32. The level of RGDP producers are willing to supply in the long run is \_\_\_\_\_ by changes in the price level.
33. The vertical *LRAS* curve will always be positioned at the \_\_\_\_\_ of output.
34. The long-run equilibrium level is where the economy will settle when undisturbed and all resources are \_\_\_\_\_ employed.
35. Long-run equilibrium will only occur where *AS* and *AD* intersect along the \_\_\_\_\_.
36. The underlying determinant of shifts in short-run aggregate supply is \_\_\_\_\_.
37. \_\_\_\_\_ production costs will motivate producers to produce less at any given price level, shifting the short-run aggregate supply curve \_\_\_\_\_.
38. A permanent increase in the available amount of capital, entrepreneurship, land, or labor can shift the *LRAS* curve to the \_\_\_\_\_.
39. A decrease in the stock of capital will \_\_\_\_\_ real output in the long run, *ceteris paribus*.
40. Investments in human capital would cause productivity to \_\_\_\_\_.
41. A(n) \_\_\_\_\_ in the amount of natural resources available would result in a leftward shift of the *LRAS* curve.
42. An increase in the number of workers in the labor force, *ceteris paribus*, tends to \_\_\_\_\_ wages and \_\_\_\_\_ short-run aggregate supply.
43. \_\_\_\_\_ output per worker causes production costs to rise and potential real output to fall, resulting in a(n) \_\_\_\_\_ shift in both *SRAS* and *LRAS*.
44. A(n) \_\_\_\_\_ in government regulations on businesses would lower the costs of production and expand potential real output, causing both *SRAS* and *LRAS* to shift to the right.
45. The most important of the factors that shift *SRAS* are changes in \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_.
46. If the price of steel rises, it will shift *SRAS* \_\_\_\_\_.
47. A fall in input prices, which shifts *SRAS* right, shifts *LRAS* right only if \_\_\_\_\_ has risen, and this situation only occurs if the \_\_\_\_\_ of those inputs is increased.
48. \_\_\_\_\_ supply shocks, such as natural disasters, can increase the costs of production.
49. Only a short-run equilibrium that is at \_\_\_\_\_ output is also a long-run equilibrium.
50. The short-run equilibrium level of real output and the price level are determined by the intersection of the \_\_\_\_\_ curve and the \_\_\_\_\_ curve.
51. The long-run equilibrium level of RGDP changes only when the \_\_\_\_\_ curve shifts.
52. Economists call unexpected shifts in supply or demand \_\_\_\_\_.
53. When short-run equilibrium occurs at less than the potential output of the economy, it results in a(n) \_\_\_\_\_ gap.
54. \_\_\_\_\_ inflation occurs when the price level rises as a result of an increase in aggregate demand.
55. Demand-pull inflation causes a(n) \_\_\_\_\_ in the price level and a(n) \_\_\_\_\_ in real output in the short run, illustrated by a movement up along the *SRAS* curve.
56. Demand-pull inflation causes a(n) \_\_\_\_\_ gap.
57. When *AD* increases, real (adjusted for inflation) wages \_\_\_\_\_ in the short run.
58. In response to an inflationary gap in the short run, real wages and other real input prices will tend to \_\_\_\_\_, which is illustrated by a(n) \_\_\_\_\_ shift in the *SRAS* curve.
59. \_\_\_\_\_ is the situation in which lower economic growth and higher prices occur together.
60. An increase in input prices can cause the *SRAS* curve to shift to the \_\_\_\_\_, resulting in \_\_\_\_\_ price levels, \_\_\_\_\_ real output, and \_\_\_\_\_ rates of unemployment in the short run.
61. With the economy initially at full-employment equilibrium, a sudden increase in oil prices would result in \_\_\_\_\_ unemployment and in real output \_\_\_\_\_ than potential output in the short run.
62. Falling oil prices would result in a(n) \_\_\_\_\_ shift in the *SRAS* curve.
63. Holding *AD* constant, falling oil prices would lead to \_\_\_\_\_ prices, \_\_\_\_\_ output, and \_\_\_\_\_ rates of unemployment in the short run.

64. An economy can self-correct from a recessionary gap through \_\_\_\_\_ wages and prices.
65. The long-run result of a fall in aggregate demand is an equilibrium \_\_\_\_\_ potential output and a(n) \_\_\_\_\_ price level.
66. Wages and prices may be sticky downward because of \_\_\_\_\_ labor contracts, a legal \_\_\_\_\_ wage, employers paying \_\_\_\_\_ wages, and \_\_\_\_\_ costs.
67. If the economy is currently in an inflationary gap, with output greater than potential output, the price level is \_\_\_\_\_ than workers anticipated.
68. The \_\_\_\_\_ of the *AD* and *AS* curves makes the *AD/AS* analysis less than completely satisfactory.
69. Say's law could be stated as "\_\_\_\_\_ creates its own \_\_\_\_\_."
70. When real output is below potential real output, unemployment is \_\_\_\_\_ than its natural rate.
71. Unlike our modern understanding, the classical model has no separate \_\_\_\_\_ curve.
72. The economy will not experience unemployment in the \_\_\_\_\_ model.
73. When resources are idle, output will be \_\_\_\_\_ responsive to changes in aggregate demand and the price level will be \_\_\_\_\_ responsive to changes in aggregate demand.

Answers: 1. real GDP demanded 2. Consumption 3. less 4. open economy 5. net exports 6. downward; inverse 7. wealth; interest rate; open economy 8. rises; increase 9. reduced; reduced; reduced 10. rises; fewer; lower 11. increases; increases; reduces; left 12. more; less 13. more; less; fall 14. downward 15. rightward 16. leftward 17. left 18. right; left 19. right 20. fewer; left 21. aggregate supply 22. short-run; long-run 23. output; input 24. upward 25. more; less 26. profit; misperception 27. rise; raising 28. fall; fall; reduce 29. relative; more 30. all inputs 31. outputs; inputs 32. not affected 33. natural rate 34. fully 35. long-run aggregate supply curve 36. production costs 37. Higher; leftward 38. right 39. reduce; reduce 40. rise 41. decrease 42. depress; increase 43. Lower; leftward 44. reduction 45. wages; nonlabor input prices; labor productivity; supply shocks 46. left; not shift 47. potential output; supply 48. Adverse 49. potential 50. aggregate demand; short-run aggregate supply 51. *LRAS* 52. *LRAS* 53. recessionary 54. Demand-pull 55. increase 56. inflationary 57. fall 58. rise; leftward 59. Stagflation 60. left; higher; lower; higher 61. higher; less 62. rightward 63. lower; greater; lower 64. declining 65. at; lower 66. long-term; minimum; efficiency; menu 67. higher 68. interdependence 69. supply; demand 70. greater 71. short-run aggregate supply 72. classical 73. more; less

## Key Terms and Concepts

aggregate demand (*AD*) 633  
 open economy 633  
 net exports 634  
 aggregate demand curve 635  
 aggregate supply (*AS*) curve 641  
 short-run aggregate supply (*SRAS*) curve 642

long-run aggregate supply (*LRAS*) curve 642  
 supply shocks 647  
 recessionary gap 650  
 inflationary gap 650

demand-pull inflation 651  
 stagflation 652  
 cost-push inflation 652  
 wage and price inflexibility 654

## Section Quiz Answers

### 22.1 The Determinants of Aggregate Demand

#### 1. What are the major components of aggregate demand?

The major components of aggregate demand are consumption, planned investment, government purchases, and net exports.

#### 2. How would an increase in personal taxes or a decrease in transfer payments affect consumption?

An increase in taxes or a decrease in transfer payments would decrease the disposable income of

households, hence reducing their demand for consumption goods.

#### 3. What would an increase in exports do to aggregate demand, other things being equal? An increase in imports? An increase in both imports and exports, where the change in exports was greater in magnitude?

An increase in exports would increase aggregate demand, other things being equal, since net exports are part of aggregate demand. An increase in imports would decrease aggregate demand, other things being equal, by reducing net exports

(demand shifts from domestic producers to foreign producers). An increase in both imports and exports would increase aggregate demand if the increase in exports exceeded the increase in imports, other things being equal, because the combination would increase net exports.

## 22.2 The Aggregate Demand Curve

### 1. Why is the aggregate demand curve downward sloping?

Aggregate demand shows what happens to the total quantity of all real goods and services demanded in the economy as a whole (that is, the quantity of real GDP demanded) at different price levels. Aggregate demand is downward sloping because of the real wealth effect, the interest rate effect, and the open economy effect as the price level changes.

### 2. How does an increased price level reduce the quantities of investment goods and consumer durables demanded?

An increased price level increases the demand for money, which, in turn, increases interest rates. Higher interest rates increase the opportunity cost of financing both investment goods and consumer durables, reducing the quantities of investment goods and consumer durables demanded.

### 3. What is the wealth effect, and how does it imply a downward-sloping aggregate demand curve?

A reduced price level increases the real value of people's currency holdings; as their wealth increases, so does the quantity of real goods and services demanded, particularly consumption goods. Therefore, the aggregate demand curve, which represents the relationship between the price level and the quantity of real goods and services demanded, slopes downward as a result.

### 4. What is the interest rate effect, and how does it imply a downward-sloping aggregate demand curve?

A reduced price level reduces the demand for money, which lowers interest rates, thereby increasing the quantity of investment goods and consumer durable goods people are willing to purchase. Therefore, the aggregate demand curve, which represents the relationship between the price level and the quantity of real goods and services demanded, slopes downward as a result.

### 5. What is the open economy effect, and how does it imply a downward-sloping aggregate demand curve?

The open economy effect occurs when a higher domestic price level raises the prices of domestically produced goods relative to the prices of imported goods. This reduces the quantity of domestically produced goods demanded (by both citizens and foreigners) as relatively cheaper foreign-made goods are substituted for them. The result is a downward-sloping aggregate demand curve, as a higher price level results in a lower quantity of domestic real GDP demanded.

## 22.3 Shifts in the Aggregate Demand Curve

### 1. How is the distinction between a change in demand and a change in quantity demanded the same for aggregate demand as for the demand for a particular good?

Just as a change in the price of a particular good changes its quantity demanded but not its demand, a change in the price level changes the quantity of real GDP demanded but not aggregate demand. Just as a change in any of the demand-curve shifters (factors other than the price of the good itself) changes the demand for a particular good, a change in any of the  $C + I + G + (X - M)$  components of aggregate demand not caused by a change in the price level changes aggregate demand.

### 2. What happens to aggregate demand if the demand for consumption goods increases, *ceteris paribus*?

Since consumption purchases are part of aggregate demand, an increase in the demand for consumption goods increases aggregate demand, *ceteris paribus*.

### 3. What happens to aggregate demand if the demand for investment goods falls, *ceteris paribus*?

Since planned investment purchases are part of aggregate demand, a falling demand for investment goods makes aggregate demand fall, *ceteris paribus*.

### 4. Why would an increase in the money supply tend to increase expenditures on consumption and investment, *ceteris paribus*?

An increase in the money supply would increase how many now relatively more plentiful dollars people would be willing to pay for goods in general. This would increase expenditures on consumption and investment, increasing aggregate demand, *ceteris paribus*.

## 22.4 The Aggregate Supply Curve

### 1. What relationship does the short-run aggregate supply curve represent?

The short-run aggregate supply curve represents the relationship between the total quantity of final goods and services that suppliers are willing and able to produce (the quantity of real GDP supplied) and the overall price level, before all input prices have had time to completely adjust to the price level.

### 2. What relationship does the long-run aggregate supply curve represent?

The long-run aggregate supply curve represents the relationship between the total quantity of final goods and services that suppliers are willing and able to produce (the quantity of real GDP supplied) and the overall price level, once all input prices have had time to completely adjust to the price level. (Actually, it shows there is no relationship between these two variables, once input prices have had sufficient time to completely adjust to the price level.)

### 3. Why is focusing on producers' profit margins helpful in understanding the logic of the short-run aggregate supply curve?

Profit incentives are the key to understanding what happens to real output as the price level changes in the short run (before input prices completely adjust to the price level). When the prices of outputs rise relative to the prices of inputs (costs), as when aggregate demand increases in the short run, profit margins increase, which increases the incentives to produce, which leads to increased real output. When the prices of outputs fall relative to the prices of inputs (costs), as when aggregate demand decreases in the short run, profit margins decrease, which decreases the incentives to produce, which leads to decreased real output.

### 4. Why is the short-run aggregate supply curve upward sloping, while the long-run aggregate supply curve is vertical at the natural rate of output?

The short-run aggregate supply curve is upward sloping because in the short run, before input prices have completely adjusted to the price level, an increase in the price level increases profit margins by increasing output prices relative to input prices, leading producers to increase real output. The long-run aggregate supply curve is vertical because in the long run, when input prices have completely adjusted to changes in the price level, input prices as well as output prices have adjusted to the price level; hence, profit margins in real

terms do not change as the price level changes, and therefore there is no relationship between the price level and real output in the long run.

The long-run aggregate supply curve is vertical at the natural rate of real output because that is the maximum output level allowed by capital, labor, and technological inputs at full employment (that is, given the determinants of the economy's production possibilities curve), which is therefore sustainable over time.

### 5. What would the short-run aggregate supply curve look like if input prices always changed instantaneously as soon as output prices changed? Why?

If input prices always changed instantaneously as soon as output prices changed, the short-run aggregate supply curve would look the same as the long-run aggregate supply curve—vertical at the natural rate of real output. This is because both input and output prices would then change proportionately, so that real profit margins (the incentives facing producers), and therefore real output, would not change as the price level changes.

### 6. If the price of cotton increased 10 percent when cotton producers thought other prices were rising 5 percent over the same period, what would happen to the quantity of RGDP supplied in the cotton industry? What if cotton producers thought other prices were rising 20 percent over the same period?

If the price of cotton increased 10 percent when cotton producers thought other prices were rising 5 percent over the same period, the quantity of RGDP supplied in the cotton industry would increase, because with other prices (including input prices) falling relative to cotton prices, the profitability of growing cotton would be rising. If the price of cotton increased 10 percent when cotton producers thought other prices were rising 20 percent over the same period, the quantity of RGDP supplied in the cotton industry would decrease, because with other prices (including input prices) rising relative to cotton prices, the profitability of growing cotton would be falling.

## 22.5 Shifts in the Aggregate Supply Curve

### 1. Which of the aggregate supply curves will shift in response to a change in the expected price level? Why?

The short-run aggregate supply curve shifts in response to a change in the expected price level by changing the expected production costs and therefore the expected profitability of producing output

at any given output price level. Remember that the long-run aggregate supply curve assumes that people have had enough time to completely adjust to a changing price level, so a change in the expected price level does not change expected profit margins along the long-run aggregate supply curve.

**2. Why do lower input costs increase the level of RGDP supplied at any given price level?**

Lower input costs increase the level of RGDP supplied at any given (output) price level by increasing the profit margin for any given level of output prices.

**3. What would discovering huge new supplies of oil and natural gas do to the short-run and long-run aggregate supply curves?**

Discovering huge new supplies of oil and natural gas would increase both the short-run and long-run aggregate supply curves, because those additional resources would allow more to be produced in the short run at any given output price level, as well as on a sustainable, long-run basis (since such a discovery would shift the economy's production possibilities curve outward).

**4. What would happen to short-run and long-run aggregate supply curves if the government required every firm to file explanatory paperwork each time a decision was made?**

This would shift both the short-run and long-run aggregate supply curves to the left. It would permanently raise producers' costs of producing any level of output, which would reduce how much producers would produce in the short run at any given price level, as well as on a sustainable, long-run basis (since such a requirement would shift the economy's production possibilities curve inward).

**5. What would happen to the short-run and long-run aggregate supply curves if the capital stock grew and available supplies of natural resources expanded over the same period of time?**

An increase in the capital stock together with increased available supplies of natural resources would shift both the short-run and long-run aggregate supply curves to the right (shifting the economy's production possibilities curve outward), increasing the short-run and sustainable levels of real output.

**6. How can a change in input prices change the short-run aggregate supply curve but not the long-run aggregate supply curve? How could it change both long-run and short-run aggregate supply?**

A temporary change in input prices can change the short-run aggregate supply curve by changing profit

margins in the short run. However, when input prices return to their previous levels (reflecting a return to their previous relative scarcity) in the long run, the sustainable level of real output will be no different from before. If, on the other hand, input price changes reflect a permanently changed supply of inputs (lower input prices reflecting an increased supply), a change in input prices would increase both the long-run and short-run aggregate supply curves by increasing the real output producible both currently and on an ongoing basis (permanently shifting the economy's production possibilities curve outward).

**7. What would happen to short- and long-run aggregate supply if unusually good weather led to bumper crops of most agricultural produce?**

Since this would mean only a temporary change in output, it would increase the short-run aggregate supply curve but not the long-run aggregate supply curve.

**8. If OPEC temporarily restricted the world output of oil, what would happen to short- and long-run aggregate supply? What would happen if the output restriction was permanent?**

A temporary oil output restriction would temporarily increase oil (energy input) prices, reducing the short-run aggregate supply curve (shifting it left) but not the long-run aggregate supply curve. If the oil output restriction was permanent, the oil price increase would also reduce the level of real output producible on a sustainable basis, and so would shift both short-run aggregate supply and long-run aggregate supply to the left.

## 22.6 Macroeconomic Equilibrium: The Short Run and the Long Run

**1. What is a recessionary gap?**

A recessionary gap exists when the macroeconomy is in equilibrium at less than the potential output of the economy because aggregate demand is insufficient to fully employ all of society's resources.

**2. What is an inflationary gap?**

An inflationary gap exists when the macroeconomy is in equilibrium at more than the potential output of the economy because aggregate demand is so high that the economy is operating temporarily beyond its long-run capacity.

**3. What is demand-pull inflation?**

Demand-pull inflation reflects an increased price level caused by an increase in aggregate demand.

**4. What is cost-push inflation?**

Cost-push inflation is output price inflation caused by an increase in input prices (that is, by supply-side forces rather than demand-side forces). It is illustrated by a leftward or upward shift of the short-run aggregate supply curve for given long-run aggregate supply and demand curves.

**5. Starting from long-run equilibrium on the long-run aggregate supply curve, what happens to the price level, real output, and unemployment as a result of cost-push inflation?**

Starting from long-run equilibrium on the long-run aggregate supply curve, cost-push inflation causes the price level to rise, real output to fall, and unemployment to rise in the short run.

**6. How would a drop in consumer confidence impact the short-run macroeconomy?**

A drop in consumer confidence would decrease the demand for consumer goods, other things being equal, which would reduce (shift left) the aggregate demand curve, resulting in a lower price level, lower real output, and increased unemployment in the short run for a given short-run aggregate supply curve.

**7. What would happen to the price level, real output, and unemployment in the short run if world oil prices fell sharply?**

If world oil prices fell sharply, it would increase (shift right) the short-run aggregate supply curve, resulting in a lower price level, greater real output, and reduced unemployment in the short run for a given aggregate demand curve.

**8. What are *sticky prices and wages*?**

*Sticky prices and wages* are terms for input prices and wages that may be very slow to adjust in the downward direction, causing the economy's adjustment mechanism to take a substantial amount of time to self-correct from a recession.

**9. How does the economy self-correct?**

The economy self-corrects for a short-run recession through declining wages and prices, brought

on by reduced demand for labor and other inputs; the economy self-corrects for a short-run boom through increasing wages and prices, brought on by increased demand for labor and other inputs.

## 22.7 The Classical and the Keynesian Macroeconomic Model

**1. What are the two primary approaches to macroeconomics?**

The classical school and the Keynesian school are the two primary approaches to macroeconomics.

**2. Which school of thought emphasized that markets can rapidly adjust to changes?**

The classical school emphasized that markets can rapidly adjust to change.

**3. Why was the double-digit unemployment of the Great Depression when Keynes wrote *The General Theory of Employment, Interest and Money* helpful in leading to its general acceptance?**

The classical school held that persistent high unemployment would not occur in a market economy, so the high unemployment in the Great Depression—a central aspect of it—appeared to be something the classical approach could not explain.

**4. What would keep wages from falling quickly in a recession?**

The two reasons cited most often that prevent wages from falling quickly in a recession are long-term union contracts and minimum-wage laws.

**5. If wages are sticky downward, why will a decrease in aggregate demand primarily reduce real output?**

For a decrease in  $AD$ , if wages are sticky downward, the short-run aggregate supply curve will be nearly horizontal over the relevant range, and the fall in real output would be nearly as great as the fall in  $AD$ .

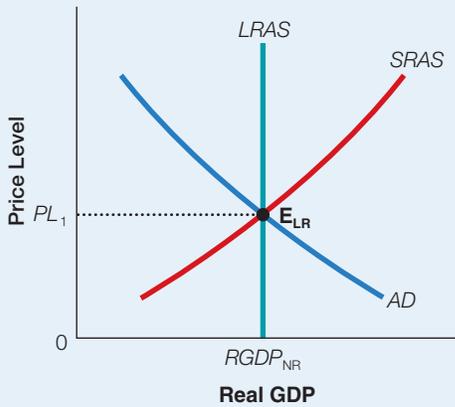
## Problems

1. Describe what the effect on aggregate demand would be, other things being equal, if
  - a. exports increase.
  - b. both imports and exports decrease.
  - c. consumption decreases.
  - d. investment increases.
  - e. investment decreases and government purchases increase.
  - f. the price level increases.
  - g. the price level decreases.

2. Fill in the blanks in the following explanations:
  - a. The wealth effect is described by the following: An increase in the price level leads to a(n) \_\_\_\_\_ in real value of money, which leads to a(n) \_\_\_\_\_ in consumer spending, which leads to a(n) \_\_\_\_\_ in RGDP demanded.
  - b. The interest rate effect is described by the following: A decrease in the price level leads to a(n) \_\_\_\_\_ in the interest rate, which leads to a(n) \_\_\_\_\_ in investments, which leads to a(n) \_\_\_\_\_ in RGDP demanded.
  - c. The open economy effect is described by the following: An increase in the price level leads to a(n) \_\_\_\_\_ in the demand for domestic goods, which leads to a(n) \_\_\_\_\_ in RGDP demanded.
3. How will each of the following changes alter aggregate supply?

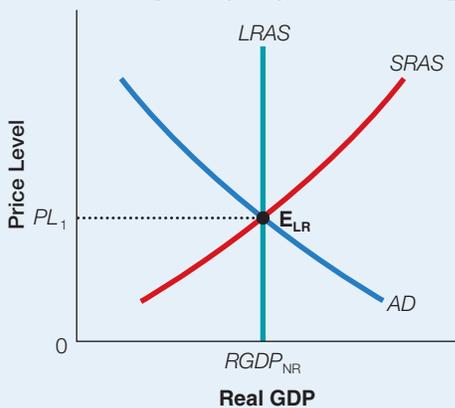
Change	Short-Run Aggregate Supply	Long-Run Aggregate Supply
An increase in aggregate demand	_____	_____
A decrease in aggregate demand	_____	_____
An increase in the stock of capital	_____	_____
A reduction in the size of the labor force	_____	_____
An increase in input prices (that does not reflect permanent changes in their supplies)	_____	_____
A decrease in input prices (that does reflect permanent changes in their supplies)	_____	_____
An increase in usable natural resources	_____	_____
A temporary adverse supply shock	_____	_____
Increases in the cost of government regulations	_____	_____

4. Use the accompanying diagram to answer questions a and b.

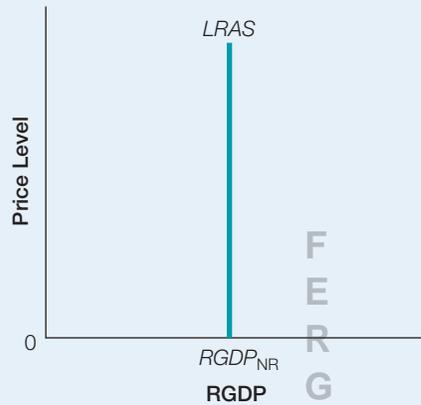


- a. On the exhibit provided, illustrate the short-run effects of an increase in aggregate demand. What happens to the price level, real output, employment, and unemployment?
- b. On the exhibit provided, illustrate the long-run effects of an increase in aggregate demand. What happens to the price level, real output, employment, and unemployment?

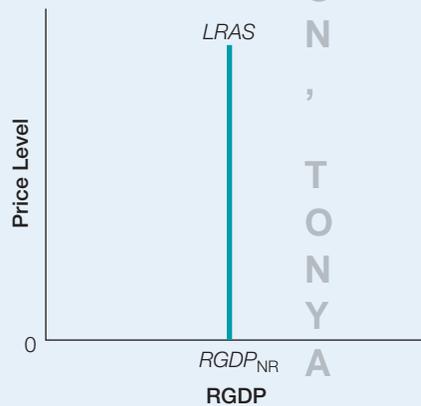
5. Use the accompanying diagram to answer questions a and b.



- a. On the exhibit provided, illustrate the short-run effects of a decrease in aggregate demand. What happens to the price level, real output, employment, and unemployment?
  - b. On the exhibit provided, illustrate the long-run effects of a decrease in aggregate demand. What happens to the price level, real output, employment, and unemployment?
6. Use the accompanying diagram to answer questions a and b.



- a. Illustrate a recessionary gap on the diagram provided.
  - b. Using the results in a, illustrate and explain the eventual long-run equilibrium in this case.
7. Use the accompanying diagram to answer questions a and b.



- a. Illustrate an inflationary gap on the diagram provided.
  - b. Using the results in a, illustrate and explain the eventual long-run equilibrium in this case.
8. If retailers such as Walmart and Target find that inventories are rapidly being depleted, would it have been caused by a rightward or leftward change in the aggregate demand curve? What are the likely consequences for output and investment?
  9. Evaluate the following statement: "A higher price level decreases the purchasing power of the dollar and reduces RGDP."
  10. How does a higher price level in the U.S. economy affect purchases of imported goods? Explain.
  11. Explain how a recession in Latin America might affect aggregate demand in the U.S. economy.
  12. You operate a business in which you manufacture furniture. You are able to increase your furniture prices by 5 percent this quarter. You assume that the demand for your furniture has increased and begin increasing furniture production. Only later do you realize that prices in the macroeconomy are rising generally at a rate of 5 percent per quarter. This is an example of what effect? What does it imply about the slope of the short-run aggregate supply curve?
  13. Distinguish cost-push from demand-pull inflation. Provide an example of an event or shock to the economy that would cause each.
  14. Is it ever possible for an economy to operate above the full-employment level in the short term? Explain.

15. Evaluate the following statement: The Keynesian assumption of wage and price rigidity best corresponds to the steepest portion of the aggregate supply curve where factories are operating well below capacity.
16. Why do classical economists and Keynesian economists agree on the long-run effects of a fall in aggregate demand, but not agree on the short-run effects?
17. How does the slope of the Keynesian short-run aggregate supply curve depend on the degree of excess capacity in the economy?
18. Why does the effect of a given increase in aggregate demand have a larger effect on real output in the short run, the more excess capacity exists in the economy?

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# The Aggregate Expenditure Model

## 23.1 Simple Aggregate Expenditure Model

## 23.2 Finding Equilibrium in the Aggregate Expenditure Model

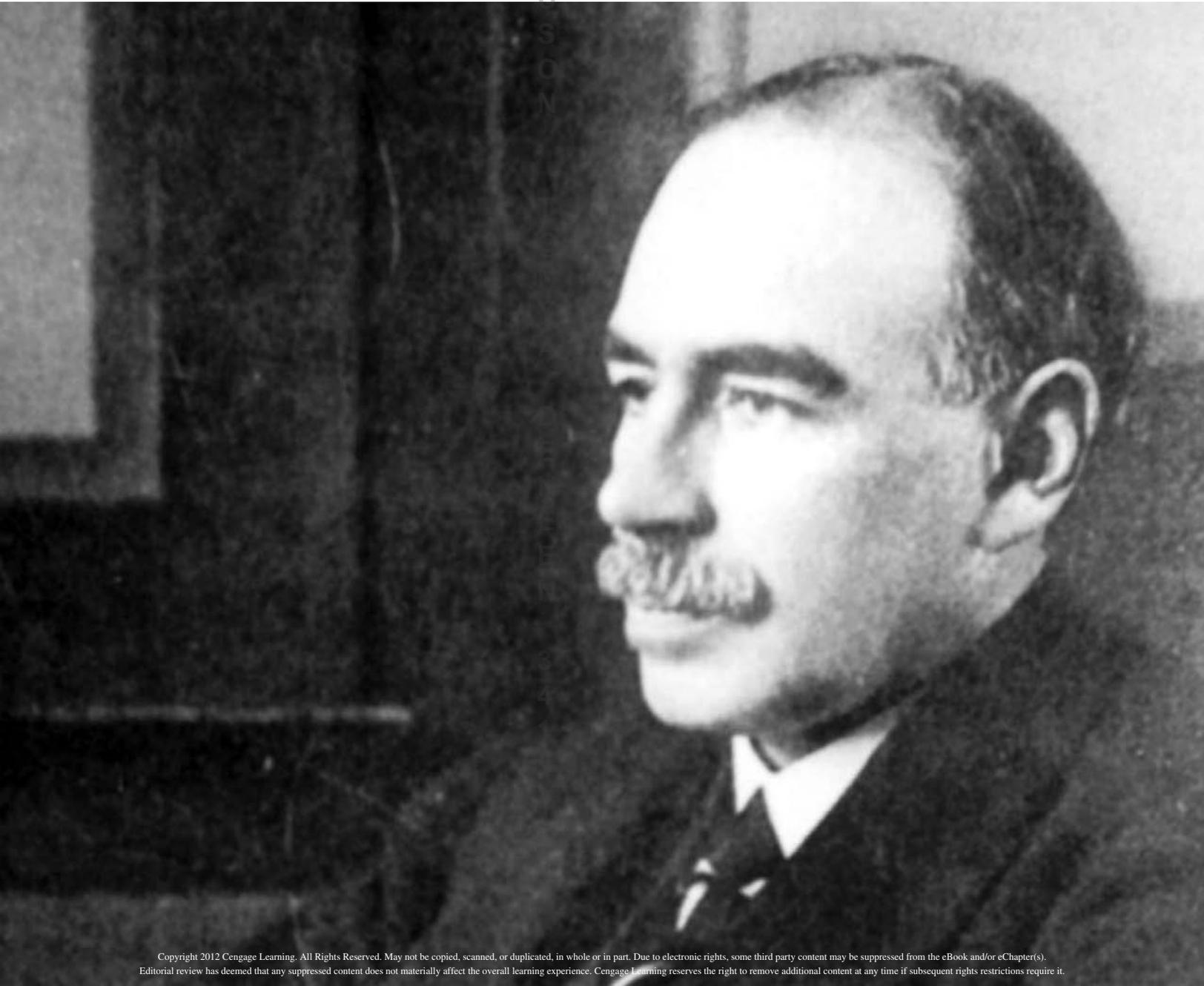
## 23.3 Adding Investment, Government Purchases, and Net Exports

## 23.4 Shifts in Aggregate Expenditure and the Multiplier

## 23.5 From Aggregate Expenditures to Aggregate Demand

Keynes studied how unanticipated changes in investment spending affect aggregate spending and real GDP. The Keynesian expenditure model is based on the condition that the components of aggregate demand (consumption, investment, government purchases, and net exports) must equal total output. Keynes believed that total spending was the critical determinant of the overall level of economic activity. When total spending increases, firms increase their output and hire more workers. Even though Keynes ignored an important component—aggregate supply—his model still provides a great deal of information about aggregate demand.

DIZ MUENCHEN GMBH, SUEDEUTSCHE ZEITUNG PHOTO/ALAMY



## 23.1

# The Simple Aggregate Expenditure Model

📁 Why do we assume a fixed price level?

📁 What economic variables influence aggregate demand?

📁 What are the autonomous factors that influence consumption spending?

In this chapter, we go into a more detailed description of the causes of short-run business cycles. We assume that we are in the Keynesian region of the aggregate supply curve, where the aggregate supply curve is horizontal and RGDP is completely determined by aggregate demand. Recall that Keynes believed that, in the short run, wages and prices were inflexible, so inflation is not a concern; real values and nominal values are equal in the aggregate expenditure model. Keynes focused on how unanticipated changes in expenditure, particularly investment expenditures, had an impact on real GDP. Keynes's model enlightens our understanding of the short-run business cycle. The model is called the aggregate expenditure model (sometimes the Keynesian cross model), because its focus is aggregate expenditures (aggregate demand), which has historically been especially important to the economy in the short run.

The key to the aggregate expenditure model is that the amount of goods and services (real GDP) depends on aggregate expenditures (total spending). When aggregate expenditures fall, it causes a decrease in output and employment. When aggregate expenditures rise, it causes an increase in output and employment. Thus, in the short run, the level of RGDP is determined by the level of aggregate expenditure.

Keynes pointed out the naiveté of Say's law. Not all income generated from output is used to buy goods and services; some is saved, hoarded, or taxed away. Supply does not automatically create an adequate demand. In other words, income is not always spent in the period that it is produced. Keynes recognized the volatility of investment spending. A decline in investment would lead to insufficient total spending—inventories would accumulate, and firms will cut production and lay off workers. To fully understand investment fluctuations, Keynes believed you had to study people's income and consumption spending patterns.

## Why Do We Assume the Price Level Is Fixed?

Because Keynes believed wages and prices were inflexible in the short run, in this chapter we will assume that the price level is fixed or constant. If the price level is fixed, then changes in nominal income will be equivalent to changes in real income. That is, when we assume the price level is fixed, we do not have to distinguish real variable changes from nominal variable changes. Keynes believed that prices and wages were rigid or fixed until we reached full employment. But let us begin by looking at the most important aggregate demand determinant—consumption.

## The Simplest Aggregate Expenditure Model: Autonomous Consumption Only

It is useful to begin by considering consumption spending by households. Household spending on goods and services is the largest single component of the demand for final goods, accounting for more than 70 percent of GDP.



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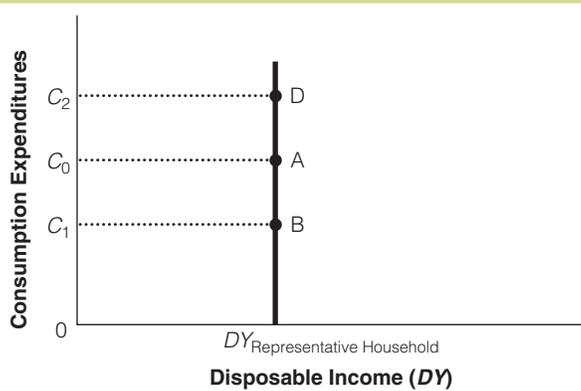
*What do we assume in the the Keynesian region of the aggregate supply curve?*



*If the price level is fixed, what is the relationship between changes in nominal income and changes in real income?*

section 23.1  
exhibit 1

### Autonomous Changes in Consumption Spending



An increase in real wealth would raise consumption spending to  $C_2$ , at point D. A decrease in real wealth would tend to lower the level of consumption spending to  $C_1$ , at point B. A higher interest rate tends to cause a decrease in consumption spending from point A to point B. As household debt increases, other things equal, consumption spending would fall from point A to point B. In general, an increase in consumer confidence would act to increase household spending (a movement from point A to point D) and a decrease in consumer confidence would act to decrease household spending (a movement from point A to point B).

Numerous economic variables influence aggregate demand for consumer goods and services, and thus, aggregate consumption expenditures. Using you or your family as an example, you know that such things as family disposable income (after-tax income), credit conditions, the level of debt outstanding, the amount of financial assets, and expectations are important determinants of consumption purchases. Most economists believe that disposable income is one of the dominant factors.

Let's begin by simplifying things quite a bit. Imagine an economy in which only consumption spending exists (no investment, government purchases, or net exports; later, we'll add in these other sectors). To begin with the simplest situation possible, let's suppose that each household has the same level of disposable income. This kind of analysis that relies on averages is called a representative household analysis. On a graph of consumption spending (vertical axis) for our representative household and the household's representative disposable income (horizontal axis), we could represent average consumption of disposable income at point A in Exhibit 1. From point A, a horizontal dotted line to the vertical axis permits us to read the value of average consumption spending,  $C_0$ .

## What Are the Autonomous Factors That Influence Spending?

Even though income is given for the representative household, other economic factors that influence consumption spending are not. When consumption (or any of the other components of spending, such as investment) does not depend on income, we call it *autonomous* (or independent). Let's look at some of these other autonomous factors and see how they would change consumption spending.



*Why are some determinants of consumption called autonomous?*

### Real Wealth

The larger the value of a household's real wealth (the money value of wealth divided by the price level, which indicates the amount of consumption goods that the wealth could buy), the larger the amount of consumption spending, other things equal. Thus, in Exhibit 1, an increase in real wealth would raise consumption to  $C_2$ , at point D, for a given level of current income. Similarly, something that would lower the value of real wealth, such as a decline in property values or a stock market decline, would tend to lower the level of consumption to  $C_1$ , at point B in Exhibit 1.



*How do changes in interest rates affect consumption?*

### The Interest Rate

A higher interest rate tends to make the consumption items that we buy on credit more expensive, which reduces expenditures on those items. An increase in the interest rate increases the monthly payments made to buy such things as automobiles, furniture, and major appliances and reduces our ability to spend out of a given income. This shift is shown as a decrease in consumption from point A to point B in Exhibit 1. Moreover, an increase in the interest rate provides a higher future return from reducing current spending, which motivates increasing savings. Thus, a higher interest rate in the current period would likely motivate an increase in savings today, which would permit households to consume more goods and services at some future date.

## Household Debt

Remember when that friend of yours ran up his credit card obligations so high that he stopped buying goods except the basic necessities? Well, our average household might find itself in the same situation if its outstanding debt exceeds some reasonable level relative to its income. So, as debt increases, other things equal, consumption expenditure would fall from point A to point B in Exhibit 1.

## Expectations

Just as in microeconomics, decisions to spend may be influenced by a person's expectations of future disposable income, employment, or certain world events. Based on monthly surveys conducted that attempt to measure consumer confidence, an increase in consumer confidence generally acts to increase household spending (a movement from point A to point D in Exhibit 1) and a decrease in consumer confidence would act to decrease spending (a movement from A to B in Exhibit 1). For example, a decline in the consumer confidence index after the financial crisis that began in December of 2007 and a subsequent fall in household spending are considered factors in the recession in the United States.

## Tastes and Preferences

Of course, each household is different. Some are young and beginning a working career; some are without children; others have families; still others are older and perhaps retired from the workforce. Some households like to save, putting dollars away for later spending, while others spend all their income, or even borrow to spend more than their current disposable income. These saving and spending decisions often vary over a household's life cycle.

As you can see, many economic factors affect consumption expenditures. The factors already listed represent some of the most important. All of these factors are considered **autonomous determinants of consumption expenditures**; that is, those expenditures that are not dependent on the level of current disposable income. Now let's make our model more complete and evaluate how changes in disposable income affect household consumption expenditures.

### autonomous determinants of consumption expenditures

expenditures not dependent on the level of current disposable income that can result from factors such as real wealth, the interest rate, household debt, expectations, and tastes and preferences

## SECTION QUIZ

- Demand for consumer goods will be affected by which of the following?
  - disposable income
  - credit conditions
  - the level of debt outstanding
  - expectations about the future
  - all of the above
- Autonomous consumption will increase when
  - real wealth increases.
  - the interest rate increases.
  - household debt increases.
  - any of the above occur.



(continued)

## SECTION QUIZ (Cont.)



3. If autonomous consumption fell, it could have been caused by
    - a. falling interest rates.
    - b. falling household debt.
    - c. more optimistic expectations about future disposable income.
    - d. increasing real wealth.
    - e. none of the above.
- 
1. How does the assumption of a fixed price level in the Keynesian expenditure model solve the problem of distinguishing between changes in the real value of a variable (such as GDP) and changes in its nominal value?
  2. Would it be possible for some consumption expenditures to be autonomous and other parts of consumption expenditures not to be autonomous?
  3. In what two ways does a higher interest rate tend to reduce current consumption?
  4. What would happen to autonomous consumption expenditures if the value of a consumer's stock market investments rose and his household debt rose at the same time?
  5. What would happen to your autonomous consumption if you expected to get a job next week paying 10 times your current salary?
  6. Why do households headed by a 50-year-old tend to save a larger fraction of their incomes than those headed by either a 30-year-old or a 70-year-old?

Answers: 1. e 2. a 3. e

## 23.2

# Finding Equilibrium in the Aggregate Expenditure Model

- 📁 What factors determine consumer spending?
- 📁 How do we find equilibrium in the aggregate expenditure model?

- 📁 Why does income equal output?
- 📁 Why does expenditure equal output?

In our first model, we looked at the economic variables that affected consumption expenditures when disposable income was fixed. This assumption is clearly unrealistic, but it allows us to develop some of the basic building blocks of the aggregate expenditure model. Now we'll look at a slightly more complicated model in which consumption also depends on disposable income.

If you think about what determines your own current consumption spending, you know that it depends on many factors previously discussed, such as your age, family size, interest rates, expected future disposable income, wealth, and, most importantly, your current disposable income. Recall from earlier chapters, disposable income is your after-tax income. Your personal consumption spending depends primarily on your current disposable income. In fact, empirical studies confirm that most people's consumption spending is closely tied to their disposable income.

## Revisiting Marginal Propensity to Consume and Save

What happens to current consumption spending when a person earns some additional disposable income? Most people will spend some of their extra income and save some of it. The percentage of your extra disposable income that you decide to spend on consumption is what economists call your **marginal propensity to consume (MPC)**. That is, MPC is equal to the *change* in consumption spending ( $\Delta C$ ) divided by the *change* in disposable income ( $\Delta DY$ ).

$$MPC = \Delta C / \Delta DY$$

For example, suppose you won a lottery prize of \$1,000. You might decide to spend \$750 of your winnings today and save \$250. In this example, your marginal propensity to consume is 0.75 (or 75 percent) because out of the extra \$1,000, you decided to spend 75 percent of it ( $0.75 \times \$1,000 = \$750$ ).

The term *marginal propensity to consume* has two parts: (1) *marginal* refers to the fact that you received an extra amount of disposable income—in addition to your income, not your total income; and (2) *propensity to consume* refers to how much you tend to spend on consumer goods and services out of your additional income.

## Marginal Propensity to Save

The flip side of the marginal propensity to consume is the **marginal propensity to save (MPS)**, which is the proportion of an addition to your income that you would save or not spend on goods and services today. That is, MPS is equal to the *change* in savings ( $\Delta S$ ) divided by the *change* in disposable income ( $\Delta DY$ ).

$$MPS = \Delta S / \Delta DY$$

In the earlier lottery example, your marginal propensity to save is 0.25, or 25 percent, because you decided to save 25 percent of your additional disposable income ( $0.25 \times \$1,000 = \$250$ ). Because your additional disposable income must be either consumed or saved, the marginal propensity to consume plus the marginal propensity to save must add up to 1, or 100 percent.

Let's illustrate the marginal propensity to consume in Exhibit 1. Suppose you estimated that you had to spend \$16,000 a year, even if you earned no income for the year, for “necessities” such as food, clothing, and shelter. And suppose for every \$1,000 of added disposable income you earn, you spend 75 percent of it and save 25 percent of it. So if your disposable income is \$0, you spend \$16,000 (that means you have to borrow or reduce your existing savings just to survive). If your disposable income is \$40,000, you'll spend \$16,000 plus 75 percent of \$40,000 (which equals \$30,000), for total spending of \$46,000. If your disposable income is \$80,000, you'll spend \$16,000 plus 75 percent of \$80,000 (which equals \$60,000), for total spending of \$76,000.

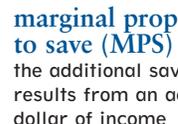
What's your marginal propensity to consume? In this case, if you spend 75 percent of every additional \$1,000 you earn, your marginal propensity to consume is 0.75, or 75 percent. And if you save 25 percent of every additional \$1,000 you earn, your marginal propensity to save is 0.25.

In Exhibit 1, the slope of the line represents the marginal propensity to consume. To better understand this concept, look at what happens when your disposable income rises from \$36,000 to \$40,000. At a disposable income of \$36,000, you spend \$16,000 plus 75 percent of \$36,000 (which is \$27,000), for total spending of \$43,000. If your disposable income rises to \$40,000, you spend \$16,000 plus 75 percent of \$40,000 (which is \$30,000), for total spending of \$46,000. So when your disposable income rises by \$4,000 (from \$36,000 to



*What do economists mean by the term “marginal propensity to consume”?*

**marginal propensity to consume (MPC)**  
the additional consumption that results from an additional dollar of income



**marginal propensity to save (MPS)**  
the additional saving that results from an additional dollar of income



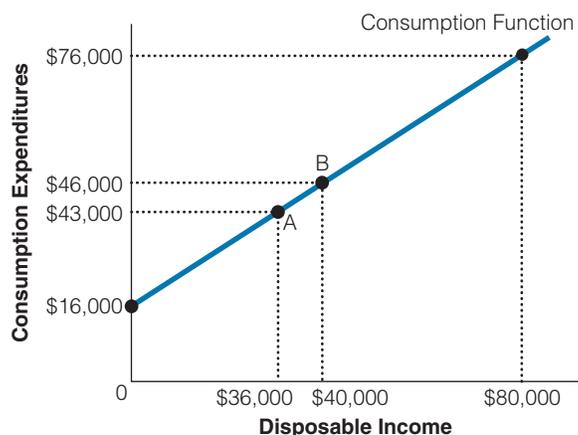
*What is the relationship between MPC and MPS?*



*Why is MPC the slope of the consumption function?*

section 23.2  
exhibit 1

### The Marginal Propensity to Consume



The slope of the line represents the marginal propensity to consume. At a disposable income of \$36,000, you spend \$16,000 plus 75 percent of \$36,000 (which is \$27,000), for total spending of \$43,000. If your disposable income rises to \$40,000, you spend \$16,000 plus 75 percent of \$40,000 (which is \$30,000), for total spending of \$46,000. So when your disposable income rises by \$4,000 (from \$36,000 to \$40,000), your spending goes up by \$3,000 (from \$43,000 to \$46,000). Your marginal propensity to consume is \$3,000 (the increase in spending) divided by \$4,000 (the increase in disposable income), which equals 0.75, or 75 percent. But notice that this MPC calculation is also the calculation of the slope of the line from point A to point B.

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\$40,000), your spending goes up by \$3,000 (from \$43,000 to \$46,000). Your marginal propensity to consume is \$3,000 (the increase in spending) divided by \$4,000 (the increase in disposable income), which equals 0.75, or 75 percent. But notice that this calculation is also the calculation of the slope of the line from point A to point B in the exhibit. Recall that the slope of the line is the rise (the change on the vertical axis) over the run (the change on the horizontal axis). In this case, that's \$3,000 divided by \$4,000, which makes 0.75 the marginal propensity to consume. So the marginal propensity to consume is the same as the slope of the line in our graph of consumption and disposable income.

Now, let's take this same logic and apply it to the economy as a whole. If we add up, or aggregate, everyone's consumption and everyone's income, we'll get a line that looks like the one in Exhibit 1, but that applies to the entire economy. This line or functional relationship is called a *consumption function*. Let's suppose consumption spending in the economy is \$1 trillion plus 75 percent of income.

Now, with consumption equal to \$1 trillion plus 75 percent of income, consumption is partly *autonomous* (the \$1 trillion part, which people would spend no matter what their income, which depends on the current interest rate, real wealth, debt, and expectations), and partly *induced*, which means it depends on income. The induced consumption is the portion that's equal to 75 percent of income.

What is the total amount of expenditure in this economy? Because we've assumed that investment, government purchases, and net exports are zero, aggregate expenditure is just equal to the amount of consumption spending represented by our consumption function.

## Equilibrium in the Aggregate Expenditure Model

The next part of the aggregate expenditure model is to examine what conditions are needed for the economy to be in equilibrium. In order to determine equilibrium, we need to show (1) that income equals output in the economy, and (2) that in equilibrium, aggregate expenditure (or consumption in this example) equals output. First, income equals output because people earn income by producing goods and services. For example, workers earn wages because they produce some product that is then sold on the market, and owners of firms earn profits because the products they sell provide more income than the cost of producing them. So any income that is earned by anyone in the economy arises from the production of output in the economy. From now on, we'll use this idea and say that income equals output; we'll use the terms *income* and *output* interchangeably. Another way to remember this concept is to recall the circular flow diagram; the top half (output) is always equal to the bottom half (income—the sum of wages, rents, interest payments, and profits).

The second condition needed for equilibrium (aggregate expenditure in the economy equals output) is the distinctive feature of the aggregate expenditure model. Just as income must equal output (because income comes from selling goods and services), aggregate expenditure equals output because people can't earn income until the products they produce are sold to someone. Every good or service that is produced in the economy must be purchased by someone or added to inventories. Exhibit 2 plots aggregate expenditure against output. As you can see, it's a 45-degree line (slope = 1). The 45-degree line shows that the number



*In the expenditure model, why must aggregate expenditure equal output in equilibrium?*

on the horizontal axis, representing the amount of output in the economy, real GDP ( $Y$ ), is equal to the number on the vertical axis, representing the amount of real aggregate expenditure ( $AE$ ) in the economy. If output is \$14 trillion, then in equilibrium, aggregate expenditure must equal \$14 trillion. All points of macroeconomic equilibrium lie on the 45-degree line.

## Disequilibrium in the Aggregate Expenditure Model

What would happen if, for some reason, output were lower than its equilibrium level, as would be the case if output were  $Y_1$  in Exhibit 3?

Looking at the vertical dotted line, we see that when output is  $Y_1$ , aggregate expenditure (shown by the consumption function) is greater than output (shown by the 45-degree line). This amount is labeled the distance  $AB$  on the graph. So people would be trying to buy more goods and services ( $A$ ) than were being produced ( $B$ ), which would cause producers to increase the amount of production, which would increase output in the economy. This process would continue until output reached its equilibrium level, where the two lines intersect. Another way to think about this disequilibrium is that consumers would be buying more than is currently produced, causing a decrease in inventories on shelves and in warehouses from their desired levels. Clearly, profit-seeking businesspeople would increase production to bring their inventory stocks back up to the desired levels. In doing so, they would move production to the equilibrium level.

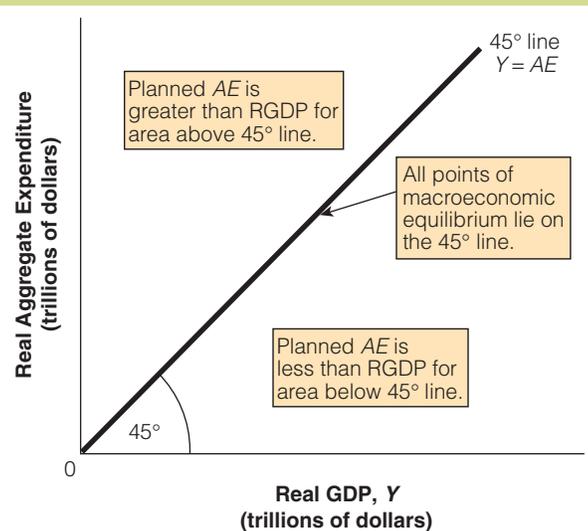
Similarly, if output were above its equilibrium level, as would occur if output were  $Y_2$  in Exhibit 3, economic forces would act to reduce output. At this point, as you can see by looking at the graph, at point  $Y_2$  on the horizontal axis aggregate expenditure ( $D$ ) is less than output ( $C$ ). People wouldn't want to buy all the output that is being produced, so producers would want to reduce their production. They would keep reducing their output until reaching the equilibrium level. Using the inventory adjustment process, inventories would be bulging from shelves and warehouses, and firms would reduce output and production until inventory stocks returned to the desired level. For example, automobile companies might close plants to reduce inventories.

This basic model—in which we've assumed that consumption spending is the only component of aggregate expenditure (that is, we've ignored investment, government spending, and net exports) and that some consumption spending is autonomous—is quite simple, yet it is the essence of the aggregate expenditure model. Equilibrium in this model, and in more complicated versions of the model, always occurs where one line representing aggregate expenditure crosses another line that represents the equilibrium condition where aggregate expenditure equals output (the 45-degree line).

Now let's put Exhibits 1 and 2 together to find the equilibrium in the economy, shown in Exhibit 3. As you might guess, the point where the two lines cross is the equilibrium point. Why? Because it is only at this point that aggregate expenditure is equal to output. Aggregate expenditure is shown by the flatter line (Aggregate Expenditure = Consumption). The equilibrium condition is shown by the 45-degree line ( $Y = AE$ ). The only point for which consumption spending equals aggregate expenditure equals output is the point where those two lines intersect, labeled "Equilibrium." Because these points are on the 45-degree line, equilibrium output  $Y^*$ , equals equilibrium aggregate expenditure  $AE^*$ .

### section 23.2 exhibit 2

### In Equilibrium, Aggregate Expenditure Equals Output



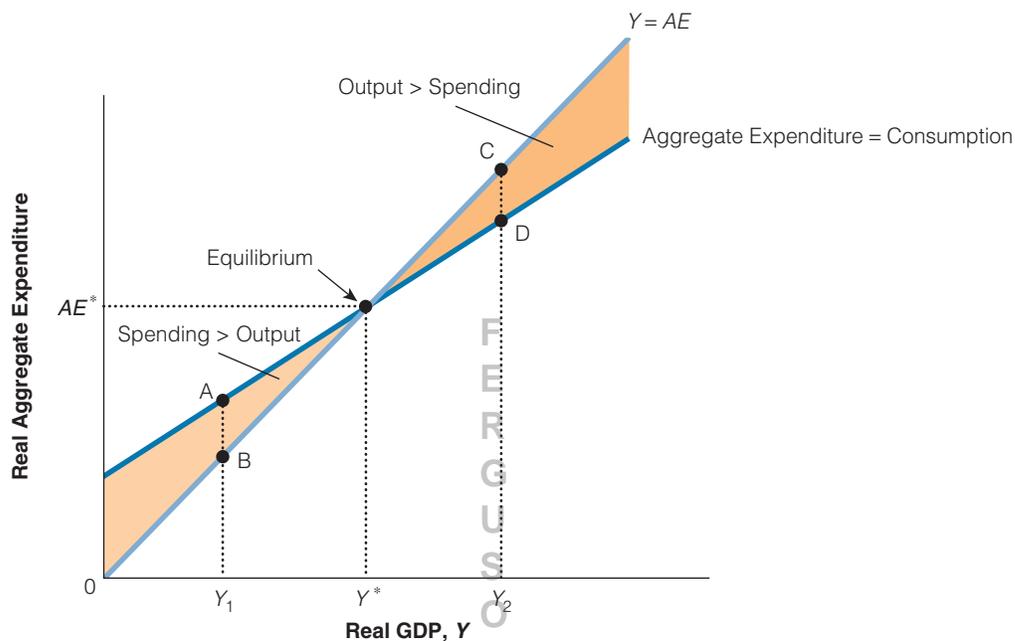
The 45-degree line shows that the number on the horizontal axis, representing the amount of output in the economy, is equal to the number on the vertical axis, representing the amount of aggregate expenditure in the economy. If output is \$14 trillion, then in equilibrium, aggregate expenditure must equal \$14 trillion.



*In the aggregate expenditure model, why does output increase when expenditures exceed output?*

section 23.2  
 exhibit 3

## Disequilibrium and Equilibrium in the Aggregate Expenditure Model



When RGDP is  $Y_1$ , aggregate expenditure is greater than output—distance AB on the graph. Consumers are trying to buy more goods and services (A) than are being produced (B), which causes producers to increase the amount of production, increasing output in the economy. This process continues until output reaches its equilibrium level,  $Y^*$ , where the two lines intersect. If RGDP is at  $Y_2$ , aggregate expenditure (D) is less than output (C). Consumers wouldn't want to buy all the output that is being produced, so producers would want to reduce their production. They would keep reducing their output until the equilibrium level of output was reached. The only point for which consumption spending equals real aggregate planned expenditure equals output is the point where those two lines intersect. Because these points are on the 45-degree line, equilibrium output,  $Y^*$  equals equilibrium aggregate expenditure  $AE^*$ .

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## SECTION QUIZ

- If an economy's marginal propensity to consume was 0.75, which of the following is not true?
  - The consumption function would have a slope of 0.75.
  - The marginal propensity to save would be 0.25.
  - Increases in disposable income would increase consumption spending by three times as much as it would increase saving.
  - Consumption will always equal 75 percent of disposable income.
  - All of the above would be true.
- If the MPS is 0.25, which of the following is true?
  - The slope of the consumption function would be 0.75.
  - The MPC is 0.75.
  - Consumption would not always be 75 percent of income.
  - All of the above are true.

(continued)

 SECTION QUIZ (Cont.)


3. Which of the following need not be equal at equilibrium in the aggregate expenditure model?
  - a. income and output
  - b. aggregate expenditures and output
  - c. consumption and income
  - d. All of the above must be equal at equilibrium in the aggregate expenditure model.
4. If output was less than the equilibrium level in the aggregate expenditure model, people would be trying to buy \_\_\_\_\_ goods and services than are being produced, so producers would \_\_\_\_\_ the amount of production.
  - a. more; increase
  - b. more; decrease
  - c. less; increase
  - d. less; decrease
5. If output was greater than the equilibrium level in the aggregate expenditure model, unplanned inventory investment would be \_\_\_\_\_, leading real output to \_\_\_\_\_.
  - a. positive; increase
  - b. positive; decrease
  - c. negative; increase
  - d. negative; decrease
6. Output equals income
  - a. always.
  - b. only in equilibrium.
  - c. only when MPC equals MPS.
  - d. unless inventories are changing.

- 
1. If consumption purchases rise with disposable income, how would an increase in taxes affect consumption purchases?
  2. If your marginal propensity to consume was 0.75, what would be your marginal propensity to save? If your marginal propensity to consume rose to 0.80, what would happen to your marginal propensity to save?
  3. Could a student have a positive marginal propensity to save, and yet have negative savings (increased borrowing) at the same time?
  4. What would happen to the slope of the consumption function if the marginal propensity to save fell?
  5. Why would an increase in disposable income increase induced consumption but not autonomous consumption?
  6. What tends to happen to inventories if aggregate expenditures exceed output? What tends to happen to output?
  7. What tends to happen to inventories if output exceeds aggregate expenditures? What tends to happen to output?

Answers: 1. d 2. d 3. c 4. a 5. b 6. a

FERRELLSON, TONY D'ENEN

## 23.3

# Adding Investment, Government Purchases, and Net Exports

- 📁 What is the impact of adding investment, government purchases, and net exports to aggregate expenditures?
- 📁 What is planned investment?
- 📁 What is unplanned investment?
- 📁 How does the aggregate expenditure model help explain the process of the business cycle?



*Why does adding other autonomous expenditures to the consumption function not change its slope?*

Now we can complicate our model in another important way by adding in the other three major components of expenditure in the economy: investment, government purchases, and net exports. As a first step, we'll add these components to the model but assume that they are autonomous, that is, they don't depend on the level of income or output in the economy. Later, we'll relax that assumption.

Suppose that consumption depends on the level of income or output in the economy, but investment, government purchases, and net exports don't; instead, they depend on other things in the economy, such as interest rates, political considerations, or the condition of foreign economies (we'll discuss these things in more detail later). Now, aggregate expenditure (AE) consists of consumption (C) plus investment (I) plus government purchases (G) plus net exports (NX):

$$AE \equiv C + I + G + NX$$

This equation is nothing more than a definition (indicated by the  $\equiv$  rather than  $=$ ): Aggregate expenditure equals the sum of its components.

When we add up all the components of aggregate expenditure, we'll get an upward-sloping line, as we did in the previous section, because consumption increases as income increases. But because we're now allowing for investment, government purchases, and net exports, the autonomous portion of aggregate expenditure is larger. Thus, the intercept of the aggregate expenditure line is higher, as shown in Exhibit 1.

What is the new equilibrium? As before, the equilibrium occurs where the two lines cross, that is, where the aggregate expenditure line intersects the equilibrium line, which is the 45-degree line.

Now that we've added in the other components of spending, especially investment spending, we can begin to discuss some of the more realistic factors related to the business cycle. This discussion of what happens to the economy during business cycles is a major element of Keynesian theory, which was designed to explain what happens in recessions.

If you look at historical economic data, you'll see that investment spending fluctuates much more than overall output in the economy. In recessions, output declines, and a major portion of the decline occurs because investment falls sharply. In expansions, investment is the major contributor to economic growth. The two major explanations for the volatile movement of investment over the business cycle involve planned investment and unplanned investment.

The first explanation for investment's strong business cycle movement is that *planned* investment responds dramatically to perceptions of future changes in economic activity. If business firms think that the economy will be good in the future, they'll build new factories, buy more computers, and hire more workers today, in anticipation of being able to sell more goods in the future. On the other hand, if firms think the economy will be weak in the future, they'll cut back on both investment and hiring. Economists find that planned investment is extremely sensitive to firms' perceptions about the future. And if firms desire to invest more today, it generates ripple effects that make the economy grow even faster.

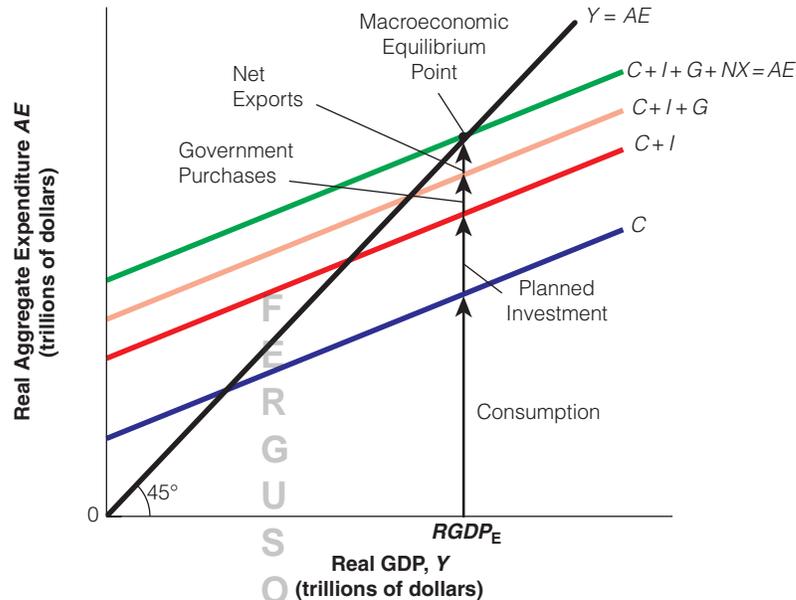
The second explanation for investment's movement over the business cycle is that businesses encounter *unplanned* changes in investment as well. The idea here is that



*How is unplanned inventory investment the key to future changes in output?*

section 23.3  
exhibit 1

Adding Investment, Government Purchases, and Net Exports to Aggregate Expenditures



Adding  $I + G + NX$  leads to a larger intercept of the aggregate expenditure line. Because consumption is the only component of aggregate expenditure that depends on income, the slope of the line is the same as the slope of the line in Exhibit 3 of Section 23.2.

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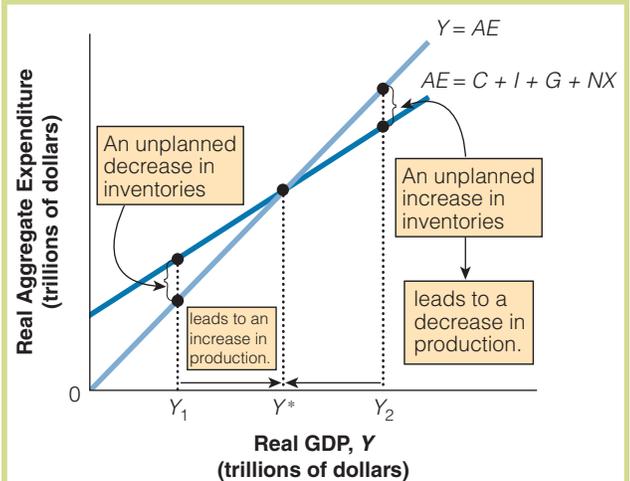
recessions, to some extent, occur as the economy is making a transition, before it reaches equilibrium. We'll use Exhibit 2 to illustrate this idea. In the exhibit, equilibrium occurs at output of  $Y^*$ . Now consider what would happen if, for some reason, firms produced too many goods, bringing the economy to output level  $Y_2$ . At output level  $Y_2$ , aggregate expenditure is less than output because the aggregate expenditure line is below the 45-degree line at that point. When people aren't buying all the products that firms are producing, unsold goods begin piling up. In the national income accounts, unsold goods in firms' inventories are counted in a subcategory of investment—inventory investment. The firms didn't plan for this to happen, so the piling up of inventories reflects **unplanned inventory investment**. Of course, once firms realize that inventories are rising because they've produced too much, they cut back on production, reducing output below  $Y_2$ . This process continues until firms' inventories are restored to normal levels and output returns to  $Y^*$ .

**unplanned inventory investment**  
changes in inventories that firms did not anticipate

Now let's look at what would happen if firms produced too few goods, as occurs when output is at  $Y_1$ . At output level  $Y_1$ , aggregate expenditure is greater than output because the aggregate expenditure line is above the 45-degree line at that point. People want to buy more goods than firms are producing, so firms' inventories begin to decline or become depleted. Again, this change in inventories shows up in the national income accounts, this time as a decline in firms' inventories and thus a decline in investment. Again, the firms didn't plan for this situation, so once they realize that inventories are

section 23.3  
exhibit 2

Unplanned Inventory Investment



At  $Y_2$ ,  $AE$  is less than output and unsold goods pile up. As unplanned inventory investment builds up, firms cut back on production until equilibrium output is restored at  $Y^*$ . At  $Y_1$ ,  $AE$  is greater than output: Consumers want to buy more than firms are producing. Inventories become depleted, and firms increase production until inventories are restored and output returns to equilibrium at  $Y^*$ .

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declining because they haven't produced enough, they'll increase production beyond  $Y_1$ . Equilibrium is reached when firms' inventories are restored to normal levels and output returns to  $Y^*$ .

So our Keynesian expenditure model helps to explain the process of the business cycle, working through investment. Next, let's see how other economic events can act to affect the equilibrium level of output in the economy. We'll begin by looking at how changes in autonomous spending (consumption, investment, government purchases, and net exports) can influence output.

## SECTION QUIZ



1. In addition to consumption, the major components of aggregate expenditures do not include
    - a. investment.
    - b. saving.
    - c. government purchases.
    - d. net exports.
    - e. All of the above are included in aggregate expenditures.
  2. When the autonomous level of investment increases,
    - a. at first, inventories will fall below desired levels.
    - b. output will rise.
    - c. consumption spending will rise.
    - d. all of the above will occur.
  3. Equilibrium output will tend to increase when
    - a. planned investment increases.
    - b. unplanned investment is positive.
    - c. either planned investment increases or unplanned investment is positive.
    - d. either planned investment decreases or unplanned investment is negative.
- 
1. When all the nonconsumption components of aggregate expenditures are autonomous, why does the aggregate expenditures line have the same slope as the consumption function?
  2. If net exports are negative, what happens to the aggregate expenditures line, other things equal? What will happen to equilibrium income?
  3. As the economy turns toward a recession, what happens to unplanned inventory investment? Why? What happens to planned investment? Why?
  4. How does unplanned inventory investment signal which way real GDP will tend to change in the economy?

Answers: 1. b 2. d 3. a

# Shifts in Aggregate Expenditure and the Multiplier

## 23.4

How do changes in the components of aggregate expenditure affect the aggregate expenditure curve?

How does the multiplier affect aggregate expenditures?

What happens if one of the components of aggregate expenditure increases for reasons other than an increase in income? Remember that we called these components or parts *autonomous*. Households' expectations might become more optimistic, or households may find credit conditions easier as interest rates decline, or their real wealth might increase as the stock market rises. All these factors increase autonomous consumption, and thus total consumption at every level of income increases. Firms might increase their investment (especially if their productivity rises or the interest rate declines), government might increase its spending, or net exports could rise as foreign economies improve their economic health. Any of these things would increase aggregate expenditure for any given level of income, shifting the aggregate expenditure curve up, as shown in Exhibit 1.

Suppose that firms optimistic about their future profitability increase their planned investment spending on plants, factories, and machines by \$100 billion. In Exhibit 1, we see that the increase in planned investment spending shifts the aggregate expenditure curve upward and results in a \$400 billion gain in equilibrium real GDP; the difference between the equilibrium real GDP at point A and the equilibrium real GDP at point B. How did the \$100 billion increase in autonomous investment raise real GDP demanded by \$400 billion? This result might seem amazing—that an increase in planned investment spending of a \$100 billion can result in a \$400 billion increase in real GDP—but it merely reflects a well-understood process, known as the **expenditure multiplier**.

A caution here: Do not assume that the multiplier applies only to changes in planned investment spending. Multipliers apply to any increase in autonomous expenditure. As an example, if the stock market went up to increase the amount of autonomous household spending by \$100 billion, the level of output would go up the same \$400 billion as found in the preceding example.

The idea of the multiplier is that permanent increases in spending in one part of the economy lead to increased spending by others in the economy as well. When firms increase investment spending private resource owners earn more wages, interest, rents, and profits, so they spend more. The higher level of economic activity encourages even more spending, until a new equilibrium with higher output is reached,  $Y_2$  rather than  $Y_1$ . In this example, the increase in output is four times as big as the initial increase in investment spending that started the cycle. Let's see how this process works in more detail.

Exhibit 2 shows what happens along the way. We begin at point A, with output of \$14 trillion. The increase in investment spending of \$100 billion directly increases aggregate expenditure by that amount, represented by point B. Firms observe the increase in aggregate expenditure (perhaps because they see their inventories declining), so over the next few months

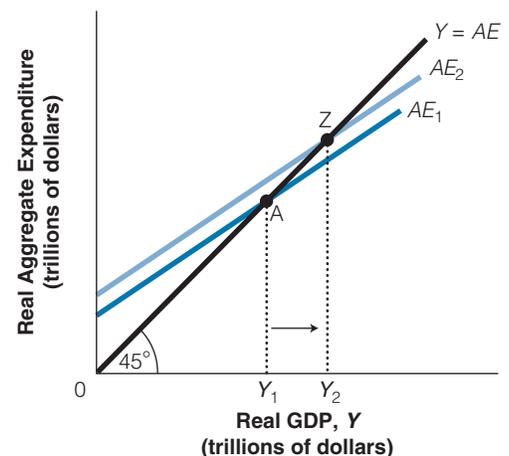


*Why do increases in autonomous purchases increase equilibrium output in the Keynesian model?*

**expenditure multiplier**  
the multiplier that only considers the impact of consumption changes on aggregate expenditures

## section 23.4 exhibit 1

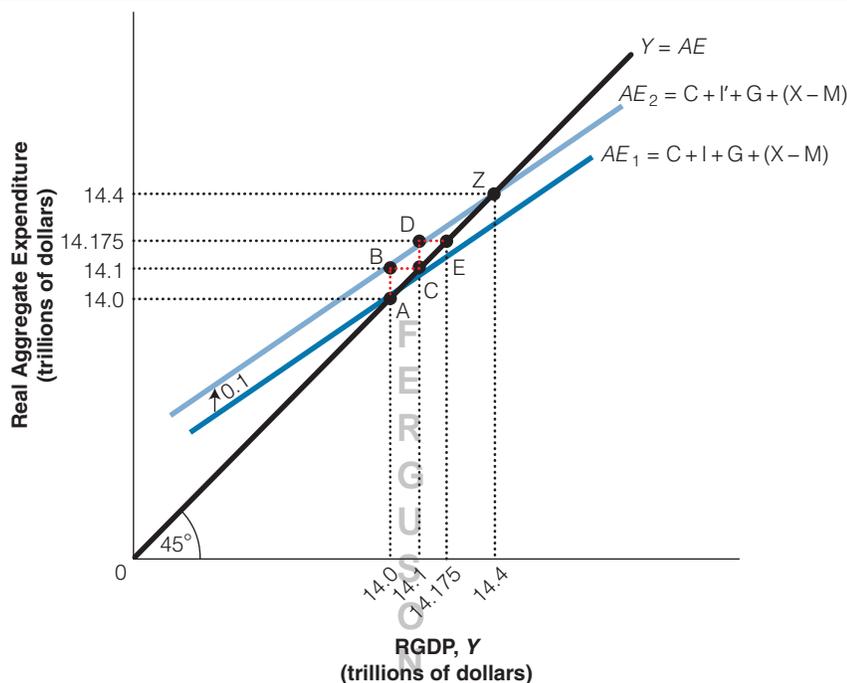
### Increases in the Autonomous Components of Aggregate Expenditure



If one of the “autonomous” components of aggregate expenditure increases for reasons other than an increase in income, like optimistic consumer or business expectations, a decrease in the interest rate, or real wealth increases, government might increase its spending, or net exports could rise as foreign economies improve their economic health. Any of these things would increase aggregate expenditure for any given level of income, shifting the aggregate expenditure curve up, as shown in Exhibit 1.

section 23.4  
 exhibit 2

## Aggregate Expenditures and the Multiplier Process



At point A, output is \$14 trillion and the increase in investment spending of \$100 billion directly increases aggregate expenditure by that amount, represented by point B. Firms observe the increase in aggregate expenditure and produce more output, moving the economy to point C, with output of \$14.1 trillion. But now consumers have an extra \$100 billion in income and they wish to spend three-fourths of it (the MPC is 0.75). Three-fourths of \$100 billion is \$75 billion, so consumers now spend an additional \$75 billion, increasing aggregate expenditure to \$14.175 trillion at point D. Again, firms observe the increase in expenditure and increase output, bringing the economy to point E. This process continues until the economy eventually reaches point Z, at which output is \$14.4 trillion. The process is not accomplished immediately but over the course of several quarters.

they produce more output, moving the economy to point C, with output of \$14.1 trillion. But now consumers have an extra \$100 billion in income and they wish to spend three-fourths of it (because the marginal propensity to consume is 0.75). Three-fourths of \$100 billion is \$75 billion, so consumers now spend an additional \$75 billion, increasing aggregate expenditure to \$14.175 trillion at point D. Again, firms observe the increase in expenditure, so over the next few months they increase output, bringing the economy to point E. This process continues until the economy eventually reaches point Z, at which output is \$14.4 trillion.

You can see on the graph how the economy reaches its new equilibrium at point Z. We can also calculate it numerically by adding up an infinite series of numbers in the following way. The first increase in output was \$100 billion, which comes directly from the increase in investment spending. Then consumers, with higher incomes of \$100 billion, want to spend three-fourths of it, so they increase spending:  $\$100 \text{ billion} \times 3/4 = \$75 \text{ billion}$ . Now, with incomes higher by \$75 billion, consumers want to spend an additional three-fourths of it:  $\$75 \text{ billion} \times 3/4 = \$56 \text{ billion}$ . Again, incomes are higher, so consumers will spend more, this time in the amount  $\$56 \text{ billion} \times 3/4 = \$42 \text{ billion}$ . The process continues indefinitely. To find the total increase in output (or income), we simply need to add up all these amounts. It turns out that an infinite sum with this pattern is exactly  $\$100 \text{ billion} / (1 - 3/4) = \$400 \text{ billion}$ . So output increases by \$400 billion from \$14 trillion to \$14.4 trillion.

This calculation of the sum of all the increases to output can be written in a convenient way. As you saw in this example, the multiplier depends on how much consumers spend out of any additions to their income. So in this model in which consumption spending is the only component of aggregate expenditure that depends on income, the multiplier is equal to  $1/(1 - \text{MPC})$ , where MPC is the marginal propensity to consume. In the previous example,



Why does the multiplier depend on the MPC?

$MPC = 3/4$ , so the multiplier is  $1/(1 - 3/4) = 4$ . The same multiplier holds whether the increase in aggregate expenditures arises from an increase in investment spending, as in the example, or from an increase in other autonomous elements of spending, such as government purchases, net exports, or the autonomous portion of consumption spending. The larger (smaller) the MPC the larger (smaller) the multiplier. For example, if the MPC is 0.8 ( $1/1 - 0.8$  or  $1/0.2 = 5$ ) than the multiplier would be 5. If the MPC is 0.5 ( $1/1 - 0.5$  or  $1/0.5 = 2$ ). The true multiplier is usually smaller because of complications that we will discuss in the chapter on fiscal policy.

The multiplier can operate in both directions. During the Great Depression, both consumption spending and planned investment fell, causing a decrease in aggregate expenditure. As sales fell, workers were laid off and falling levels of production and income led to further declines in consumption spending as the economy fell into a downward spiral. The downturn can also start in a certain sector and then spread via the multiplier to other sectors of the economy. Recall, the information technology recession of 2001. The initial impact of the decline in investment spending was felt in the computer and telecommunications industries but eventually the declines in production, income, and spending spread into other industries, such as automobiles, furniture, appliances, airlines, and restaurants. And the financial crisis of 2008 started in the housing and financial sectors and was quickly felt throughout the economy.

## SECTION QUIZ



- Which of the following would increase aggregate expenditures?
    - Households become more optimistic about the future.
    - Interest rates fall.
    - Foreign economies improve.
    - Government purchases increase.
    - Any of the above would increase aggregate expenditures.
  - If the MPC equals 0.5,
    - the expenditure multiplier will equal 2.
    - a \$5 billion increase in investment would tend to increase output by \$10 billion.
    - the expenditure multiplier is less than if the MPC = 0.8.
    - all of the above are true.
  - Equilibrium output would tend to rise when
    - autonomous expenditures increase.
    - the MPC increases.
    - either autonomous expenditures increase or the MPC increases.
    - neither autonomous expenditures increase nor the MPC increases.
- 
- If autonomous expenditure rises and the marginal propensity to consume rises, what would happen to equilibrium income?
  - If autonomous expenditure rises and the marginal propensity to consume falls, what would happen to equilibrium income?
  - If the marginal propensity to consume was 0.75, what would happen to equilibrium income if government purchases increased by \$500 billion and investment fell by \$500 billion at the same time? What if government purchases increased by \$500 billion and investment fell by \$400 billion at the same time?
  - Why does a larger marginal propensity to consume lead to a larger multiplier?
  - If autonomous consumption was \$300 billion, investment was \$200 billion, government purchases were \$400 billion, and net exports were a negative \$100 billion, what would autonomous consumption be? What would equilibrium income be?
  - What would happen to equilibrium income if, other things equal, imports increased by \$100 billion and the marginal propensity to consume was 0.9?

Answers: 1. d 2. c 3. c

## 23.5

# From Aggregate Expenditures to Aggregate Demand

Why do aggregate expenditures depend on the price level?

How do we move from aggregate expenditures to aggregate demand?



*How do changes in the price level affect the aggregate expenditure function?*

To go from the Keynesian cross-aggregate expenditure model to aggregate demand, all we need to add is how the price level affects the components of aggregate demand.

The effect of different price levels can be seen in Exhibit 1. Let's consider three different price levels,  $P = 90$ ,  $P = 100$ , and  $P = 110$ , where  $P$  is a price index like the GDP deflator. Suppose the price level is 100, and suppose at that level of prices, the aggregate expenditure curve is given as the curve labeled  $AE (P = 100)$ , shown in the top diagram. The equilibrium in the Keynesian aggregate expenditure model occurs at point A. Now we plot point A in the bottom diagram, corresponding to a price level of 100 and output of \$8 trillion.

What happens if the price level falls from 100 to 90? Recall from the previous chapter, that a lower price level will cause an increase in RGDP demanded through the real wealth, interest rate and open economy effects. The lower price level will (1) increase the real value of household's money holdings (part of their wealth) causing purchasing power to rise leading to greater consumption expenditures; (2) firms and households will reduce their holdings of money and save, more causing interest rates to fall and increasing investment and consumption expenditures; and (3) it leads to an increase in imports and a decrease in exports. As a consequence of the increase in RGDP demanded associated with the lower price level there is a higher level of planned expenditures, so the aggregate expenditure curve shifts up to  $(AE, P = 90)$  and the new equilibrium is at point B. So we plot B in the bottom diagram, corresponding to the price level 90 and output \$15 trillion, as seen in Exhibit 1.

Finally, what happens if the price level rises to 110? The higher price level will (1) decrease the value of household's money holdings (part of their wealth), causing purchasing power to fall leading to reduced consumption expenditures; (2) firms and households will increase their holdings of money and increase the demand for loanable funds, causing interest rates to rise and decreasing consumption and investment expenditures; and (3) it leads to an increase in exports and a decrease in imports. As a consequence of the decrease in RGDP demanded associated with the higher price level, there is a lower level of planned expenditures  $(AE, P = 110)$  and a lower level, of output, \$13 trillion, as seen in Exhibit 1. The higher price level means lower aggregate expenditure, so the aggregate expenditure curve shifts down to  $AE (P = 110)$ , and the equilibrium in the Keynesian-cross diagram is at point C. We plot point C in the bottom diagram, corresponding to a price level of 110 and output of \$13 trillion.

Notice that the higher the price level, the lower is aggregate demand. Imagine carrying out this same experiment for every possible price level. Then the points like A, B, and C in the lower diagram would trace out the entire aggregate demand curve.

*What is the relationship between the price level and equilibrium real GDP?*

## Shifts in Aggregate Demand

In the previous section, we used the relationship between aggregate expenditure and the price level to derive the aggregate demand curve. Now we'll show that changes in any of the components of aggregate expenditure that occur for any reason other than a change in the price level or output lead to a shift of the aggregate demand curve. We'll start with Exhibit 1 (but to keep things readable we'll only draw in one of the aggregate expenditure lines in the top half of the exhibit), then consider what happens when the autonomous parts of consumption, investment, government purchases, or net exports change. Such a change would

shift the aggregate expenditure curve upwards, as shown in Exhibit 2, where we denote the original aggregate expenditure curve  $AE_1$  and the new aggregate expenditure curve  $AE_2$ .

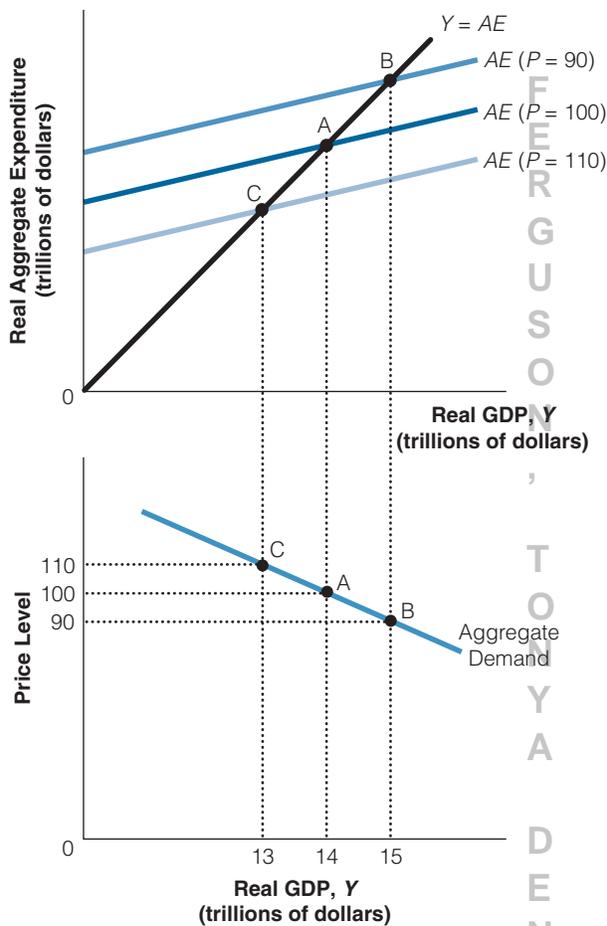
Originally, we had equilibrium at point A with output of \$14 trillion when the price level was 100. After the increase in government spending, the aggregate expenditure curve shifts up, and we get equilibrium at point D with output of \$14.5 trillion when the price level is 100



*How do changes in the aggregate expenditure function change aggregate demand?*

**section 23.5  
exhibit 1**

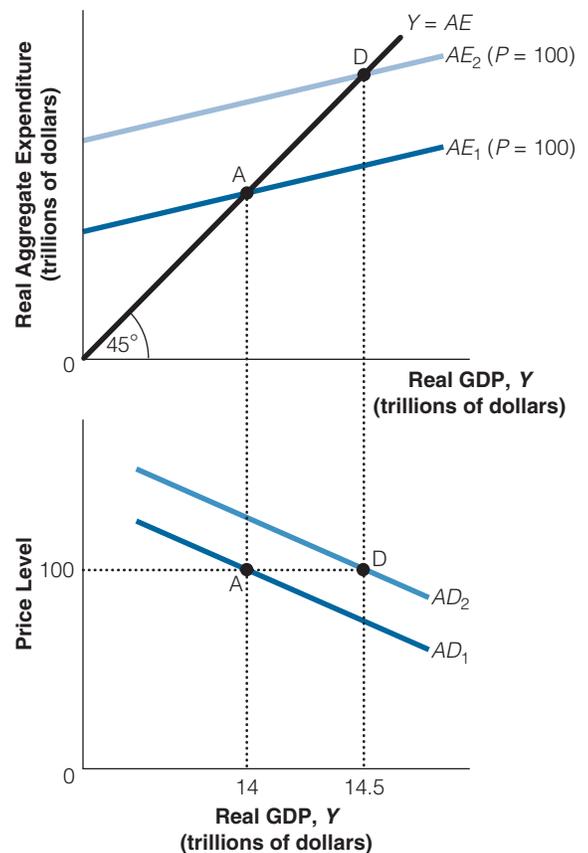
**From Aggregate Expenditure to Aggregate Demand**



Suppose the price level is 100, and suppose at that level of prices, the aggregate expenditure curve is given as the curve labeled  $AE (P = 100)$ , shown in the top diagram. The equilibrium in the aggregate expenditure model occurs at point A. Now we plot point A in the bottom diagram, corresponding to a price level of 100 and output of \$14 trillion. If the price level falls from 100 to 90, the aggregate expenditure curve shifts up to  $AE (P = 90)$ , and the equilibrium in the aggregate-cross diagram is at point B. So we plot point B in the bottom diagram, corresponding to price level 90 and output \$15 trillion. If the price level rises to 110 the aggregate expenditure curve shifts down to  $AE (P = 110)$ , and the equilibrium is at point C. We plot point C in the bottom diagram, corresponding to a price level of 110 and output of \$13 trillion.

**section 23.5  
exhibit 2**

**Shifting the Aggregate Expenditure and the Aggregate Demand Curve**



If the autonomous parts of consumption, investment, government purchases, or net exports increase, it shifts the aggregate expenditure curve upwards from  $AE_1$  to  $AE_2$ . Originally, we had equilibrium at point A with output of \$14 trillion when the price level was 100. Now suppose the government increased spending, the aggregate expenditure curve shifts up, and we get equilibrium at point D with output of \$14.5 trillion when the price level is 100. Similarly, for any other given price level, equilibrium output would be higher. So, the new aggregate demand curve on the lower diagram has shifted to the right.

100. Similarly, for any other given price level, equilibrium output would be higher. So the new aggregate demand curve on the lower diagram has shifted to the right. In sum, changes in the price level create the real wealth, interest rate, and open economy effects, which shift the aggregate expenditure curve and change RGDP demanded; these price quantity combinations generate the aggregate demand curve. But at a given price level, changes in spending plans,  $C$ ,  $I$ ,  $G$ , or  $(X - M)$ , shift the aggregate demand curve.



*If aggregate supply is vertical, how does an increase in aggregate demand affect real GDP?*

*Why is the aggregate expenditure model inconsistent with the stagflation of the 1970s?*

## Limitations of the Aggregate Expenditure Model

The aggregate expenditure model is helpful in explaining how short-run business cycles occur. However, the model fails to show price level changes, so there is no way to measure inflation. The model also fails to explain the stagflation of the 1970s—unemployment and inflation together—that is, it does not incorporate possible shifts in the aggregate supply curve. In other words, it cannot explain cost-push inflation. It also does not take into consideration the expectations of consumers and firms as they react to changes in policies designed to stabilize the economy. It does not take into account that an economy can *temporarily* produce beyond the natural rate of real output,  $RGDP_{NR}$ . It does not allow for the economy to self-correct.

**great**  
economic thinkers

### John Maynard Keynes (1883–1946)

John Maynard Keynes was born in Cambridge, England, in 1883. Keynes's father was a political economist and logician; his mother was a justice of the peace who eventually became the mayor of Cambridge, England.

Many would argue that Keynes was one of the most brilliant minds of the twentieth century. He was educated at Eton and Cambridge, where he studied mathematics and philosophy. Keynes had a brief tutelage under Alfred Marshall who tried to convince Keynes to pursue economics. Keynes began his career in the India Office of the British government. He soon became bored and returned to King's College, Cambridge, to lecture in economics, a post he held until his death in 1946.

Keynes had many interests outside of economics, including mathematics, art, and theater. Keynes married a Russian ballerina, and for a time, he associated with a group of intellectuals known as

Bloomsbury Group (which included such notables as E. M. Forster and Virginia Wolff).

Keynes's contributions to the field of economics have influenced public policy since 1930. He is the father of discretionary fiscal policy—deliberating using government spending and taxes to stabilize the economy.

Keynes believed that the economy could stay in a period of unemployment for a long time and not self-correct. Specifically, Keynes emphasized the idea that wages and prices do not always adjust rapidly to bring about full employment in an economy. Keynes believed that government spending could stimulate the economy back to full employment.

Keynes was also a successful investor in the commodity and stock markets. His own net worth increased from a miniscule level in 1920 to over \$2 million by the time of his death.

 SECTION QUIZ


1. When the price level falls,
  - a. consumption increases because real wealth increases.
  - b. investment rises because interest rates decline.
  - c. net exports rise because exchange rates decline.
  - d. all of the above are true.
2. Which of the following would shift both the aggregate expenditure function and aggregate demand?
  - a. an increase in consumption because disposable income rose
  - b. an increase in consumption because the price level fell
  - c. an increase in consumption because of increased consumer optimism
  - d. All of the above would shift both the aggregate expenditure function and aggregate demand
3. If the economy was operating on a completely flat segment of the short-run aggregate supply curve, an increase in aggregate demand would
  - a. increase output and increase the price level.
  - b. increase output and decrease the price level.
  - c. decrease output and increase the price level.
  - d. decrease output and decrease the price level.
  - e. do none of the above.

1. In the aggregate expenditure model, does a lower price level lead to an increase in the real quantity of goods and services demanded or an increase in demand?
2. If autonomous expenditures increased by \$20 billion, what is the change in aggregate demand at a given price level if the marginal propensity to consume is 0.75?
3. If autonomous expenditures decreased by \$50 billion, what is the change in aggregate demand at a given price level if the marginal propensity to consume is 0.8?
4. Along a vertical, long-run aggregate supply curve, what effect will a \$10 billion increase in government expenditures have on real output?
5. If the short-run aggregate supply curve is upward sloping, why will the change in real output due to an increase in autonomous expenditures in the short run be less than that indicated by the change in aggregate demand?
6. If wages are sticky downward, why will a decrease in autonomous expenditures reduce real output much like the Keynesian expenditure model indicates?

Answers: 1. d 2. c 3. e

3  
4  
1  
5  
B  
U

## Interactive Summary

### Fill in the blanks:

- Keynes believed that \_\_\_\_\_ was the critical determinant of the overall level of economic activity.
- In the simple Keynesian model, we assume that the price level is \_\_\_\_\_ as output changes.
- \_\_\_\_\_ spending is the largest component of the demand for final goods and services.
- The \_\_\_\_\_ factors affecting consumption are those that do not depend on income.
- A(n) \_\_\_\_\_ in real wealth would decrease autonomous consumption.
- A higher interest rate today tends to make items purchased on credit \_\_\_\_\_ expensive and \_\_\_\_\_ expenditures on those items.
- Either lower interest rates or lower household debt would tend to \_\_\_\_\_ autonomous consumption.
- An increase in consumer confidence would tend to \_\_\_\_\_ consumption spending.
- Personal consumption spending depends most importantly on your current \_\_\_\_\_.
- Your marginal propensity to consume is equal to the change in \_\_\_\_\_ divided by the change in \_\_\_\_\_.
- The more you spend out of any given increase in income, the \_\_\_\_\_ your marginal propensity to consume.
- Your marginal propensity to save is equal to the change in \_\_\_\_\_ divided by the change in \_\_\_\_\_.
- The MPC and MPS must add up to \_\_\_\_\_.
- The MPC is equal to the \_\_\_\_\_ of the consumption function.
- Consumption spending is partly \_\_\_\_\_, or independent of income, and partly \_\_\_\_\_, or dependent on income.
- Income and \_\_\_\_\_ are always the same in the economy.
- Aggregate \_\_\_\_\_ equal \_\_\_\_\_ when the economy is in equilibrium.
- In the Keynesian model, if output were lower than its equilibrium level, inventories would \_\_\_\_\_ desired levels and producers would \_\_\_\_\_ output.
- When inventories rise above desired levels, output will \_\_\_\_\_.
- When aggregate expenditures exceed output, output will \_\_\_\_\_.
- In addition to consumption, the major components of aggregate expenditures are \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_.
- Only in equilibrium do aggregate expenditures \_\_\_\_\_ output.
- One reason that investment contributes to the business cycle is that \_\_\_\_\_ investment responds dramatically to perceptions about future changes in business activity.
- When unplanned inventory investment is \_\_\_\_\_, output will tend to fall.
- In equilibrium, unplanned business investment \_\_\_\_\_ zero.
- An increase in autonomous government purchases by \$2 billion will increase output by \_\_\_\_\_ \$2 billion in the simple Keynesian model.
- The expenditure multiplier is equal to 1 divided by \_\_\_\_\_, when consumption is the only component of aggregate expenditures.
- When autonomous investment increases, the level of consumption will \_\_\_\_\_ as a result.
- The \_\_\_\_\_ the MPC, the smaller is the expenditure multiplier.
- To go from the aggregate expenditure model to aggregate demand, we need to add how the \_\_\_\_\_ affects each of the aggregate expenditure components.
- Consumption, investment, and net exports all increase as a result of a(n) \_\_\_\_\_ in the price level.
- In terms of the aggregate expenditure model, a fall in the price level shifts the aggregate expenditures curve \_\_\_\_\_.
- Changes in any of the components of aggregate expenditures for any reason other than a change in the \_\_\_\_\_ or \_\_\_\_\_ will also shift the aggregate demand curve.
- When the aggregate expenditure curve shifts up for reasons other than changes in the price level, the aggregate demand curve shifts \_\_\_\_\_.
- The aggregate supply curve must be \_\_\_\_\_ in the long run.

36. If the short-run aggregate supply curve slopes upward, an increase in aggregate demand will increase real output \_\_\_\_\_ than aggregate expenditures in the short run.
37. The aggregate expenditure model could not explain the \_\_\_\_\_ of the 1970s.

Answers: 1. total spending 2. constant 3. Consumption 4. autonomous 5. decrease 6. more; reduces 7. increase 8. increase 9. disposable income 10. consumption spending; disposable income 11. greater 12. savings; disposable income 13. 1 14. slope 15. autonomous; induced 16. output 17. expenditures; output 18. fall below; increase 19. fall 20. rise 21. investment; government purchases; net exports 22. equal 23. planned 24. positive 25. equals 26. more than 27.  $(1 - MPC)$  28. increase 29. smaller 30. price level 31. fall 32. up 33. price level; income 34. right 35. vertical 36. less 37. stagflation

## Key Terms and Concepts

autonomous determinants of consumption expenditures 677  
marginal propensity to consume (MPC) 679

marginal propensity to save (MPS) 679

unplanned inventory investment 685  
expenditure multiplier 687

## Section Quiz Answers

### 23.1 The Simple Aggregate Expenditure Model

1. **How does the assumption of a fixed price level in the Keynesian expenditure model solve the problem of distinguishing between changes in the real value of a variable (such as GDP) and changes in its nominal value?**

If the price level is fixed, a change in nominal income is equivalent to a change in real income.

2. **Would it be possible for some consumption expenditures to be autonomous and other parts of consumption expenditure not to be autonomous?**

Yes. Some consumption depends on income, but other consumption is autonomous (not changing with income), depending on variables such as real wealth, interest rates, and so on.

3. **In what two ways does a higher interest rate tend to reduce current consumption?**

A higher interest rate reduces current consumption by (1) increasing the cost of consumption items bought on credit and (2) increasing the return to current saving, which increases savings, which in turn reduces consumption.

4. **What would happen to autonomous consumption expenditures if the value of a consumer's stock market investments rose and his household debt rose at the same time?**

If the value of a consumer's stock market investments rose, it would increase autonomous consumption, but if household debt rose, it would reduce autonomous consumption. Since these effects are in opposite directions, the net effect would be indeterminate without more information.

5. **What would happen to your autonomous consumption if you expected to get a job next week paying 10 times your current salary?**

Since your expected future income will rise substantially, just like an increase in real wealth, it will increase your current consumption.

6. **Why do households headed by a 50-year-old tend to save a larger fraction of their incomes than those headed by either a 30-year-old or a 70-year-old?**

A 50-year-old is in his peak earning years and is also trying to save for retirement, both of which increase saving. A 70-year-old is in retirement and drawing down previous savings. A 30-year-old has a relatively low income and is often faced with the expenses of raising a family.

## 23.2 Finding Equilibrium in the Aggregate Expenditure Model

1. **If consumption purchases rise with disposable income, how would an increase in taxes affect consumption purchases?**

An increase in taxes reduces disposable income, which in turn reduces consumption purchases.

2. **If your marginal propensity to consume was 0.75, what would be your marginal propensity to save? If your marginal propensity to consume rose to 0.80, what would happen to your marginal propensity to save?**

Since the marginal propensity to consume plus the marginal propensity to save must equal 1, if  $MPC = 0.75$ ,  $MPS = 0.25$ . If  $MPC = 0.8$ ,  $MPS = 0.2$ .

3. **Could a student have a positive marginal propensity to save, and yet have negative savings (increased borrowing) at the same time?**

Yes. A student could be increasing his saving (decreasing his dissaving) with each dollar of income earned, yet still have an income low enough (less than autonomous consumption divided by  $MPS$ ) that he must borrow.

4. **What would happen to the slope of the consumption function if the marginal propensity to save fell?**

Since the slope of the consumption function equals  $MPC$ , a fall in  $MPS$  implies an increase in  $MPC$  and a steeper consumption function.

5. **Why would an increase in disposable income increase induced consumption but not autonomous consumption?**

Autonomous consumption is defined as consumption spending that does not depend on income, while induced consumption spending is induced by increases in disposable income.

6. **What tends to happen to inventories if aggregate expenditures exceed output? What tends to happen to output?**

If aggregate expenditures exceed output, inventories will fall, which will give producers incentives to increase output.

7. **What tends to happen to inventories if output exceeds aggregate expenditures? What tends to happen to output?**

If output exceeds aggregate expenditures, inventories will rise, giving producers incentives to decrease output.

## 23.3 Adding Investment, Government Purchases, and Net Exports

1. **When all the nonconsumption components of aggregate expenditures are autonomous, why does the aggregate expenditures line have the same slope as the consumption function?**

The slope of the aggregate expenditures line equals the change in aggregate expenditures divided by the change in income, but where only consumption depends on income, the change in aggregate expenditures equals the change in consumption, and the aggregate expenditures line has the same slope as the consumption function.

2. **If net exports are negative, what happens to the aggregate expenditures line, other things equal? What will happen to equilibrium income?**

Autonomous expenditures equal the sum of autonomous consumption plus investment plus government purchases plus net exports. If net exports are negative, autonomous expenditures are lower and the aggregate expenditure line shifts down, resulting in lower equilibrium income.

3. **As the economy turns toward a recession, what happens to unplanned inventory investment? Why? What happens to planned investment? Why?**

As the economy turns toward a recession, unplanned inventory investment is positive because sales are less than producers' planned. Planned inventory falls because it is very sensitive to perceptions of future changes in business conditions.

4. **How does unplanned inventory investment signal which way real GDP will tend to change in the economy?**

Unplanned inventory increases signal that demand was weaker than expected, which will tend to result in a decrease in real output and income. Unplanned inventory decreases signal that demand was stronger than expected, which will tend to result in an increase in real output and income.

## 23.4 Shifts in Aggregate Expenditure and the Multiplier

1. **If autonomous expenditure rises and the marginal propensity to consume rises, what would happen to equilibrium income?**

Either of these changes moves the  $AE$  intersection with the 45-degree line to the right, increasing equilibrium income.

**2. If autonomous expenditure rises and the marginal propensity to consume falls, what would happen to equilibrium income?**

Since the first change moved the *AE* intersection with the 45-degree line to the right, the second moved it left. Since the two changes would change equilibrium income in opposite directions, we do not know the net effect without more information.

**3. If the marginal propensity to consume was 0.75, what would happen to equilibrium income if government purchases increased by \$500 billion and investment fell by \$500 billion at the same time? What if government purchases increased by \$500 billion and investment fell by \$400 billion at the same time?**

If government purchases increased by \$500 billion and investment fell by \$500 billion at the same time, there would be no change in autonomous expenditures and therefore no change in equilibrium income. If government purchases increased by \$500 billion and investment fell by \$400 billion at the same time, autonomous expenditures would increase by \$100 billion. It would increase equilibrium income by \$100 billion times one over one minus 0.75, or \$400 billion.

**4. Why does a larger marginal propensity to consume lead to a larger multiplier?**

A larger marginal propensity to consume makes the denominator of the multiplier smaller, which makes the multiplier larger.

**5. If autonomous consumption was \$300 billion, investment was \$200 billion, government purchases were \$400 billion, and net exports were a negative \$100 billion, what would autonomous consumption be? What would equilibrium income be?**

Autonomous expenditures are the autonomous components of consumption, investment, and government purchases plus net exports. Here that would be \$300 billion plus \$200 billion plus \$400 billion minus \$100 billion, or \$800 billion. Equilibrium income would be \$800 billion times one over one minus MPC. We cannot calculate that number without knowing MPC.

**6. What would happen to equilibrium income if, other things equal, imports increased by \$100 billion and the marginal propensity to consume was 0.9?**

Net exports would decrease by \$100 billion, which would decrease autonomous expenditures by \$100 billion. Income would fall by \$100 billion times one over one minus 0.9, or \$1 trillion.

## 23.5 From Aggregate Expenditures to Aggregate Demand

**1. In the aggregate expenditure model, does a lower price level lead to an increase in the real quantity of goods and services demanded or on increase in demand?**

A lower price level increases the real quantity of goods and services demanded. However, because it was caused by a changing price level rather than a change in autonomous expenditures, it does not cause a change in aggregate demand.

**2. If autonomous expenditures increased by \$20 billion, what is the change in aggregate demand at a given price level if the marginal propensity to consume is 0.75?**

*AD* would increase by the increase in autonomous expenditures times one over one minus MPC, or \$20 billion  $\times$  4 = \$80 billion.

**3. If autonomous expenditures decreased by \$50 billion, what is the change in aggregate demand at a given price level if the marginal propensity to consume is 0.8?**

*AD* would decrease by the decrease in autonomous expenditures times one over one minus MPC, or \$50 billion  $\times$  5 = \$250 billion.

**4. Along a vertical, long-run aggregate supply curve, what effect will a \$10 billion increase in government expenditures have on real output?**

A change in aggregate expenditures, increasing aggregate demand, will have no effect on real output along a vertical, long-run aggregate supply curve, regardless of MPC.

**5. If the short-run aggregate supply curve is upward sloping, why will the change in real output due to an increase in autonomous expenditures in the short run be less than that indicated by the change in aggregate demand?**

If the short-run aggregate supply curve is upward sloping, real output will increase less than the change in aggregate demand.

**6. If wages are sticky downward, why will a decrease in autonomous expenditures reduce real output much like the Keynesian expenditure model indicates?**

A decrease in autonomous expenditures will reduce *AD* by the amount indicated by the multiplier formula. If wages are sticky downward, the short-run aggregate supply curve will be nearly horizontal over the relevant range, and the fall in real output would be nearly as great as the fall in *AD*.

## Problems

1. Which of the following are likely to cause a reduction in consumption?
  - a. an increase in interest rates
  - b. an increase in the value of stock market portfolios
  - c. a decrease in disposable income
  - d. an increase in income taxes
  - e. deflation
2. Identify the most volatile component of aggregate expenditure. Identify its largest component.
3. Which of the following will cause the aggregate expenditure schedule to increase?
  - a. an increase in consumer optimism
  - b. an increase in the purchase of imports
  - c. an increase in the sale of exports
  - d. pessimism by business owners about the outlook of the economy
  - e. an increase in government spending due to the outbreak of war
4. What would happen to autonomous consumption if household debt fell and the interest rate rose over the same time period?
5. What would happen to autonomous consumption if real wealth increased and expectations of the future became more optimistic?
6. Consumption equals \$32,000 when disposable income equals \$40,000. Consumption increases to \$38,000 when disposable income increases to \$50,000. What is the marginal propensity to consume? The marginal propensity to save?
7. If the marginal propensity to save increases, what happens to the consumption function?
8. If MPC was equal to 0.5, would doubling your income double your consumption spending?
9. Why can't an economy with an MPC greater than 1 reach a stable equilibrium in the aggregate expenditure model?
10. Why are unplanned inventory changes the key to predicting future changes in real GDP in the aggregate expenditure model?
11. Why would an increase in planned investment increase real GDP, but an unplanned increase in inventory investment decrease real GDP, in the aggregate expenditure model?
12. If the economy is a net importer, what will that do to the aggregate expenditure function and equilibrium level of real GDP?
13. Why are planned and unplanned investment unlikely to both increase over the same period of time?
14. Why do the aggregate expenditure function and the aggregate demand curve both shift upward at the same time?
15. Evaluate the following statement: The Keynesian assumption of wage and price rigidity best corresponds to the steepest portion of the aggregate supply curve where factories are operating below capacity.
16. Visit the Economy at a Glance page at the Bureau of Economic Analysis, <http://www.bea.gov/newsreleases/glance.htm>. Locate information about recent changes in inventory levels as well as the ratio of inventory to sales. Can you detect a trend upward or downward in inventory levels? What does the trend bode for national output according to the aggregate expenditure model?

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# Fiscal Policy

- 24.1 Fiscal Policy
- 24.2 Fiscal Policy and the *AD/AS* Model
- 24.3 The Multiplier Effect
- 24.4 Supply-Side Effects of Tax Cuts
- 24.5 Possible Obstacles to Effective Fiscal Policy
- 24.6 Automatic Stabilizers
- 24.7 The National Debt

During the financial crisis that began in 2008, an unprecedented amount of assistance was given to banks, auto manufacturers, homeowners, and government housing agencies. Funds came from the Treasury, the Federal Reserve and the Federal Deposit Insurance Corporation. The American Recovery Act of 2009 added over \$860 billion to the budget deficit. Roughly \$290 billion was for tax cuts, and the rest was for government spending to increase investment and consumer spending in the hopes of creating new jobs. Proponents argued that assistance in a crisis is pulling the correct policy lever, as a briefer recession helps everyone—taxpayers, workers, and firms. But not everyone agrees. Others argue that billions were wasted on poorly

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managed but politically connected firms. These debates will continue. In this chapter, we talk about the role of government, particularly government purchases, taxes, and transfer payments, during recessions and booms.

The financial crisis has also led to increases in the deficit and the national debt. What are the implications of a growing debt on economic growth? on future generations? These are all fiscal policy issues.

In earlier chapters, we discussed how an economy can face a recessionary gap when aggregate demand is deficient or an inflationary gap when there is excessive aggregate demand. **In this chapter, we will see how the government can employ fiscal policy—the use of government purchases, transfers, and/or taxes—to combat recessions or curb inflationary pressures.** We will also see that a number of problems are associated with successfully enacting and applying fiscal policy to stabilize an economy. Finally, we will examine the automatic stabilizers and the national debt.

## Fiscal Policy

### 24.1

📁 What is fiscal policy?

📁 How does expansionary fiscal policy affect the government's budget?

📁 How does contractionary fiscal policy affect the government's budget?

## Fiscal Policy

**Fiscal policy** is the use of government purchases, taxes, and transfer payments to alter RGDP and the price level. Government spending takes two forms: government purchases of goods and services like national defense and education, and transfer payments like Social Security, Medicare, and Medicaid. So government expenditures (spending) are the sum of government purchases and government transfer payments. The government takes in the bulk of its tax revenues from three taxes: personal income taxes, corporate income taxes, and payroll taxes (like Social Security and Medicare).

Sometimes the government uses fiscal policy to stimulate the economy during a contraction (or recession) or to try to curb an expansion in order to bring inflation under control. In the early 1980s, large tax cuts helped the U.S. economy out of a recession. In the 1990s, Japan used large government spending programs to try to spend itself out of a recessionary slump. In 2001, a large tax cut was implemented to combat an economic slowdown and to promote long-term economic growth in the United States. And the fiscal stimulus package that the Obama administration enacted in 2009 to combat the recession was the largest fiscal stimulus since World War II. But that was small compared to the \$2.5 trillion spent on the financial system. When should the government use such policies and how well do they work are just a couple of the questions we will address in this chapter.

### fiscal policy

use of government purchases, taxes, and transfer payments to alter equilibrium output and prices



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*Why is government spending not the same as government purchases?*

## The Government and Total Spending

In a previous chapter, we learned that aggregate demand is equal to consumer spending, investment spending, government purchases, and net exports:  $AD = C + I + G + (X - M)$ . The government directly controls government purchases, but it can also indirectly affect aggregate demand through taxes and transfer programs. For example, an increase in taxes and/or a reduction in transfer payments can reduce disposable income and decrease consumer spending. Similarly, a decrease in taxes and/or an increase in transfer payment can

increase disposable income and lead to an increase in consumer spending. The government can also influence investment spending through business taxes. For example, a tax cut for firms may increase investment spending and shift the aggregate demand curve to the right. Thus, the government can change aggregate demand in a number of ways.

## global watch

### Japan's Fiscal Policy Experiment

Prior to the 1990s, Japan experienced several decades of rapid economic growth with only a mild recession in 1974. However, the 1990s were a different story—the exuberant bubble burst, as the stock market made a major correction and land values plunged. Consequently, consumption and investment spending—two major components of aggregate demand—fell.

In the decade of the 1990s, Japan grew at an unusually slow rate—1.2 percent per year—almost 3 percentage points below the average growth rate of the previous decade. In order to combat the recession, the Japanese launched a fiscal policy stimulus package of unprecedented tax cuts and spending increases. Government expenditures rose from slightly over 30 percent of GDP to almost 40 percent of GDP. The Japanese government spent well over a trillion dollars during the decade to heal their ailing economy. Because of the tax cuts,

government tax revenues fell from 34 percent to 31 percent of GDP. And the continued fiscal efforts, financed with lower taxes and higher government spending, led to a growing debt problem. (The debt-to-GDP ratio almost doubled in the decade of the 1990s—from 0.58 in 1991 to 1.1 in 2000.)

The results of the fiscal policy are mixed. The fiscal policy clearly did not bring about a full recovery. However, some economists argue that without the spending and tax cuts, the Japanese would have suffered a depression rather than a sustained period of slow economic growth. Other economists argue that the wasteful nature of government spending was the reason that fiscal policy was not more successful. The Japanese built bridges, railroad lines, tunnels, and highways to sparsely populated areas. It is safe to say that none of these projects would have been undertaken by the private sector. Thus, a better-designed fiscal policy might have been more effective.

#### SECTION QUIZ

- Traditionally, government has used \_\_\_\_\_ to influence \_\_\_\_\_.
  - taxing and spending; the demand side of the economy
  - spending; the supply side of the economy
  - supply management; the demand side of the economy
  - demand management; the supply side of the economy
- Contractionary fiscal policy consists of
  - increased government spending and increased taxes.
  - decreased government spending and decreased taxes.
  - decreased government spending and increased taxes.
  - increased government spending and decreased taxes.

(continued)

## SECTION QUIZ (Cont.)



3. If the government wanted to move the economy out of a current recession, which of the following might be an appropriate policy action?
  - a. decrease taxes
  - b. increase government purchases of goods and services
  - c. increase transfer payments
  - d. any of the above
4. If government policy makers were worried about the inflationary potential of the economy, which of the following would be a correct fiscal policy change?
  - a. increase taxes
  - b. reduce transfer payments
  - c. reduce government purchases
  - d. all of the above

1. If, as part of its fiscal policy, the federal government increases its purchases of goods and services, is that an expansionary or contractionary tactic?
2. If the federal government decreases its purchases of goods and services, does the budget deficit increase or decrease?
3. If the federal government increases taxes and/or decreases transfer payments, is that an expansionary or contractionary fiscal policy?
4. If the federal government increases taxes or decreases transfer payments, does the budget deficit increase or decrease?
5. If the federal government increases government purchases and lowers taxes at the same time, does the budget deficit increase or decrease?

Answers: 1. a 2. c 3. d 4. d

## Fiscal Policy and the $AD/AS$ Model

24.2

How can government stimulus of aggregate demand reduce unemployment?

How can government reduction of aggregate demand reduce inflation?

### Fiscal Policy and the $AD/AS$ Model

The primary tools of fiscal policy, government purchases, taxes, and transfer payments, can be presented in the context of the aggregate supply and demand model. In Exhibit 1, we have used the  $AD/AS$  model to show how the government can use fiscal policy as either an expansionary or contractionary tool to help close a recessionary or an inflationary gap.

#### Expansionary Fiscal Policy to Close a Recessionary Gap

If the government decides to purchase more, cut taxes, and/or increase transfer payments, other things constant, total purchases will rise. That is, increased government purchases, tax cuts, or transfer payment increases can increase consumption, investment, and government purchases, shifting the aggregate demand curve to the right. The effect of this



*How would you close a recessionary gap with fiscal policy?*



How would you close an inflationary gap with fiscal policy?

increase in aggregate demand depends on the position of the macroeconomic equilibrium before the government stimulus. For example, in Exhibit 1, the initial equilibrium is at  $E_1$ , a recession scenario, with real output below potential RGDP. Starting at this point and moving along the short-run aggregate supply curve, an increase in government purchases, a tax cut, and/or an increase in transfer payments would increase the size of the budget deficit and lead to an increase in aggregate demand, ideally from  $AD_1$  to  $AD_2$ . The result of such a change would be an increase in the price level, from  $PL_1$  to  $PL_2$ , and an increase in RGDP, from  $RGDP_1$  to  $RGDP_{NR}$ . If the policy change is of the right magnitude and timed appropriately, the expansionary fiscal policy might stimulate the economy, pull it out of the contraction and/or recession, and result in full employment at  $RGDP_{NR}$ . The recessionary gap is then closed.

### Contractionary Fiscal Policy to Close an Inflationary Gap

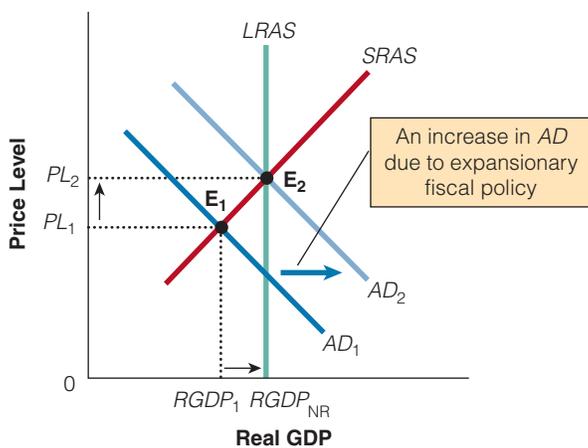
Suppose that the price level is at  $PL_1$  and that short-run equilibrium is at  $E_1$ , as shown in Exhibit 2. Say that the government decides to reduce its purchases, increase taxes, or reduce transfer payments. A government purchase change may directly affect aggregate demand.

A tax increase on consumers or a decrease in transfer payments will reduce households' disposable incomes, reducing purchases of consumption goods and services, and higher business taxes will reduce investment purchases. The reductions in consumption, investment, and/or government purchases will shift the aggregate demand curve leftward, ideally from  $AD_1$  to  $AD_2$ . This lowers the price level from  $PL_1$  to  $PL_2$  and brings RGDP back to the full-employment level at  $RGDP_{NR}$ , resulting in a new short- and long-run equilibrium at  $E_2$ , and the inflationary gap is closed.

Exhibit 3 summarizes the preceding discussion of the tools available to the government for enacting fiscal policy.

section 24.2  
exhibit 1

#### Expansionary Fiscal Policy to Close a Recessionary Gap

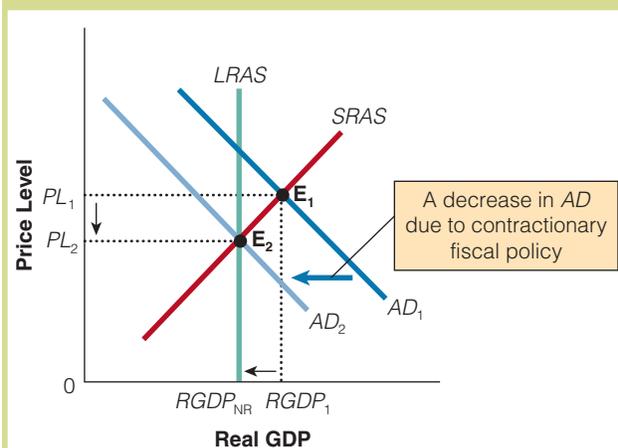


The increase in government purchases, a tax cut, and/or an increase in transfer payments leads to a rightward shift in aggregate demand. This shift results in a change in equilibrium from  $E_1$  to  $E_2$ , reflecting a higher price level and a higher RGDP. Thus, the expansionary fiscal policy can close the recessionary gap and move the economy from  $RGDP_1$  to  $RGDP_{NR}$ . Because this result is on the  $LRAS$  curve, it is a long-run, sustainable equilibrium.

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section 24.2  
exhibit 2

#### Contractionary Fiscal Policy to Close an Inflationary Gap



The reduction in government purchases, a tax increase, or transfer payment decrease leads to a leftward shift in aggregate demand and a change in the short-run equilibrium from  $E_1$  to  $E_2$ , reflecting a lower price level and a return to full-employment RGDP ( $RGDP_{NR}$ ). The final long-run effect is a new lower price level and real output that has returned to  $RGDP_{NR}$ , and the inflationary gap is closed.

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section 24.2  
exhibit 3

Summary of Fiscal Policy Tools

Macroeconomic Problem	Fiscal Policy Prescription	Fiscal Policy Tools
Unemployment (Slow or negative RGDP growth rate—below $RGDP_{NR}$ )	Expansionary fiscal policy to increase aggregate demand	Cut taxes Increase government purchases Increase government transfer payments
Inflation (Rapid RGDP growth rate—beyond $RGDP_{NR}$ )	Contractionary fiscal policy to decrease aggregate demand	Raise taxes Decrease government purchases Decrease government transfer payments

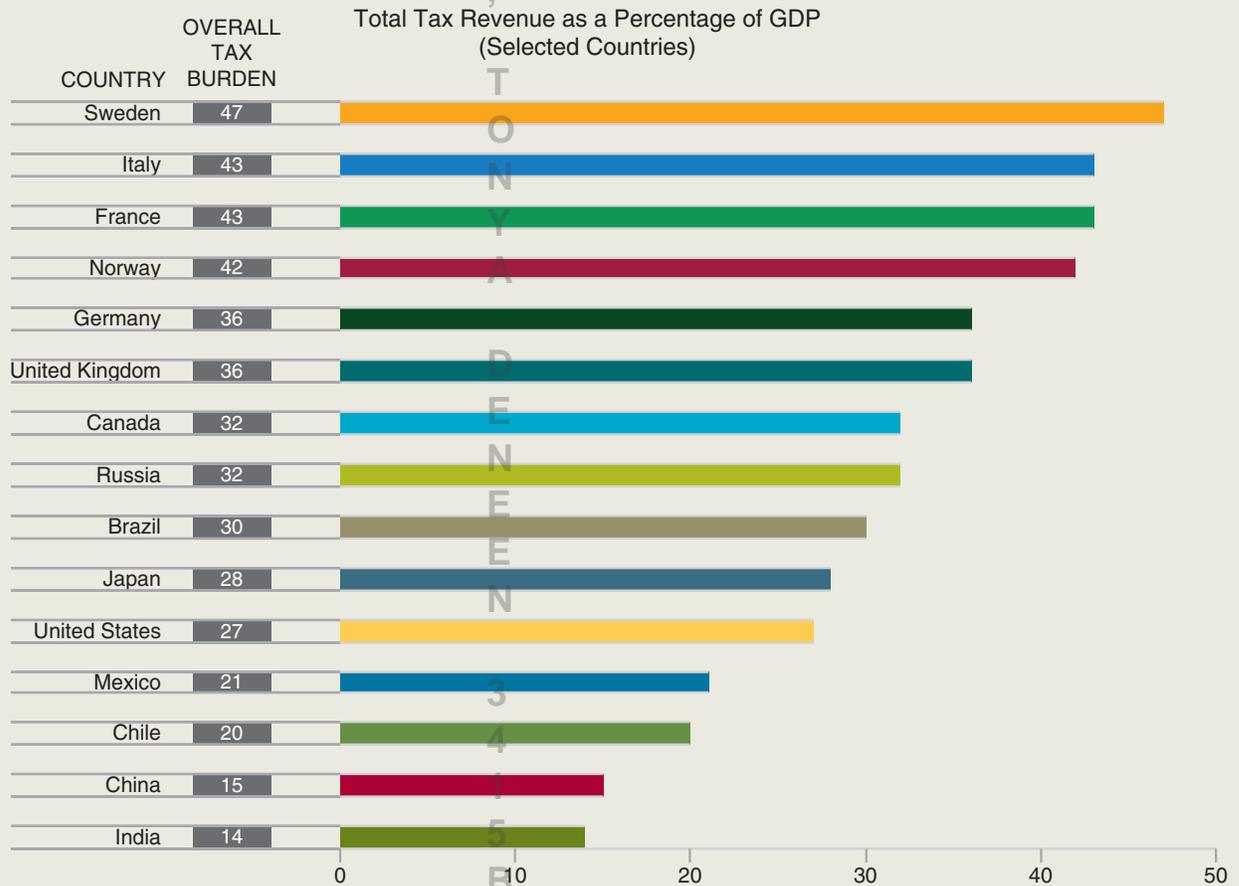
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global watch

## Global Tax: Revenues and Government Spending as a Percentage of GDP

In the table below, we see tax burdens for several major countries. Notice that the United States is in the middle of the pack. In fact, the U.S. tax burden is low compared to many European countries. Also, notice that some of the developing countries have

lower tax burdens, like Chile, Mexico, and India. This is consistent with the history of the United States. That is, as the population of a country grows wealthier, the government often takes a larger share of income in taxes.



SOURCE: OECD (Data are for most recent date available).

## The New Deal and Expansionary Fiscal Policy?

Roosevelt's sweep into office allowed him to push through Congress a massive amount of legislation in the first 100 days of his administration. Roosevelt did not enter the presidency with the idea that government deficit spending was a necessary stimulus to economic recovery. In fact, it was only later in his administration that he appears to have believed deficit spending would help the economy in its gravely depressed state.

Despite all of the fanfare about the first 100 days of Roosevelt's campaign for programs against the Depression, it is not really clear that they had much effect on aggregate demand. After all, besides considering what programs were instituted, we also have to look at how they were paid for and at what other programs were dropped.

In Roosevelt's campaign, he criticized Hoover for large budget deficits that had been marked up after the Crash of 1929. In fact, Hoover's administration had the largest federal deficit in the history of the United States prior to Roosevelt's election. Once elected, Roosevelt told Congress that he did not want the country to be "wrecked on the rocks of loose fiscal policy." Deficits during the Depression years were indeed small. In fact, in 1937 the total government budget, including federal, state, and local levels, had a surplus of \$0.3 billion. During this time, taxes were repeatedly raised.

Fiscal policies, then, were in fact extremely weak, and even perverse. At the same time that the federal government was increasing expenditures, local and state governments were decreasing them.

If we measure the total of state, federal, and local fiscal policies, we find that they were truly expansive only in 1931 and 1936 as compared to what the government was doing prior to the Depression. These two years were expansive only because of large veterans' payments, passed by Congress in both years—by the way, over the vigorous opposition of both Hoover and Roosevelt. In both 1933 and 1937, and, to a lesser degree, in 1938, fiscal policy was quite a bit less expansionary than in 1939.

Continued tepid use of increased government spending and a slow increase in private investment led to a slow improvement, and finally by 1939 output exceeded 1929 in real terms. Because of productivity advances and a growth in the labor force, however, the return to 1929 output levels did not mean an end to unemployment. The 1939 unemployment rate of 17.2 percent was much lower than the 1933 rate, but still well above a typical unemployment rate of 5 percent.

Preparations for war in 1941 led to a 77 percent increase in government spending over the previous year. This \$11 billion increase in government purchases of goods and services, followed by still greater increases in subsequent years as the United States entered World War II, led to aggregate demand increases of a magnitude to wipe out unemployment and end the Depression, which was by far the worst in U.S. history.

SOURCE: From Miller/Sexton. *Issues in American Economic History*, 1E. © 2005 South-Western, a part of Cengage Learning, Inc. Reproduced by permission. [www.cengage.com/permissions](http://www.cengage.com/permissions).

### SECTION QUIZ

1. An increase in taxes combined with a decrease in government purchases would
  - a. increase *AD*.
  - b. decrease *AD*.
  - c. leave *AD* unchanged.
  - d. have an indeterminate effect on *AD*.



(continued)

## SECTION QUIZ (Cont.)



2. If the economy was in a recessionary gap, in order to return to  $RGDP_{NR}$ , the government could
  - a. decrease taxes and increase government purchases.
  - b. increase taxes and increase government purchases.
  - c. decrease taxes and decrease government purchases.
  - d. decrease taxes and increase government purchases.
3. If the government wanted to offset the effect of a boom in consumer and investor confidence on  $AD$ , it might
  - a. decrease government purchases.
  - b. decrease taxes.
  - c. increase taxes.
  - d. do either (a) or (c).
4.  $AD$  will shift to the right, other things being equal, when
  - a. the government budget deficit increases because government purchases rose.
  - b. the government budget deficit increases because taxes fell.
  - c. the government budget deficit increases because transfer payments rose.
  - d. any of the above circumstances exist.

1. If the economy is in recession, what sort of fiscal policy changes would tend to bring it out of recession?
2. If the economy is at a short-run equilibrium at greater than full employment, what sort of fiscal policy changes would tend to bring the economy back to a full-employment equilibrium?
3. What effects would an expansionary fiscal policy have on the price level and real GDP, starting from a full-employment equilibrium?
4. What effects would a contractionary fiscal policy have on the price level and real GDP, starting from a full-employment equilibrium?

Answers: 1. b 2. a 3. d 4. d

## The Multiplier Effect

### 24.3

📁 What is the multiplier effect?

📁 How does the marginal propensity to consume affect the multiplier effect?

📁 How does investment interact with the multiplier effect?

## Government Purchases, Taxes, and Aggregate Demand

Recall from our earlier discussion that any one of the major spending components of aggregate demand ( $C$ ,  $I$ ,  $G$ , or  $X - M$ ) can initiate changes in aggregate demand, thereby producing a new short-run equilibrium. If policy makers are unhappy with the present short-run equilibrium GDP, perhaps they consider unemployment too high because of a current aggregate demand shortfall. If government were to increase its purchases of jet fighters, highways, and schools, this increased spending would lead to an increase in aggregate demand. That is, they can deliberately manipulate the level of government purchases

to obtain a new short-run equilibrium value. But how much new additional government purchasing is necessary?

## The Multiplier Effect

Usually, when an increase in purchases of goods or services occurs, the ultimate increase in total purchases tends to be greater than the initial increase, which is known as the **multiplier effect**. But how does this effect work? Suppose the government increases its defense budget by \$10 billion to buy aircraft carriers. When the government purchases the aircraft carriers, not only does it add to the total demand for goods and services directly, but it also provides \$10 billion in added income to the companies that actually construct the aircraft carriers. These companies will then hire more workers and buy more capital equipment and other inputs to produce the new output. The owners of these inputs therefore receive more income because of the increase in government purchases. What will they do with this additional income? Although behavior will vary somewhat among individuals, collectively they will probably spend a substantial part of the additional income on additional consumption purchases, pay some additional taxes incurred because of the income, and save a bit of it as well. The **marginal propensity to consume (MPC)** is the fraction of additional disposable (after-tax) income that a household consumes rather than saves. That is, MPC is equal to the *change* in consumption spending ( $\Delta C$ ) divided by the *change* in disposable income ( $\Delta DY$ ).

$$MPC = \Delta C / \Delta DY$$

For example, suppose you won a lottery prize of \$1,000. You might decide to spend \$750 of your winnings today and save \$250. In this example, your marginal propensity to consume is 0.75 (or 75 percent), because out of the extra \$1,000, you decided to spend 75 percent of it ( $0.75 \times \$1,000 = \$750$ ). The term *marginal propensity to consume* has two parts: (1) *marginal* refers to the fact that you received an *extra* amount of disposable income—an addition to your income, not your total income; and (2) *propensity to consume* refers to how much you tend to spend on consumer goods and services out of your additional income.

The flip side of the marginal propensity to consume is the **marginal propensity to save (MPS)**, which is the proportion of an addition to your income that you would save, or not spend on goods and services today. That is, MPS is equal to the change in savings ( $\Delta S$ ) divided by the change in disposable income ( $\Delta DY$ ).

$$MPS = \Delta S / \Delta DY$$

In the lottery example, your marginal propensity to save is 0.25, or 25 percent, because you decided to save 25 percent of your additional disposable income ( $0.25 \times \$1,000 = \$250$ ). Because your additional disposable income must be either consumed or saved, the marginal propensity to consume plus the marginal propensity to save must add up to 1, or 100 percent.

## The Multiplier Effect at Work

Suppose that out of every dollar in *added* disposable income generated by increased investment purchases, individuals collectively spend two-thirds, or 67 cents, on consumption purchases. In other words, the MPC is  $2/3$ . The initial \$10 billion increase in government purchases causes both a \$10 billion increase in aggregate demand and an income increase of \$10 billion to suppliers of the inputs used to produce aircraft carriers; the owners of those inputs, in turn, will spend an additional \$6.67 billion ( $2/3$  of \$10 billion) on additional consumption purchases. A chain reaction has been started. The added \$6.67 billion in consumption purchases by those deriving income from the initial investment brings a

### multiplier effect

a chain reaction of additional income and purchases that results in total purchases that are greater than the initial increase in purchases

### marginal propensity to consume (MPC)

the additional consumption resulting from an additional dollar of disposable income



What is the marginal propensity to consume?

### marginal propensity to save (MPS)

the change in savings divided by the change in disposable income



Why do the marginal propensity to consume and the marginal propensity to save add up to 1?

section 24.3  
exhibit 1

The Multiplier Process

Change in government purchases	\$10.00 billion—direct effect on <i>AD</i>	} The sum of the indirect effect on <i>AD</i> , through induced additional consumption purchases, is equal to \$20 billion
First change in consumption purchases	6.67 billion (2/3 of 10)	
Second change in consumption purchases	4.44 billion (2/3 of 6.67)	
Third change in consumption purchases	2.96 billion (2/3 of 4.44)	
Fourth change in consumption purchases	1.98 billion (2/3 of 2.96)	
Fifth change in consumption purchases	1.32 billion (2/3 of 1.98)	
⋮	⋮	
⋮	⋮	
⋮	⋮	

---

\$30 billion = Total change in aggregate demand

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\$6.67 billion increase in aggregate demand and in new income to suppliers of the inputs that produced the goods and services. These persons, in turn, will spend some two-thirds of their additional \$6.67 billion in income, or \$4.44 billion, on consumption purchases. This \$4.44 billion becomes aggregate demand and income to still another group of people, who will then proceed to spend two-thirds of that amount, or \$2.96 billion, on consumption purchases.

The chain reaction continues, with each new round of purchases providing income to a new group of people who in turn increase their purchases. As successive changes in consumption purchases occur, the feedback becomes smaller and smaller. The added income generated and the number of resulting consumer purchases get smaller because some of the increase in income goes to savings and tax payments that do not immediately flow into greater investment or government spending. As indicated in Exhibit 1, the fifth change in consumption is indeed much smaller than the first change in consumption.

What is the total impact of the initial increase in government purchases on additional consumption and income? We can find the answer by using the multiplier formula, calculated as follows:

$$\text{Multiplier} = 1/(1 - \text{MPC})$$

In this case,

$$\text{Multiplier} = 1/(1 - 2/3) = 1/(1/3) = 3$$

An initial increase in government purchases of \$10 billion will increase total purchases by \$30 billion (\$10 billion × 3), as the initial \$10 billion in government purchases also generates an additional \$20 billion in consumption.



*Why does each additional round of the multiplier process get smaller and smaller?*

## Changes in the MPC Affect the Multiplier Process

Note that the larger the marginal propensity to consume, the larger the multiplier effect, because relatively more additional consumption purchases out of any given income increase generates relatively larger secondary and tertiary income effects in successive rounds of the process. For example, if the MPC is 3/4, the multiplier is 4:

$$\text{Multiplier} = 1/(1 - 3/4) = 1/(1/4) = 4$$

If the MPC is only 1/2, however, the multiplier is 2:

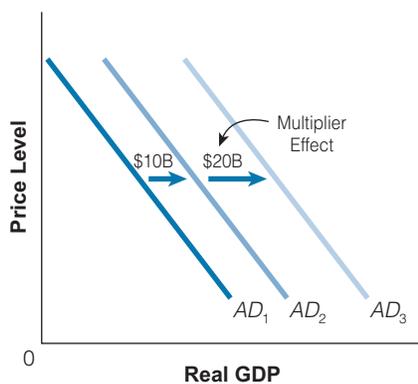
$$\text{Multiplier} = 1/(1 - 1/2) = 1/(1/2) = 2$$



*Why does a larger marginal propensity to consume lead to a larger multiplier effect?*

section 24.3  
exhibit 2

The Multiplier Effect on  
Aggregate Demand



In this hypothetical example, an increase in government purchases of \$10 billion for new aircraft carriers will shift the aggregate demand curve to the right by more than the \$10 billion initial purchase, other things being equal. It will shift aggregate demand by a total of \$30 billion, to  $AD_3$ . (The shifts are shown larger than they would really be for visual ease; \$30 billion is a small shift in a \$15,000 billion economy.)

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## The Multiplier and the Aggregate Demand Curve

As we discussed earlier, when the federal Department of Defense decides to buy additional aircraft carriers, it affects aggregate demand. It increases the incomes of owners of inputs used to make the aircraft carriers, including profits that go to the owners of the firms involved. That is the initial effect. The secondary effect—the greater income that results—will lead to increased consumer purchases. In addition, the higher profits for the firms involved in carrier construction may lead them to increase their investment purchases. So the initial effect of the government's purchases will tend to have a multiplied effect on the economy. In Exhibit 2, we can see that the initial impact of a \$10 billion additional purchase by the government directly shifts the aggregate demand curve from  $AD_1$  to  $AD_2$ . The multiplier effect then causes the aggregate demand to shift out \$20 billion further, to  $AD_3$ . If MPC is  $2/3$ , the total effect on aggregate demand of a \$10 billion increase in government purchases is therefore \$30 billion.

## Tax Cuts and the Multiplier

If the government wants to use fiscal stimulus to move the economy to the natural rate, increased government purchases is only one alternative. The government can also stimulate business and consumer spending through tax cuts. Both Japan (1999) and the United States (2001 and 2003) have recently employed tax cuts to stimulate their economies.

How much of an  $AD$  shift do we get from a change in taxes? As in the case of government purchases, it depends on the marginal propensity to consume. However, the tax multiplier is smaller than the government purchases multiplier because government purchases have a direct impact on aggregate demand, while a tax cut has only an indirect impact on aggregate demand. Why? Because consumers will save some of their income from the tax cut. So if the MPC is  $3/4$ , then when their disposable income rises by \$1,000, households will increase their consumption by \$750 while saving \$250 of the added income.

To compare the multiplier effect of a tax cut with an increase in government purchases, suppose there were a \$10 billion tax cut and that the MPC is  $2/3$ . The initial increase in consumption spending from the tax cut would be  $2/3 \times \$10$  billion ( $MPC \times \text{tax cut}$ ) = \$6.67 billion. Because in this case people would save one-third of their tax cut income, the effect on aggregate demand of the change in taxes would be smaller than that of a change of equal size in government purchases. The cumulative change in spending (the increase in  $AD$ ) due to the \$10 billion tax cut is found by plugging the initial effect of the changed consumption spending into our earlier formula:  $1/(1 - MPC) \times \$6.67$  billion, which is  $3 \times \$6.67 = \$20$  billion. So the initial tax cut of \$10 billion leads to a stimulus of \$20 billion in consumer spending. Although this amount is less than the \$30 billion from government purchases, it is easy to see why tax cuts and government purchases are both attractive policy prescriptions for a slow economy.

## Taxes and Investment Spending

Taxes can also stimulate investment spending. For example, if a cut in corporate-profit taxes leads to expectations of greater after-tax profits, it could fuel additional investment spending. That is, tax cuts designed for consumers and investors can stimulate both the  $C$  and  $I$



*Why is the tax multiplier smaller than the government purchases multiplier?*

components of aggregate demand. A number of administrations have used this strategy to stimulate aggregate spending and shift the aggregate demand curve to the right: Kennedy (1963), Reagan (1981), and Bush (2001 and 2003).

## A Reduction in Government Purchases and Tax Increases

Reductions in government purchases and tax increases are magnified by the multiplier effect, too. Suppose the government made cutbacks in the space program. Not only would it decrease government purchases directly, but aerospace workers would be laid off and unemployed workers would cut back on their consumption spending; this initial cutback would have a multiplying effect through the economy, leading to an even greater reduction in aggregate demand. Similarly, tax hikes would leave consumers with less disposable income, so they would cut back on their consumption, which would lower aggregate demand and set off the multiplier process, leading to an even larger cumulative effect on aggregate demand.



*Does the multiplier apply to both increases and decreases in aggregate demand?*

## Time Lags, Saving, and Imports Reduce the Size of the Multiplier

The multiplier process is not instantaneous. If you get an additional \$100 in income today, you may spend two-thirds of that on consumption purchases eventually, but you may wait six months or even longer to do it. Such time lags mean that the ultimate increase in

Use

what you've learned

### The Broken Window Fallacy

Whenever a government program is justified not on its merits but by the jobs it will create, remember the broken window: Some teenagers toss a brick through a bakery window. A crowd gathers and laments, "What a shame." But before you know it, someone suggests a silver lining to the situation: Now the baker will have to spend money to have the window repaired. This will add to the income of the repairman, who will spend his additional income, which will add to another seller's income, and so on. You know the drill. The chain of spending will multiply and generate higher income and employment. If the broken window is large enough, it might produce an economic boom! . . .

Most voters fall for the broken window fallacy, but not students of economic principles. They will say, "Hey, wait a minute!" If the baker hadn't spent his money on window repair, he would have spent it on the new suit he was saving to buy. Then the tailor would have the new income to spend, and so on. The broken window didn't create net new spending; it just diverted spending from somewhere else. The broken window does not create new activity, just

different activity. People see the activity that takes place. They don't see the activity that *would* have taken place.

The broken window fallacy is perpetrated in many forms. Whenever job creation or retention is the primary objective, I call it the job-counting fallacy. Students of economics principles understand the nonintuitive reality that real progress comes from job destruction. It once took 90 percent of our population to grow our food. Now it takes 3 percent. Pardon me, but are we worse off because of the job losses in agriculture? The would-have-been farmers are now college pros and computer gurus or singing the country blues on Sixth Street.

If you want jobs for jobs' sake, trade in bulldozers for shovels. If that doesn't create enough jobs, replace shovels with spoons. But there will always be more work to do than people to work. So instead of counting jobs, we should make every job count.

SOURCE: Robert D. McTeer Jr., "The Dismal Science? Hardly!" June 4, 2003. Reprinted from *The Wall Street Journal* © 2003 Dow Jones & Company. All Rights Reserved.

purchases resulting from an initial increase in purchases may not be achieved for a year or more. The extent of the multiplier effect visible within a short time will be less than the total effect indicated by the multiplier formula. In addition, saving and money spent on import goods (which are not part of aggregate demand for domestically produced goods and services) will reduce the size of the multiplier, because each of them reduces the fraction of a given increase in income that will go to additional purchases of domestically produced consumption goods.

It is also important to note that the multiplier effect is not restricted to changes in government purchases and taxes. The multiplier effect can apply to changes that alter spending in any of the components of aggregate demand: consumption, investment, government purchases, or net exports.

Some have argued that the multiplier effect of a new sports stadium, for example, will lead to additional local spending that will be three or four times the amount of the initial investment. However, this outcome is unlikely. It is important to remember that money spent on the stadium (taxpayer dollars) could also have been spent on food, clothing, entertainment, recreation, and many other goods and services. So the expenditures on the stadium come at the expense of other consumer expenditures. In addition, the multiplier is most effective when it brings idle resources into production. If all resources are fully employed, the expansion in demand and the multiplier effect will lead to a higher price level, not increases in employment and RGDP.

## The 2008–2009 Recession

The 2008–2009 recession is the worst recession since the Great Depression. It has led to the largest peacetime fiscal expansion in history. Many countries around the world have been increasing the size of their budget deficits by cutting taxes and increasing government spending. There is debate among economists on the effectiveness of fiscal policy to stimulate the economy, and much of that debate depends on the size of the multiplier. A multiplier of 1 means that an increase in government purchases of \$1 billion would increase aggregate demand and lead to an increase in \$1 billion of RGDP. The economy could now have new highways, bridges, fighter jets and aircraft carriers without sacrificing other components of aggregate demand like private consumption and investment. How is this possible? The answer is that these are idle resources that are now being put to use. If the multiplier is greater than 1 it is even more magical; RGDP rises by more than the increase in government purchases.

The Obama economists believe the multiplier for government purchases is close to 1.5 (a \$1 billion increase in government purchases will increase a country's GDP by \$1.5 billion) and the multiplier for taxes is closer to 1. Other economists believe that the multiplier for government purchases is much smaller, closer to 0.5. So there is debate on the size of the government purchase multiplier. And it appears that despite a \$787 billion injection, the fiscal stimulus had far less impact than many policy makers anticipated.

However, economists do agree that the multiplier is very small—close to zero—when the economy is at or near full employment and that the effectiveness of fiscal policy depends on the type of action that is taken. For example, the short-run effect of government spending on infrastructure like highways and bridges tends to be greater than, say, that of a tax cut where individuals will save a large portion of their tax windfall. Tax cuts for poorer people may be more effective than those for richer, because the poor tend to spend a larger proportion of their additional (marginal) income. Economists also agree that tax multipliers are much higher when taxes are permanent than when they are temporary and that fiscal multipliers will be lower in heavily indebted economies than in prudent ones.

In the words of macroeconomist Robert Barro, “Do not use the cover of fiscal policy to undertake massive public works programs that do not pass muster from the perspective of cost-benefit analysis . . . it is wrong now to think that added government spending is free.”



*Why is the multiplier effect on real output smaller when resources are fully employed?*

in the **news**

## Air Force to Award \$35 Billion Tanker Contract

The Air Force is poised to award one of the biggest contracts in military history—a \$35 billion deal to build nearly 200 giant airborne refueling tankers. The rival companies are Chicago-based Boeing Co. and European Aeronautic Defence and Space Co.

. . . If Boeing wins, production would occur in Everett, Washington; Wichita, Kansas; and in cities in several other states. If EADS wins, the tanker would be assembled in Mobile, Alabama. The two companies say that, either way, some 50,000 jobs would be created.

In the real world, the multiplier process is important because it may help explain why small changes in consumption, investment, and government purchases can result in larger, multiplied changes in total purchases. These increased purchases, in turn, may lead to increased real output and reduced unemployment when the economy is not already fully employed. In this application, when the government purchases the refueling tankers, we are assuming that it would not have purchased other goods and services with those same dollars instead.

This assumption is important because the purchase of the refueling tankers has the potential to lead to a net increase in demand only so far as it increases total government purchases, which, if the economy is less than fully employed, will increase real output and employment. That is, the demand for the refueling tankers, other things being equal, will lead to an increase in output for Boeing or EADS (which are competing to get the defense contract to build the refueling tanker). As a result, the company that wins the contract will hire more employees, who will take their paychecks and spend some of it on clothes, restaurant meals, and other



ISRAEL SUN/IDF/LANDOV

goods and services. These purchases will result in further growth in those industries, many of which are located far from the aircraft plant. In other words, a government purchase has the potential to have an impact on the economy that is greater than the magnitude of that original purchase. This is the multiplier process at work. However, if the aircraft purchases simply replace other government purchases, the multiplied expansion in defense-related industries will be offset by a multiplied contraction in industries where government purchases have fallen.

Contrast this example with government purchases of food for a school lunch program. Government purchases of school lunches rise, but private consumption falls as parents now purchase less food—perhaps by the same amount—for their children’s lunches. Overall, we would expect only a small change in demand, if any, as government demand replaces private demand. In some real sense, the suppliers of apples, milk, cookies, and chips have just had the names of their customers change.

G U S C O N S U M E R S T O D A Y S B U

 SECTION QUIZ


1. The multiplier effect is based on the fact that \_\_\_\_\_ by one person is (are) \_\_\_\_\_ to another.
  - a. income; income
  - b. expenditures; expenditures
  - c. expenditures; income
  - d. income; expenditures
2. The expenditure multiplier is
  - a.  $1/MPC$ .
  - b.  $1/(1 - MPC)$ .
  - c.  $(1 - MPC)/1$ .
  - d.  $1/\Delta MPC$ .
3. If the marginal propensity to consume is two-thirds, the multiplier is
  - a. 30.
  - b. 66.
  - c. 1.5.
  - d. 3.
4. The federal government buys \$20 million worth of computers from Dell. If the MPC is 0.60, what will be the impact on aggregate demand, other things being equal?
  - a. Aggregate demand will increase \$12 million.
  - b. Aggregate demand will increase \$13.33 million.
  - c. Aggregate demand will increase \$20 million.
  - d. Aggregate demand will increase \$50 million.
  - e. Aggregate demand will not change.
5. When taxes are increased, disposable income \_\_\_\_\_, and hence consumption \_\_\_\_\_.
  - a. increases; increases
  - b. increases; decreases
  - c. decreases; increases
  - d. decreases; decreases
  - e. stays the same; stays the same

- 
1. How does the multiplier effect work?
  2. What is the marginal propensity to consume?
  3. Why is the marginal propensity to consume always less than one?
  4. Why does the multiplier effect get larger as the marginal propensity to consume gets larger?
  5. If an increase in government purchases leads to a reduction in private-sector purchases, why will the effect on the economy be smaller than that indicated by the multiplier?

Answers: 1. c 2. b 3. d 4. d 5. d

# Supply-Side Effects of Tax Cuts

24.4

What is supply-side economics?

What do its critics say about supply-side ideas?

How do supply-side policies affect long-run aggregate supply?

## What Is Supply-Side Economics?

The debate over short-run stabilization policies has been going on for some time, with no sign that it is close to being settled. When policy makers discuss methods of stabilizing the economy, the focus since the 1930s has been on managing the economy through demand-side policies. But a group of economists believes that we should be focusing on the supply side of the economy as well, especially in the long run, rather than just on the demand side. In particular, they believe that individuals will save less, work less, and provide less capital when taxes, government transfer payments (such as welfare), and regulations are too burdensome on productive activities. In other words, they believe that fiscal policy can work on the supply side of the economy as well as the demand side.

## Impact of Supply-Side Policies

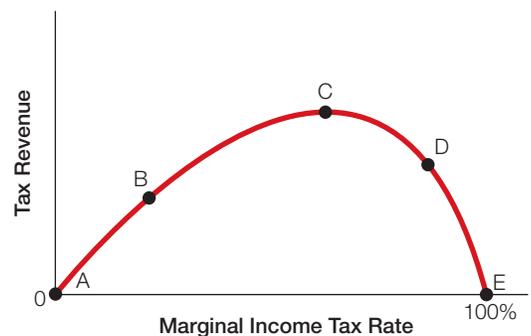
Supply-siders would encourage government to reduce individual and business taxes, deregulate, and increase spending on research and development. Supply-siders believe that these types of government policies could generate greater long-term economic growth by stimulating personal income, savings, and capital formation.

## The Laffer Curve

High marginal income tax rates could conceivably reduce work and investment incentives and increase tax evasion to the point that government revenues are lower than they would be at some lower marginal income tax rate. Economist Arthur Laffer argued that point graphically in what has been called the Laffer curve, depicted in Exhibit 1. When marginal income tax rates are low, increasing the federal marginal tax rate will increase federal tax revenues, as shown by the movement from point B to point C in Exhibit 1. However, at higher federal marginal tax rates, disincentive effects and increased tax evasion may actually reduce federal tax revenue. Over this range of marginal income tax rates, lowering taxes may actually increase federal tax revenue. This relationship is shown by the movement from point D to point C in Exhibit 1. A high marginal income tax rate on the rich might reduce the incentive to work, save, and invest, and perhaps as important, it might produce illegal shifts in transactions to what has been termed the underground economy, meaning that people make cash and barter transactions that are difficult for any

section 24.4  
exhibit 1

The Laffer Curve



If the marginal income tax rate is set at 100 percent, at point E, citizens will have no incentive to work or invest and tax revenues will be zero. Tax revenues will also be zero if the tax rate is zero, at point A. If the economy has a relatively high marginal income tax rate, at point D, tax revenues could be increased by lowering the marginal income tax rate, a move toward point C. However, as marginal income tax rates are lowered beyond point C, the tax revenues fall. Moving in the other direction, from point B to point C, we see that tax revenues would increase with higher marginal income tax rates up to point C. At higher marginal income tax rates beyond point C, tax revenues would fall.

tax collector to observe. If tax evasion becomes common, the equity and revenue-raising efficiency of the tax system suffers, as does general respect for the law.

Although all economists believe that incentives matter, disagreement exists as to the shape of the Laffer curve and where the economy actually is on the Laffer curve. That is, many economists believe that tax cuts increase incentives to work and invest but current U.S. tax levels do not appear to be on the downward side of the Laffer curve. There is also no evidence that prior to the Reagan cuts of the 1980s, the average marginal tax rate was high enough that a cut in tax rates would result in larger overall tax revenues. However, it is possible that taxpayers in the high-income group were on that portion of the curve. Other studies have shown that maximum tax revenues occurred in Sweden between 70 to 80 percent marginal income tax rates. So there may actually be a point where the marginal income tax rates of a country may be so high that tax revenues will fall. Some economists believe that France might also be close to that point.

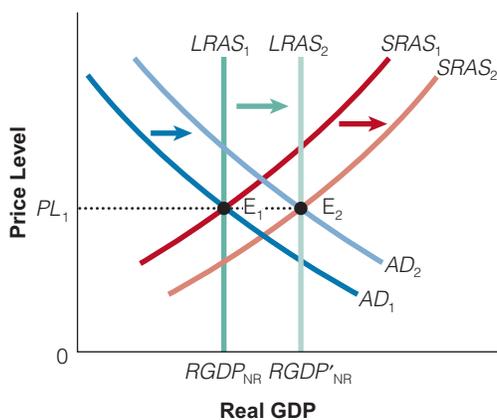
It also depends on what type of taxes. With regard to capital taxes, the United States and many developed countries may be on the left side of the Laffer curve. However, one study shows that Denmark and Sweden may be to the right of the peak on capital taxes. That is, cutting taxes might improve their budgetary situation.

## Research and Development and the Supply Side of the Economy

Some economists believe that investment in research and development will have long-run benefits for the economy. In particular, greater research and development will lead to new technology and knowledge, which will permanently shift the short- and long-run aggregate supply curves to the right. The government could encourage investments in research and development by giving tax breaks or subsidies to firms. The challenge, of course, is to produce *productive* research and development.

### section 24.4 exhibit 2

#### The Impact of Supply-Side Policies on Short-Run and Long-Run Aggregate Supply



The impact of a permanent reduction in tax rates and regulations together with investments in research and development could create long-term effects on income, saving, and capital formation, shifting both the *SRAS* curve and the *LRAS* curve rightward. As income rises and is spent, the aggregate demand curve shifts to the right.

## How Do Supply-Side Policies Affect Long-Run Aggregate Supply?

We see in Exhibit 2 that rather than being primarily concerned with short-run economic stabilization, supply-side policies are aimed at increasing both the short-run and long-run aggregate supply curves. If these policies are successful and maintained, output and employment will increase in the long run, as reflected in the shift from  $RGDP_{NR}$  to  $RGDP'_{NR}$ . Both short- and long-run aggregate supply will increase over time, as the effects of deregulation and major structural changes in plant and equipment work their way through the economy. It takes workers some time to fully respond to improved work incentives.

## Critics of Supply-Side Economics

Of course, those who believe in supply-side economics have their critics. These critics are skeptical about the magnitude of the impact of lower taxes on work effort and the impact of deregulation on productivity. Critics claim that the tax cuts of the 1980s led to moderate real output growth but only through a reduction in real tax revenues, inflation, and large budget deficits.

Although real economic growth followed the tax cuts, supply-side critics say that it came as a result of a large budget deficit. The critics raise several questions: What will happen to the distribution of income if most supply-side policies focus on benefits to those with capital? Will people save and invest much more if capital gains taxes are reduced (capital gains are increases in the value of an asset)? It may be more likely that saving and investment is driven by changes in income and expectations of profitability. How much more work effort will we see if marginal tax rates are lowered? The increase in the quantity of labor supplied following a tax cut is likely to be limited since most workers are already working 40 hour weeks and do not have opportunities to work more hours. Will the new production that occurs from deregulation be enough to offset the benefits thought by many to come from regulation?

## The Supply-Side and Demand-Side Effects of a Tax Cut

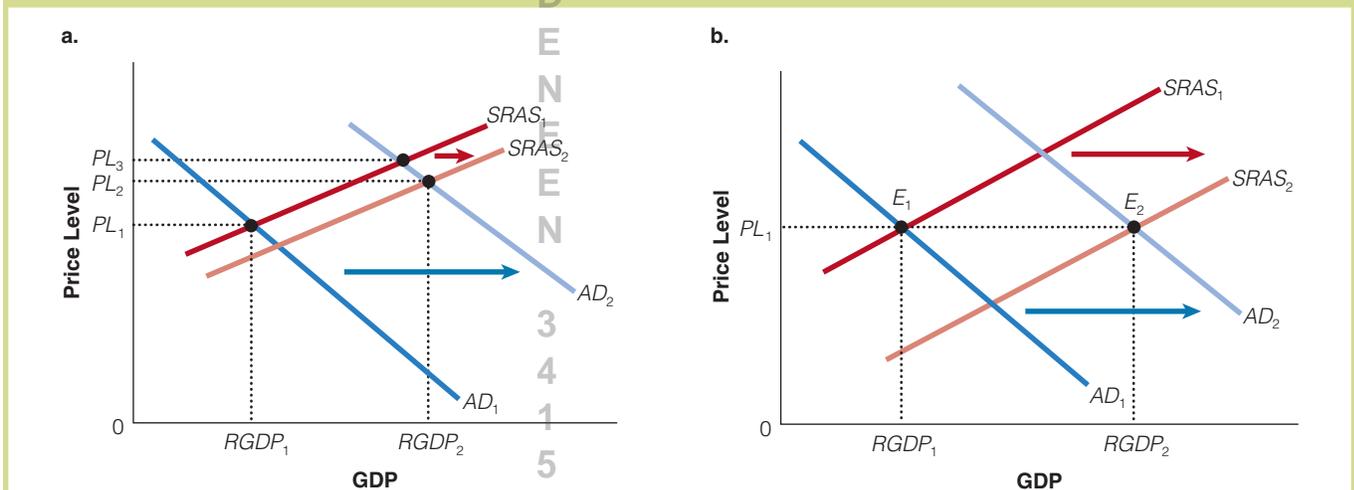
A tax cut can lead to greater incentives to work and save—an increase in aggregate supply (short-run and long-run)—and to demand-side stimulus from the increased disposable income (income after taxes) and an increase in aggregate demand. But how much will the tax rate affect aggregate demand and aggregate supply? We do not know for sure, but let’s look at two possible outcomes of the supply-side effects of a tax cut. We will focus on the aggregate demand curve and the SRAS curve. Suppose the tax cut leads to a large increase in AD but only a small increase in SRAS. What happens to the price level and RGDP? The more traditional view of a fiscal policy tax cut is shown in Exhibit 3(a). We can see that RGDP increases from  $RGDP_1$  to  $RGDP_2$  and price level increases from  $PL_1$  to  $PL_2$ . The good news is that the price level rises less than it would if there were no supply-side effect to the tax cut. Without the supply-side effect from the tax cut, the price level would rise to  $PL_3$ . But what if the supply-side effect were much larger, as shown in Exhibit 3(b)? It could completely offset the higher price-level effect of an expansionary fiscal policy, as RGDP rises from  $RGDP_1$  to  $RGDP_2$  and the price level stays constant at  $PL_1$ .



*Why would a tax rate reduction increase both aggregate demand and aggregate supply?*

**section 24.4**  
**exhibit 3**

**Two Possible Supply-Side Effects of a Tax Cut**



If the supply-side tax cut has a small effect on the SRAS but a large effect on AD, then RGDP increases from  $RGDP_1$  to  $RGDP_2$ , while the price level rises from  $PL_1$  to  $PL_2$ , as shown in (a). However, if the supply-side tax cut has a large effect on SRAS and a large effect on AD, then RGDP increases from  $RGDP_1$  to  $RGDP_2$ , and the price level is constant at  $PL_1$ , as shown in (b).

Fiscal policy was used infrequently in the United States and Europe from the 1980s to the late 1990s because of concerns over large budget deficits. However, the budget surplus that emerged in the latter half of the 1990s opened the gate for increased government spending and the Bush tax cut in 2001. Most economists agree that taxes alter incentives and distort market outcomes, as we learned in Chapter 7. Taxes clearly change people's behavior; and the tax cuts that lead to the strongest incentives to work, save, and invest will lead to the greatest economic growth and will be the least inflationary.

## SECTION QUIZ



1. Lower marginal tax rates stimulate people to work, save, and invest, resulting in more output and a larger tax base. This statement most closely reflects which of the following views?
  - a. the Keynesian
  - b. the multiplier view
  - c. the aggregate demand theory
  - d. the supply-side view
2. Other things being constant, an increase in marginal tax rates will
  - a. decrease the supply of labor and reduce its productive efficiency.
  - b. decrease the supply of capital and decrease its productive efficiency.
  - c. encourage individuals to buy goods that are tax deductible instead of those that are more desired but nondeductible.
  - d. do all of the above.
3. According to the Laffer curve,
  - a. decreasing tax rates on income will always increase tax revenues.
  - b. decreasing tax rates on income will always decrease tax revenues.
  - c. decreasing tax rates are more likely to increase tax revenues the higher tax rates are to start with.
  - d. decreasing tax rates are more likely to increase tax revenues the lower tax rates are to start with.

1. Is supply-side economics more concerned with short-run economic stabilization or long-run economic growth?
2. Why could you say that supply-side economics is really more about after-tax wages and after-tax returns on investment than it is about tax rates?
3. Why do government regulations have the same sort of effects on businesses as taxes?
4. Why are the full effects of supply-side policies not immediately apparent?
5. If taxes increase, what would you expect to happen to employment in the underground economy? Why?

Answers: 1. d 2. d 3. c

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# Possible Obstacles to Effective Fiscal Policy

24.5

How does the crowding-out effect limit the economic impact of increased government purchases or reduced taxes?

How do time lags in policy implementation affect policy effectiveness?

## The Crowding-Out Effect

Some economists believe that fiscal policy is not as potent as we described earlier because of the crowding-out effect. The crowding-out effect occurs when household consumption and investment spending decrease as a result of financing a budget deficit. There are direct effects. For example, if the government spent more on school lunch programs, individuals might buy fewer groceries.

There are also indirect effects. If the government spends more on defense and social programs without raising taxes for those programs, the deficit will rise.

Let's see how more spending on government purchases can lead to less investment spending. The multiplier effect of an increase in government purchases implies that the increase in aggregate demand will tend to be greater than the initial fiscal stimulus, other things being equal. However, because all other things will not tend to stay equal in this case, the multiplier effect may not hold true. For example, an increase in government purchases stimulates aggregate demand. As the new spending takes place, income and real GDP will rise which will cause households and firms to increase their demand for money to accommodate increased buying and selling. The increase in the demand for money will cause the interest rate to rise. As a result of the higher interest rate, consumers may decide against buying a car, a home, or other interest-sensitive goods, and businesses may cancel or scale back plans to expand or buy new capital equipment. In short, the higher interest rate will choke off some private spending on goods and services, and as a result, the impact of the increase in government purchases may be smaller than first assumed. Economists call this the **crowding-out effect**.

In Exhibit 1, suppose government purchases initially increased by \$10 billion. This change by itself would shift aggregate demand to the right by \$10 billion times the multiplier, from  $AD_1$  to  $AD_2$ . However, when the government increases its purchases of goods and services, it leads to an increase in income. The increase in income leads to an increase in the demand for money and a higher interest rate. The higher interest rate crowds out investment spending, causing the aggregate demand curve to shift left, from  $AD_2$  to  $AD_3$ . Because both these processes are taking place at the same time, the net effect is an increase in aggregate demand from  $AD_1$  to  $AD_3$  rather than to  $AD_2$ .

The multiplier and crowding-out effect can also impact the size of the shift in aggregate demand from a tax change. Recall that when tax cuts stimulate consumer spending, earnings and profits rise, which further stimulates consumer spending—the multiplier effect. But the higher income leads to an increase in the demand for money, which tends to lead to higher interest rates. The higher interest rates make borrowing more costly and reduce investment spending—the crowding-out effect. Also, remember, if households view tax cuts as permanent, they are more likely to increase spending by a larger amount than if they viewed the tax as temporary.



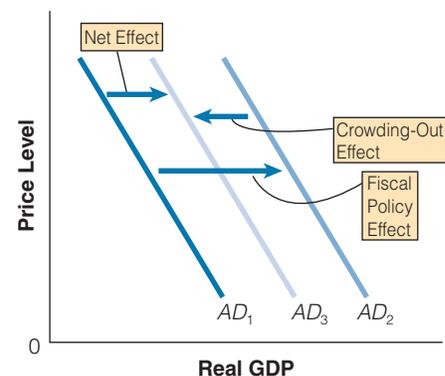
*When the government borrows to pay the deficit, can it drive up the interest rates and crowd out private consumption and investment?*

### crowding-out effect

theory that government borrowing drives up the interest rate, lowering consumption by households and investment spending by firms

#### section 24.5 exhibit 1

#### The Crowding-Out Effect



Government borrowing to finance a deficit leads to a higher interest rate and lower levels of private investment spending. The lower levels of private spending can crowd out the fiscal policy effect, shifting aggregate demand to the left from  $AD_2$  to  $AD_3$ . The net effect of the fiscal policy is a small increase in aggregate demand,  $AD_1$  to  $AD_3$ , not the larger increase from  $AD_1$  to  $AD_2$ .

## Time Lags in Fiscal Policy Implementation



*How will the lag time of a fiscal policy impact its effectiveness?*

It is important to recognize that in a democratic country, fiscal policy is implemented through the political process, and that process takes time. Often, the lag between the time that a fiscal response is desired and the time an appropriate policy is implemented and its effects felt is considerable. Sometimes a fiscal policy designed to deal with a contracting economy may actually take effect during a period of economic expansion, or vice versa, resulting in a stabilization policy that actually destabilizes the economy.

### The Recognition Lag

Government tax or spending changes require both congressional and presidential approval. Suppose the economy is beginning a downturn. It may take two or three months before enough data are gathered to indicate the actual presence of a downturn. This time span is called the *recognition lag*. Sometimes a future downturn can be forecast through econometric models or by looking at the index of leading indicators, but usually decision makers are hesitant to plan policy on the basis of forecasts that are not always accurate.

### The Implementation Lag

At some point, however, policy makers may decide that some policy change is necessary. At this point, experts are consulted, and congressional committees hold hearings and listen to testimony on possible policy approaches. During the consultation phase, many decisions have to be made. If, for example, a tax cut is recommended, what form should the cut take, and how large should it be? Across-the-board income tax reductions? Reductions in corporate taxes? More generous exemptions and deductions from the income tax (e.g., for child care, casualty losses, education of children)? In other words, who should get the benefits of lower taxes? Likewise, if the decision is made to increase government expenditures, which programs should be expanded or initiated, and by how much? Because these questions have profound political consequences, reaching decisions is seldom easy and usually involves substantial compromise and a great deal of time.

Finally, once the House and Senate have completed their separate deliberations and have arrived at a final version of the fiscal policy bill, it is presented to Congress for approval. After congressional approval is secured, the bill then goes to the president for approval or veto. These steps are all part of what is called the *implementation lag*.

During the period 1990–1991, the actual output of the economy was less than the potential output of the economy—a recessionary gap. Because automatic stabilizers resulted in lower taxes and larger transfer payments, consumption did not fall as far as it might have.

However, before President Clinton began his term in 1993, he believed that more was needed, so he put together a stimulus package of additional government spending and tax cuts. But by the time the bill reached the floor of Congress, the recession was over, illustrating how difficult it is to time fiscal stimulus. When the economy went into recession in March of 2001, it was not until a year later that the stimulus package was signed into law. Another example is when President John F. Kennedy thought the economy was operating below its potential in 1962; Congress finally passed a tax cut in 1964.



*Would the impact lag generally be greater for government public works project than a tax cut?*

### The Impact Lag

Even after legislation is signed into law, it takes time to bring about the actual fiscal stimulus desired. If the legislation provides for a reduction in withholding taxes, for example, it might take a few months before the changes show up in workers' paychecks. With respect to changes in government purchases, the delay is usually much longer. If the government increases spending for public works projects such as sewer systems, new highways, or urban renewal, it takes time to draw up plans and get permissions, to advertise for bids from contractors, to get contracts, and then to begin work. Further delays might occur because of government regulations. For example, an environmental impact statement must be completed before most public works projects can begin, a process that often takes many months or even years, called the *impact lag*.

## SECTION QUIZ



- One of the real-world complexities of countercyclical fiscal policy is that
  - fiscal policy is based on forecasts, which are not foolproof.
  - a lag occurs between a change in fiscal policy and its effect.
  - how much of the multiplier effect will take place in a given amount of time is uncertain.
  - All of the above are correct.
- According to the crowding-out effect, if the federal government borrows to finance deficit spending,
  - the demand for money will decrease, driving interest rates down.
  - the demand for money will increase, driving interest rates up.
  - the supply of money will increase, driving interest rates up.
  - the supply of money will decrease, driving interest rates down.
- When the crowding-out effect of an increase in government purchases is included in the analysis,
  - $AD$  shifts left.
  - $AD$  doesn't change.
  - $AD$  shifts right, but by more than the simple multiplier analysis would imply.
  - $AD$  shifts right, but by less than the simple multiplier analysis would imply.
- Which of the following statements is true?
  - The crowding-out effect will tend to reduce the magnitude of the effects of increases in government purchases.
  - The crowding-out effect implies that expansionary fiscal policy will tend to reduce private purchases of interest-sensitive goods.
  - The crowding-out effect can occur as a result of direct effects (e.g., building a library may result in fewer books being purchased on Amazon).
  - The crowding-out effect can occur as a result of financing a deficit that drives up real interest rates and crowds out private consumption and investment spending.
  - All of the above statements are true.

- Why does a larger government budget deficit increase the magnitude of the crowding-out effect?
- Why does fiscal policy have a smaller effect on aggregate demand the greater the crowding-out effect is?
- How do time lags affect the effectiveness of fiscal policy?

Answers: 1. d 2. b 3. d 4. e

## Automatic Stabilizers

### 24.6

What are automatic stabilizers?

Which automatic stabilizers are the most important?

## Automatic Stabilizers

Some changes in government transfer payments and taxes take place automatically as business cycle conditions change, without deliberations in Congress or the executive branch of the government. Changes in government transfer payments or tax collections that automatically tend to counter business cycle fluctuations are called **automatic stabilizers**.

**automatic stabilizers** changes in government transfer payments or tax collections that automatically help counter business cycle fluctuations



Automatic stabilizers work without legislative action. The stabilizers serve as shock absorbers for the economy. But the key is that they do it quickly.

## How Do the Tax System and Transfer Payments Stabilize the Economy?

The most important automatic stabilizer is the tax system. Personal income taxes vary directly in amount with income and, in fact, rise or fall by greater percentages than income itself. Big increases and big decreases in GDP are both lessened by automatic changes in income tax receipts. Because incomes, earnings, and profits all fall during a recession, the government collects less in taxes. When you work less, you are paid less and therefore pay less in taxes. It's like an automatic tax cut that acts to reduce the severity of a recession. This is also true for payroll taxes, which depend on a worker's earnings, and corporate income taxes, which depend on a firm's profits. When earnings and profits fall during a recession, so do government revenues. So, like the personal income tax, the corporate income tax and payroll taxes are automatic stabilizers, too. This reduced tax burden partially offsets the magnitude of the recession. Beyond this factor, the unemployment compensation program is another source of automatic stabilization. During recessions, unemployment is usually high and unemployment compensation payments increase, providing income that will be consumed by recipients. During boom periods, such payments will fall as the number of unemployed decreases. The system of public assistance (such as food stamps, Temporary Assistance for Needy Families, and Medicaid) payments tends to be another important automatic stabilizer because the number of low-income persons eligible for some form of assistance grows during recessions (stimulating aggregate demand) and declines during booms (reducing aggregate demand). Perhaps the Great Depression would not have been so "great" if automatic stabilizers had been in place. Many had to dig into their savings and cut back on their spending, which made matters worse.

Automatic stabilizers are not strong enough to completely offset a serious recession. However, they certainly reduce the severity of a recession, without the problems associated with lags that were discussed in the last section.

Despite the shortcomings of traditional fiscal policy, it provides policy makers with another option in the event of a severe downturn. The use of fiscal policy can reassure investors and consumers that the government realizes it has the potential to make up for insufficient demand, especially if the economy is far from its potential output.



*What are the advantages of automatic stabilizers?*



*What are the disadvantages of automatic stabilizers in a severe recession?*

### SECTION QUIZ



- Automatic stabilizers
  - reduce the problems caused by lags, using fiscal policy as a stabilization tool.
  - are changes in fiscal policy that act to stimulate *AD* automatically when the economy goes into recession.
  - are changes in fiscal policy that act to restrain *AD* automatically when the economy is growing too fast.
  - All of the above are correct.
- During a recession, government transfer payments automatically \_\_\_\_\_ and tax revenue automatically \_\_\_\_\_.
  - fall; falls
  - increase; falls
  - increase; increases
  - fall; increases

(continued)

## SECTION QUIZ (Cont.)



1. How does the tax system act as an automatic stabilizer?
2. Are automatic stabilizers affected by a time lag? Why or why not?
3. Why are transfer payments such as unemployment compensation effective automatic stabilizers?

Answers: 1. a 2. b

## The National Debt

### 24.7

- What are budget deficits and budget surpluses?
- How is the national debt financed?
- What has happened to the federal budget balance?
- What impact does a budget deficit have on the interest rate?
- What impact does a budget surplus have on the interest rate?

### Fiscal Stimulus Affects the Budget

As discussed earlier in the chapter, when government spending exceeds tax revenues, a budget deficit results. When tax revenues are greater than government spending, a budget surplus exists.

**Budget Deficit:**

Government Spending > Tax Revenues

**Budget Surplus:**

Tax Revenues > Government Spending

### How Government Finances the Debt

For many years, the U.S. government ran budget deficits and built up a large federal debt. The budget deficit occurs when government expenditure exceed tax revenues in a given year. The federal, or public, debt is the total amount the federal government owes all its creditors. But how will the government pay for all of those budget deficits that have turned into debt? After all, it has to have some means of paying out the funds necessary to support government expenditures that are in excess of the funds derived from tax payments. One thing the government can do is simply print money—dollar bills. This approach was used to finance much of the Civil War budget deficit, both in the North and in the Confederate states. However, printing money to finance activities is highly inflationary and also undermines confidence in the government. Typically, the budget deficit is financed by issuing debt. The federal government in effect borrows an amount necessary to cover the deficit by issuing bonds, or IOUs, payable with interest typically at some maturity date. More specifically, the U.S. Treasury borrows by selling Treasury bills (T-bills), notes, and bonds to government agencies, banks, households, and foreigners. We also need to distinguish between the gross debt and the public debt. The gross debt includes U.S. Treasury securities purchased by U.S. federal agencies. Because the government owes this debt to itself, economists generally focus on public debt—debt held by the public excluding federal government interagency borrowing. It is important to remember that projected liabilities of programs such as Social Security and Medicare are not included in the current national debt. Adding these and other projected liabilities could more than triple the size of the public debt.



*What is the difference between the gross debt and the public debt?*

The total of the values of all bonds outstanding constitutes the federal debt. That is, it the amount owed by the federal government to owners of government securities. This figure does not include debt incurred by state and local government. Exhibit 1 shows the federal budget as a percentage of GDP since 1912. Notice the difference between tax revenues and government expenditures in 1945, during World War II, which is when the budget deficit was the highest. Exhibit 2 shows the projected budget until the year 2015.

## Why Run a Budget Deficit?

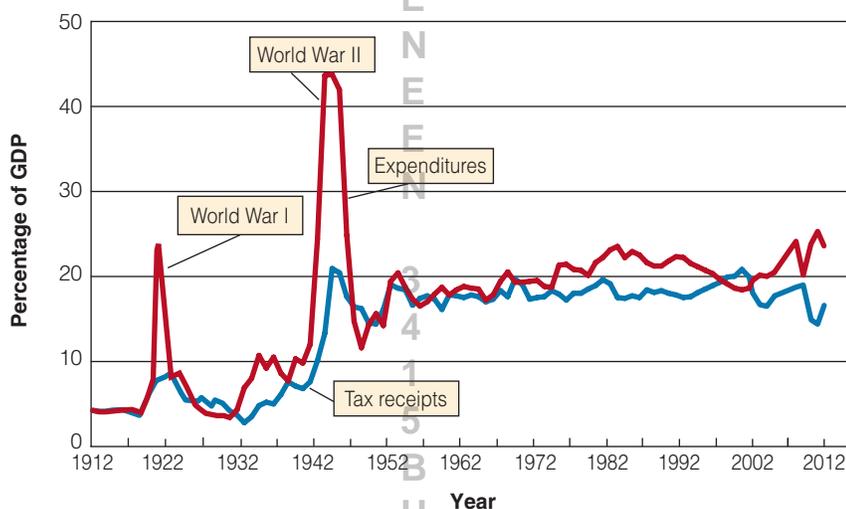
From 1960 through 1997, the federal budget was in deficit every year except one—in 1969, the government ran a small budget surplus. Budget deficits can be important because they provide the federal government with the flexibility to respond appropriately to changing economic circumstances. For example, the government may run deficits during special emergencies such as military involvements, earthquakes, fires, or floods. The government may also use a budget deficit to avert an economic downturn.

Historically, the largest budget deficits and a growing government debt occur during war years, when defense spending escalates and taxes typically do not rise as rapidly as spending. The federal government will also typically run budget deficits during recessions, as taxes are cut and government spending increases. However, in the 1980s, deficits and debt soared in a relatively peaceful and prosperous time. In 1980, President Reagan ran a platform of lowering taxes and reducing the size of government. Although the tax cuts occurred, the reduction in the growth of government spending did not. The result was huge peacetime budget deficits and a growing national debt that continued through the early 1990s, as shown in Exhibit 1.

However, when President Clinton took office in 1993, he set a goal to reduce the budget deficit. This goal was a high priority for both Democrats and Republicans. And after nearly a decade of uninterrupted economic growth, the deficit eventually turned into a budget surplus. In 2001 the budget surplus slipped into a deficit for three primary reasons: (1) the 2001 tax cut that President Bush promised in his presidential campaign; (2) the war on terrorism and wars in Iraq and Afghanistan; and (3) the 2001 recession that led to less tax revenue and

section 24.7  
exhibit 1

Federal Budget (Percentage of GDP)



SOURCE: Economic Report of the President, 2011.

NOTE: Projections for 2011 and 2012.

section 24.7  
exhibit 2

## Public Debt Trends

Fiscal Year	Public Debt (billions of dollars)	Public Debt as a Percentage of GDP
1929	\$ 16.9	18.0%
1940	43.0	45.0
1945	260.2	120.0
1950	256.8	94.0
1955	274.4	69.0
1960	290.5	56.0
1965	322.3	47.0
1970	380.9	38.0
1975	541.9	35.0
1980	909.1	33.0
1985	1,817.5	44.0
1990	3,206.6	56.0
1995	4,921.0	67.2
2000	5,629.0	57.9
2005	7,905.3	64.6
2010	13,786.6	94.3

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greater government spending. However, in looking at the future projections in Exhibit 2, it appears the United States will face large deficits for the next decade.

## The Burden of Public Debt

The “burden” of the debt is a topic that has long interested economists, particularly whether the burden falls on present or future generations. Exhibit 2 shows the burden as a percentage of GDP from 1929 to 2010. Arguments can be made that the generation of taxpayers living at the time that the debt is issued shoulders the true cost of the debt, because the debt permits the government to take command of resources that might be available for other, private uses. In a sense, the resources it takes to purchase government bonds might take away from private activities, such as private investment financed by private debt. No economist can deny, however, that the issuance of debt does involve some intergenerational transfer of incomes. Long after federal debt is issued, a new generation of taxpayers is making interest payments to people of the generation that bought the bonds issued to finance that debt. But what if foreigners buy the government securities, sometimes called external national debt? This actually increases the burden of the debt on future generations of Americans, because future debt payments will go to foreigners. Almost 30 percent of the debt was held by foreigners in 2010. The positive side is that foreign investment supplements domestic saving and keeps interest rates lower than they would otherwise be.

However, even when foreigners hold part of the debt, if public debt is created intelligently the “burden” of the debt should be less than the benefits derived from the resources acquired as a result, particularly when the debt allows for an expansion in real economic activity or for the development of vital infrastructure for the future. The opportunity cost of expanded public activity may be small in terms of private activity that must be forgone to finance the public activity if unemployed resources are put to work. The real issue of importance is whether the government’s activities have benefits that are greater than their costs; whether it is done through raising taxes, printing money, or running deficits, it is, for the most part, a “financing issue.”



*Who bears the burden of the public debt?*

## Would a Balanced Budget Amendment Work?

What are the arguments for and against balancing the budget? If we had a balanced budget, how could we allow the government to run deficits during emergencies?

From 1960 to 1998, the federal budget was in deficit every year except one, when the government ran a small balanced surplus in 1969. In 1998, the federal government ran a surplus and continued to run surpluses for the next three years. However, a series of events—the recession of 2001, the terrorist attacks, financing the wars in Iraq and Afghanistan, and a financial crisis—brought deficits back in the picture.

Some individuals believe that we must control the deficits through responsible fiscal restraint—a belief that has prompted a drive to add a balanced budget amendment to the U.S. Constitution.

But the possibility that the spending activities of the federal government may be constitutionally restricted is terrifying to some. Opponents' arguments can be summarized as follows:

First, at best, a balanced budget amendment would be ineffective because it is impossible to guarantee that revenues and expenditures will always match up on an annual basis. Second, at worst, a balanced budget amendment would reduce the fiscal flexibility of the federal government, thereby making it more difficult to respond appropriately to changing economic circumstances. Furthermore, if the public really wants the government to balance its budget, our elected representatives already have the power to respond to this desire.

It is certainly true that no amendment to the Constitution can ensure that the budget will ever be perfectly balanced. No one can exactly predict either revenues or expenditures over a specified interval. And in some circumstances, budget flexibility can be justified. Finally, it is true that Congress has the control over taxing and spending needed to eliminate the chronic deficits if it chooses to do so. Given all these factors, why should we clutter up the Constitution with a balanced budget amendment?

Proponents of a balanced budget amendment argue that, in the absence of fiscal restraints,

excessive government spending will occur because the private advantages that each of us realizes from spending on our government programs are paid for almost entirely by other taxpayers. Of course, each of us suffers from having to pay for the programs of others, and most of us would be willing to reduce our special interest demands if others would do the same. But we all recognize that as long as we continue to pay for the programs of others, we enjoy no advantage from reducing our individual demands on the government treasury. In this uncontrolled setting, we are in a spending free-for-all, with penalties for the fiscally responsible and rewards for the fiscally irresponsible.

Of course, a balanced budget amendment could be written that would allow the government to run deficits in time of special emergencies such as military involvement, earthquakes, financial crises, fires, or floods. In addition, the voters might adopt a plan that would allow for a two-thirds vote to increase the deficit or that would opt for a running average balanced budget instead of balancing the budget every year. Any of these proposals could work toward controlling runaway federal spending to some degree. A balanced budget would mean greater national saving, investment and economic growth. A smaller debt would also lead to less of a burden on future generations of taxpayers. Inheriting this debt will lower future standards of living, other things equal. However, what if the deficit is reduced by cutting back on spending in education? With less education, future generations could be less productive with lower incomes. If the deficit became so large that financing the debt (sometimes called monetizing the debt) became problematic then there might be a temptation to turn to inflation to finance the debt. In addition, parents and grandparents could offset some of this problem to the extent that they save more now and bequeath larger inheritances to their children.

The most important issue of all might be at what *level* the budget should be balanced. Many would prefer deficits in a small budget to a much larger, but balanced, budget. However, the real issue, as always, is: Are we getting government goods and services with benefits that are greater than costs?

## in the news **Obstacle to Deficit Cutting: A Nation on Entitlements**

Efforts to tame America's ballooning budget deficit could soon confront a daunting reality: Nearly half of all Americans live in a household in which someone receives government benefits, more than at any time in history.

At the same time, the fraction of American households not paying federal income taxes has also grown—to an estimated 45 percent in 2010, from 39 percent five years ago, according to the Tax Policy Center, a nonpartisan research organization. . . .

A little more than half don't earn enough to be taxed; the rest take so many credits and deductions they don't owe anything. Most still get hit with Medicare and Social Security payroll taxes, but 13 percent of all U.S. households pay neither federal income nor payroll taxes.

"We have a very large share of the American population that is getting checks from the government," says Keith Hennessey, an economic adviser to President George W. Bush and now a fellow at the conservative Hoover Institution, "and an increasingly smaller portion of the population that's paying for it."

The dimensions of the budget hole were underscored Monday, when the Treasury reported that the government ran a \$1.26 trillion deficit for the first 11 months of the fiscal year, on pace to be the second-biggest on record.

Yet even as Americans express concern over the deficit in opinion polls, many oppose benefit cuts, particularly with the economy on an uneven footing. A Wall Street Journal/NBC News poll conducted late last month found 61 percent of voters were "enthusiastic" or "comfortable" with congressional candidates who support cutting federal spending in general. But 56 percent expressed the same enthusiasm for candidates who voted to extend unemployment benefits.

As recently as the early 1980s, about 30 percent of Americans lived in households in which an individual was receiving Social Security, subsidized housing, jobless benefits or other government-

provided benefits. By the third quarter of 2008, 44 percent were, according to the most recent Census Bureau data.

That number has undoubtedly gone up, as the recession has hammered incomes. Some 41.3 million people were on food stamps as of June 2010, for instance, up 45 percent from June 2008. With unemployment high and federal jobless benefits now available for up to 99 weeks, 9.7 million unemployed workers were receiving checks in late August 2010, more than twice as many as the 4.2 million in August 2008.

Still more Americans—19 million by 2019, according to the Congressional Budget Office—will get federal aid to buy health insurance when legislation passed this year is implemented. . . .

. . . Government data don't show how many of the households receiving government benefits also escape federal taxes. But there is certainly some overlap between the two groups, since many benefits are aimed at those earning too little to pay income taxes and at people who don't have jobs, and who thus don't pay payroll taxes.

Cutting spending on these "entitlements" is widely seen as an inevitable ingredient in any credible deficit-reduction program. Yet despite occasional bouts of belt-tightening in Washington and bursts of discussion about restraining big government, the trend toward more Americans receiving government benefits of one sort or another has continued for more than 70 years—and shows no sign of abating.

An aging population is adding to the ranks of Americans receiving government benefits, and will continue to do so as more of the large baby-boom generation, those born between 1946 and 1964, become eligible. Today, an estimated 47.4 million people are enrolled in Medicare, up 38 percent from 1990. By 2030, the number is projected to be 80.4 million.

The difficulty of restraining benefits when so much of the population depends on them is now

*(continued)*

in the **news**

## Obstacle to Deficit Cutting: A Nation on Entitlements (Cont.)

on view across Europe, where efforts to rein in deficits are forcing governments to cut popular entitlements. European countries have traditionally provided far more generous welfare benefits than the United States has, including monthly allowances for children regardless of income, free college tuition and universal health care. Public retirement programs are also bigger, since the combination of aging populations and low birth rates means fewer workers are paying into the system.

In recent months, political leaders in Europe have struggled to convince voters that change is necessary. German Chancellor Angela Merkel has exempted pensions from her government's planned budget cuts, reflecting the growing power of the retiree vote. French President Nicolas Sarkozy is facing mass protests, including a national strike week, as he tries to raise France's minimum retirement age from 60 to 62. Greece's government had to face down demonstrations this year when it slashed pension benefits, as it was forced to do to get bailout money from other European countries and the International Monetary Fund.

Still, Europe does offer examples that change is possible. Germany slashed benefits for the long-term unemployed in 2004, a step that analysts credit with prompting more Germans to get jobs as well as improving the country's budget balance. Cuts to entitlements are politically possible, says Daniel Gros, director of the Center for European Policy Studies, a nonpartisan think tank in Brussels, "but societies need some time to get used to the idea."

The U.S. government first offered large-scale assistance during Franklin Delano Roosevelt's New Deal. The Social Security Act, passed in 1935, created the popular retirement program as well as unemployment compensation, the early stages of what became known as "welfare" and assistance to the blind and elderly. In the 1940s, the G.I. Bill offered unemployment benefits, education assistance and loans to veterans. That same decade, Washington began offering free or reduced-price

lunches to children from low-income families and, a decade later, monthly benefits to the disabled.

Lyndon Johnson's Great Society programs brought food stamps plus Medicare and Medicaid. In the 1970s, Supplemental Security Income was created on top of routine Social Security benefits for the poorest of the elderly and disabled, and so-called Section 8 vouchers began subsidizing rental housing. The earned-income tax credit was launched in 1975 to offer extra cash to low-wage workers, and grew in the 1990s to become one of the government's principle antipoverty programs.

Benefits for children were expanded in 1997 with the State Children's Health Insurance Program during the Clinton administration—and were expanded again in 2009. Shortly after President Barack Obama took office, Congress passed the American Recovery and Reinvestment Act, the stimulus bill, which among other things extended unemployment compensation and offered incentives for states to cover more workers.

All this is expensive. Payments to individuals—a budget category that includes all federal benefit programs plus retirement benefits for federal workers—will cost \$2.4 trillion this year, up 79 percent, adjusted for inflation, from a decade earlier when the economy was stronger. That represents 64.3 percent of all federal outlays, the highest percentage in the 70 years the government has been measuring it. The figure was 46.7 percent in 1990 and 26.2 percent in 1960.

When the economy recovers, some—but not all—current recipients of federal aid are likely to lose their benefits, which some say is reason enough to keep them going for now.

. . . Cutting federal benefits while the economy is still weak would be a mistake, some analysts say, because it could hinder recovery by giving consumers less money to spend.

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 SECTION QUIZ


1. How does the government finance budget deficits?
  - a. The Federal Reserve creates new money.
  - b. It issues debt to government agencies, private institutions, and private investors.
  - c. It is primarily financed by foreign investors.
  - d. It does nothing to finance budget deficits.
2. When government debt is financed internally, future generations will
  - a. inherit a lower tax liability.
  - b. inherit neither higher taxes nor interest payment liability.
  - c. inherit higher taxes.
  - d. do none of the above.
3. Higher budget deficits would tend to
  - a. raise interest rates.
  - b. reduce investment.
  - c. reduce the growth rate of the capital stock.
  - d. do all of the above.

- 
1. What will happen to the interest rate when a budget deficit occurs?
  2. What will happen to the interest rate when a budget surplus occurs?
  3. What are the intergenerational effects of a national debt?
  4. What must be true for Americans to be better off as a result of an increase in the national debt?

Answers: 1. b 2. c 3. d

## Interactive Summary

### Fill in the blanks:

1. \_\_\_\_\_ is the use of government spending and/or taxes to alter real GDP and price levels.
2. When government spending (for purchases of goods and services and transfer payments) exceeds tax revenues, the result is a budget \_\_\_\_\_.
3. When the government wishes to stimulate the economy by increasing aggregate demand, it will \_\_\_\_\_ government purchases of goods and services, \_\_\_\_\_ taxes, or use some combination of these approaches.
4. Expansionary fiscal policy is associated with \_\_\_\_\_ government budget deficits.
5. If the government wishes to dampen a boom in the economy, it will \_\_\_\_\_ its purchases of goods and services, \_\_\_\_\_ taxes, or use some combination of these approaches.
6. By changing tax rates, the government can alter the amount of \_\_\_\_\_ income of households and thereby bring about changes in \_\_\_\_\_ purchases.
7. Increased budget \_\_\_\_\_ will stimulate the economy when it is operating at less than full capacity.
8. The result of an expansionary fiscal policy in the short run would be a(n) \_\_\_\_\_ in the price level and a(n) \_\_\_\_\_ in RGDP.
9. If the government wants to use fiscal policy to help “cool off” the economy when it has overheated and inflation has become a serious problem, it will tend to \_\_\_\_\_ government purchases and/or \_\_\_\_\_ taxes.

10. A tax \_\_\_\_\_ on consumers will reduce households' disposable incomes and thus their purchases of \_\_\_\_\_ goods and services, while higher business taxes will reduce \_\_\_\_\_ purchases.
11. Contractionary fiscal policy will result in a(n) \_\_\_\_\_ price level and \_\_\_\_\_ employment in the short run.
12. The \_\_\_\_\_ effect explains why, when an initial increase in purchases of goods or services occurs, the ultimate increase in total purchases will tend to be greater than the initial increase.
13. When the government purchases additional goods and services, not only does it add to the total demand for goods and services directly, but the purchases also add to people's \_\_\_\_\_.
14. When people's incomes rise because of increased government purchases of goods and services, collectively people will spend a substantial part of the additional income on additional \_\_\_\_\_ purchases.
15. The additional consumption purchases made as a portion of one's additional income is measured by the \_\_\_\_\_.
16. With each additional round of the multiplier process, the added income generated and the resulting consumer purchases get \_\_\_\_\_ because some of each round's increase in income goes to \_\_\_\_\_ and \_\_\_\_\_ payments.
17. \_\_\_\_\_ is equal to  $1/(1 - MPC)$ .
18. The larger the marginal propensity to consume, the \_\_\_\_\_ the multiplier effect.
19. If the marginal propensity to consume were smaller, a given increase in government purchases would have a(n) \_\_\_\_\_ effect on consumption purchases.
20. The extent of the multiplier effect visible within a short time period will be \_\_\_\_\_ than the total effect indicated by the multiplier formula.
21. The multiplier effect triggered by an increase in spending arises because of the additional \_\_\_\_\_ spending that it leads to.
22. If your MPC were equal to 0.7, your MPS would equal \_\_\_\_\_.
23. Savings and money spent on imported goods will each \_\_\_\_\_ the size of the multiplier.
24. The multiplier effect of an increase in government purchases implies that the increase in aggregate demand will tend to be \_\_\_\_\_ than the initial fiscal stimulus, other things being equal.
25. Supply-side economists believe that individuals will save \_\_\_\_\_, work \_\_\_\_\_, and provide \_\_\_\_\_ capital when taxes, government transfer payments (such as welfare), and regulations are too burdensome on productive activities.
26. The \_\_\_\_\_ curve shows that high tax rates could conceivably reduce work incentives to the point that government revenues are lower at high marginal tax rates than they would be at somewhat lower rates.
27. If the demand-side stimulus from reduced tax rates is \_\_\_\_\_ than the supply-side effects, the result will be a higher price level and a greater level of real output.
28. Changes in government transfer payments or tax collections that automatically tend to counter business cycle fluctuations are called \_\_\_\_\_.
29. The most important automatic stabilizer is the \_\_\_\_\_ system.
30. Big increases and big decreases in GDP are both \_\_\_\_\_ by automatic changes in income tax receipts.
31. Because incomes, earnings, and profits all fall during a recession, the government collects \_\_\_\_\_ in taxes. This reduced tax burden partially \_\_\_\_\_ any contractionary fall in aggregate demand.
32. When the government borrows money to finance a deficit, it \_\_\_\_\_ the overall demand for money in the money market, driving interest rates \_\_\_\_\_.
33. The \_\_\_\_\_ effect refers to the theory that when the government borrows money to finance a deficit, it drives interest rates up, choking off some private spending on goods and services.
34. The monetary authorities could \_\_\_\_\_ the money supply to offset the \_\_\_\_\_ interest rates due to the crowding-out effect of expansionary fiscal policy.
35. Expansionary fiscal policy will tend to \_\_\_\_\_ the demand for dollars relative to other currencies.
36. Expansionary fiscal policy will tend to cause net exports to \_\_\_\_\_.
37. The larger the crowding-out effect, the \_\_\_\_\_ the actual effect of a given change in fiscal policy.
38. Because of the \_\_\_\_\_ in implementing fiscal policy, a fiscal policy designed to deal with a contracting economy may actually take effect during a period of economic expansion.
39. Timed correctly, contractionary fiscal policy could correct a(n) \_\_\_\_\_; timed incorrectly, it could cause a(n) \_\_\_\_\_.

- 40. If the federal government is running a(n) \_\_\_\_\_, the federal debt would be getting smaller.
- 41. Historically, the largest budget deficits have tended to be in \_\_\_\_\_ years.
- 42. Deficit reduction is a(n) \_\_\_\_\_ fiscal policy in the short run.
- 43. \_\_\_\_\_ a federal budget deficit could be an appropriate fiscal policy if the economy were in a recession.
- 44. If unemployed resources are put to work by government spending, the opportunity cost of expanded public activity would be \_\_\_\_\_ than otherwise.
- 45. Starting at a full-employment equilibrium, the only long-term effect of an increase in aggregate demand will be an increase in the \_\_\_\_\_ level.
- 46. Starting at a full-employment equilibrium, once the economy has returned to its long-run equilibrium after an increase in government purchases, employment will be \_\_\_\_\_ full employment.

Answers: 1. Fiscal policy 2. deficit 3. increase; increase 4. increased 5. reduce; increase 6. disposable; consumption 7. deficits 8. increase; increase 9. reduce; increase 10. increase; consumption; investment 11. lower; lower 12. multiplier 13. incomes 14. consumption 15. marginal propensity to consume 16. smaller; savings; tax 17. The expenditure multiplier 18. larger 19. smaller 20. less 21. consumption 22. 0.3 23. reduce 24. greater 25. less; less; less 26. Laffer 27. greater 28. automatic stabilizers 29. tax 30. lessened 31. less; offsets 32. increase; up 33. crowding-out 34. increase; higher 35. increase 36. fall 37. smaller 38. time lags 39. inflationary boom; recession 40. surplus 41. war 42. contractionary 43. Increasing 44. lower 45. price 46. equal to

## Key Terms and Concepts

fiscal policy 701  
 multiplier effect 708  
 marginal propensity to consume (MPC) 708

marginal propensity to save (MPS) 708

crowding-out effect 719  
 automatic stabilizers 721

## Section Quiz Answers

### 24.1 Fiscal Policy

- 1. If, as part of its fiscal policy, the federal government increases its purchases of goods and services, is that an expansionary or contractionary tactic?**

An increase in government purchases of goods and services would be an expansionary tactic, increasing aggregate demand, other things equal.

- 2. If the federal government decreases its purchases of goods and services, does the budget deficit increase or decrease?**

If the federal government decreased its purchases of goods and services, for a given level of tax revenue, the budget deficit (the difference between government spending and government revenues) would decrease.

- 3. If the federal government increases taxes and/or decreases transfer payments, is that an expansionary or contractionary fiscal policy?**

Either an increase in taxes or a decrease in transfer payment would be a contractionary tactic, decreasing aggregate demand by decreasing people's disposable incomes and therefore reducing the demand for consumption goods.

- 4. If the federal government increases taxes or decreases transfer payments, does the budget deficit increase or decrease?**

If the federal government increased taxes or decreased transfer payments, for a given level of government purchases, a budget deficit (the difference between government spending and government revenues) would decrease.

- 5. If the federal government increases government purchases and lowers taxes at the same time, does the budget deficit increase or decrease?**

Increased government purchases would increase a budget deficit, other things equal. Lowered taxes would also increase a budget deficit, other things equal. Therefore, both changes together would increase a budget deficit.

## 24.2 Fiscal Policy and the AD/AS Model

- 1. If the economy is in recession, what sort of fiscal policy changes would tend to bring it out of recession?**

If the economy is in recession, aggregate demand intersects short-run aggregate supply to the left of the long-run aggregate supply curve. Expansionary fiscal policy—increased government purchases, decreased taxes, and/or increased transfer payments—addresses a recession by shifting aggregate demand to the right.

- 2. If the economy is at a short-run equilibrium at greater than full employment, what sort of fiscal policy changes would tend to bring the economy back to a full-employment equilibrium?**

If the economy is at a short-run equilibrium at greater than full employment, aggregate demand intersects short-run aggregate supply to the right of the long-run aggregate supply curve. Contractionary fiscal policy—decreased government purchases, increased taxes, and/or decreased transfer payments—addresses a short-run equilibrium at greater than full employment by shifting aggregate demand to the left.

- 3. What effects would an expansionary fiscal policy have on the price level and real GDP, starting from a full-employment equilibrium?**

Starting from a full-employment equilibrium, an expansionary fiscal policy would increase aggregate demand, increasing the price level and real GDP in the short run. However, in the long run, real GDP will return to its full-employment long-run equilibrium level as input prices adjust (the short-run aggregate supply curve shifts up or left), and only the price level will end up higher.

- 4. What effects would a contractionary fiscal policy have on the price level and real GDP, starting from a full-employment equilibrium?**

Starting from a full-employment equilibrium, a contractionary fiscal policy would decrease aggregate

demand, decreasing the price level and real GDP in the short run. However, in the long run, real GDP will return to its full-employment long-run equilibrium level as input prices adjust (the short-run aggregate supply curve shifts down or right), and the price level will end up lower.

## 24.3 The Multiplier Effect

- 1. How does the multiplier effect work?**

The multiplier effect occurs because the increased purchases during each “round” of the multiplier process generate increased incomes for the owners of the resources used to produce the goods purchased, which leads them to increase consumption purchases in the next “round” of the process. The result is a final increase in total purchases, including the induced consumption purchases, that is greater than the initial increase in purchases.

- 2. What is the marginal propensity to consume?**

The marginal propensity to consume is the proportion of an additional dollar of income that would be spent on additional consumption purchases.

- 3. Why is the marginal propensity to consume always less than one?**

This is true because all expenditures ultimately have to be financed out of income, so each dollar of added income cannot lead to more than a dollar of added purchases. In addition, taxes and savings also have to be financed out of income.

- 4. Why does the multiplier effect get larger as the marginal propensity to consume gets larger?**

The larger the marginal propensity to consume, the larger the fraction of increased income in each “round” of the multiplier process that will go to additional consumption purchases. Since each round of the multiplier process will therefore be larger the greater the marginal propensity to consume, the multiplier will also be larger.

- 5. If an increase in government purchases leads to a reduction in private-sector purchases, why will the effect on the economy be smaller than that indicated by the multiplier?**

At the same time that the increased government purchases are leading to a multiple expansion of income and purchases for one set of citizens, the “crowded-out” private-sector purchases are causing a multiple contraction of income and purchases for other citizens. The net effect on the economy will therefore be smaller than the increase in government purchases times the multiplier.

## 24.4 Supply-Side Effects of Tax Cuts

### 1. Is supply-side economics more concerned with short-run economic stabilization or long-run economic growth?

Supply-side economics is more concerned with long-run economic growth than short-run economic stabilization. It is focused primarily on adopting policies that will increase the long-run aggregate supply curve (society's production possibilities curve) over time, by increasing incentives to work, save, and invest.

### 2. Why could you say that supply-side economics is really more about after-tax wages and after-tax returns on investment than it is about tax rates?

Changes in after-tax wages and after-tax returns on investment are the incentives that change people's behavior, not changes in the tax rates themselves.

### 3. Why do government regulations have the same sort of effects on businesses as taxes?

To the extent that government regulations impose added costs on businesses, the effects of these added costs are the same—a decrease (leftward or upward shift) in supply—as if a tax of that amount were imposed on the business.

### 4. Why are the full effects of supply-side policies not immediately apparent?

It often takes a substantial period of time before improved productivity incentives have their complete effects. For instance, an increase in the after-tax return on investment will increase investment, but it will take many years before the capital stock has completed its adjustment. The same is true for human capital investments in education, research and development, and so forth—if a student or researcher learns more today, the full effect won't be observed immediately.

### 5. If taxes increase, what would you expect to happen to employment in the underground economy? Why?

The primary benefit of employment in the underground economy is the savings due to not having to pay taxes (or bear some of the costs of regulations imposed on legitimate employment). The cost includes the risk of being caught, the difficulty of dealing on a cash-only or barter basis, and so on. As tax rates increase, the benefits of working in the underground economy increase relative to the costs, and employment in the underground economy will tend to increase, other things being equal.

## 24.5 Possible Obstacles to Effective Fiscal Policy

### 1. Why does a larger government budget deficit increase the magnitude of the crowding-out effect?

A larger government budget deficit increases the demand for loanable funds, thereby increasing the magnitude of the increase in interest rates and crowding out more private-sector investment as a result.

### 2. Why does fiscal policy have a smaller effect on aggregate demand the greater the crowding-out effect is?

The greater the crowding-out effect, the smaller the net effect (the increase in government purchases minus the private-sector purchases crowded out) fiscal policy has on aggregate demand. For example, if each dollar of added government purchases crowds out 50 cents worth of private-sector purchases, fiscal policy will have only half the effect on aggregate demand that it would if there were no crowding-out effect.

### 3. How do time lags affect the effectiveness of fiscal policy?

The time lag between when a policy change is desirable and when it is adopted and implemented (for data gathering, decision making, etc.), as well as the time lag between when a policy is implemented and when it has its effects, makes it difficult for fiscal policy to have the desired effect at the desired time, particularly given the difficulty in forecasting the future course of the economy.

## 24.6 Automatic Stabilizers

### 1. How does the tax system act as an automatic stabilizer?

Some taxes, such as progressive income taxes and corporate profits taxes, automatically increase as the economy grows, and this increase in taxes restrains disposable income and the growth of aggregate demand below what it would have been otherwise. Similarly, they automatically decrease in recessions, and this decrease in taxes increases disposable income and acts as a partial offset to the fall in aggregate demand. The result is reduced business cycle instability.

### 2. Are automatic stabilizers affected by a time lag? Why or why not?

Since automatic stabilizers respond to business cycle changes without the need for legislative or executive action, there is no appreciable lag between when business cycle conditions justify a change in them and when they do change. However, there is still a

lag between when those stabilizers change and when their full effects are felt.

### 3. Why are transfer payments such as unemployment compensation effective automatic stabilizers?

Some transfer payment programs, such as unemployment compensation, act as automatic stabilizers because when business cycle conditions worsen, people can start receiving increased transfer payments as soon as they become eligible (lose their jobs, in the case of unemployment compensation). The same is true of some other welfare-type programs, such as food stamps.

## 24.7 The National Debt

### 1. What will happen to the interest rate when a budget deficit occurs?

When the government borrows to finance a budget deficit, it causes the interest rate to rise, other things equal.

### 2. What will happen to the interest rate when a budget surplus occurs?

When there is a budget surplus, it adds to national saving and lowers the interest rate, other things equal.

### 3. What are the intergenerational effects of a national debt?

Arguments can be made that the generation of the taxpayers living at the time that the debt is issued shoulders the true cost of the debt, because the debt permits the government to take command of resources that would be available for other, private uses. However, the issuance of debt does involve some intergenerational transfer of incomes. Long after federal debt is issued, a new generation of taxpayers is making interest payments to persons of the generation that bought the bonds issued to finance that debt. If public debt is created intelligently, however, the “burden” of the debt should be less than the benefits derived from the resources acquired as a result; this is particularly true when the debt allows for an expansion in real economic activity or for the development of vital infrastructure for the future.

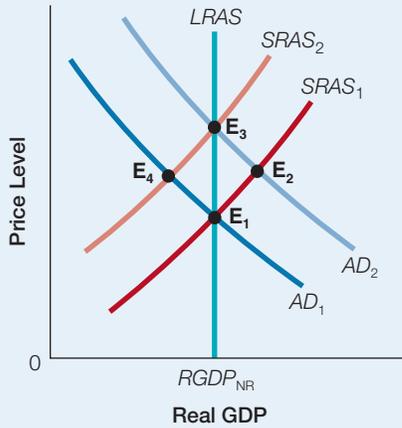
### 4. What must be true for Americans to be better off as a result of an increase in the national debt?

For Americans to be better off as a result of an increase in the federal debt, the value of the investments and other spending financed by the debt must be greater than the cost of financing it.

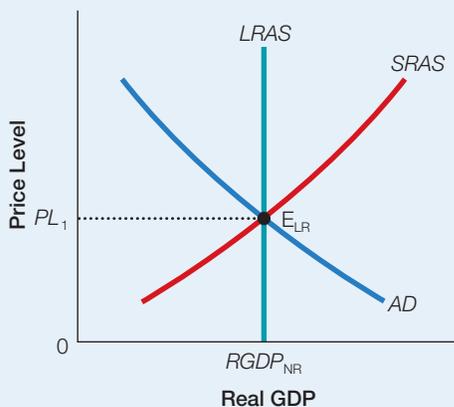
## Problems

1. Why are federal government actions that increase deficits considered expansionary fiscal policy and those that decrease deficits considered contractionary fiscal policy?
2. Are increases in both government purchases and net taxes at the same time expansionary or contractionary? Would both changes together increase or decrease the federal government deficit?
3. Answer the following questions.
  - a. If the current budget shows a surplus, what would an increase in government purchases do to it?
  - b. What would that increase in government purchases do to aggregate demand?
  - c. When would an increase in government purchases be an appropriate countercyclical fiscal policy?
4. Answer the following questions.
  - a. If the current budget shows a deficit, what would an increase in taxes do to it?
  - b. What would that increase in taxes do to aggregate demand?
  - c. When would an increase in taxes be an appropriate contractionary fiscal policy?

5. Use the accompanying diagram to answer the following questions.



- a. At what short-run equilibrium point might expansionary fiscal policy make sense to help stabilize the economy?
  - b. What would be the result of appropriate fiscal policy in that case?
  - c. What would be the long-run result if no fiscal policy action were taken in that case?
  - d. At what short-run equilibrium point might contractionary fiscal policy make sense to help stabilize the economy?
  - e. What would be the result of appropriate fiscal policy in that case?
  - f. What would be the long-run result if no fiscal policy action were taken in that case?
6. What is a recessionary gap? What would be the appropriate fiscal policy to combat or offset one? What is an inflationary gap? What would be the appropriate fiscal policy to combat or offset one?
  7. What would the multiplier be if the marginal propensity to consume was
    - a. 1/3?
    - b. 1/2?
    - c. 3/4?
  8. If government purchases increased by \$20 billion, other things being equal, what would be the resulting change in aggregate demand, and how much of that change would be a change in consumption, if the MPC were
    - a. 1/3?
    - b. 1/2?
    - c. 2/3?
    - d. 3/4?
    - e. 4/5?
  9. Could the multiplier be written as 1 divided by the marginal propensity to save (MPS)?
  10. Why does it take a larger reduction in taxes to create the same increase in AD as a given increase in government purchases?
  11. Explain why an equal dollar increase in both government purchases and net taxes would increase aggregate demand.
  12. Use the accompanying diagram to answer the following questions.



- a. Starting from the initial equilibrium in the diagram, illustrate the case of a supply-side fiscal policy that left the price level unchanged.
  - b. Compared to your answer in (a), when would a supply-side fiscal policy result in an increase in the price level?
13. Why can a decrease in tax rates increase *AS* as well as *AD*, whereas an increase in government purchases will increase *AD* but not *AS*?
  14. How do automatic stabilizers affect budget deficits and surpluses? How would automatic stabilizers be affected by an annually balanced budget rule?
  15. Why do automatic stabilizers minimize the lag problem with fiscal policy?
  16. Answer the following questions:
    - a. Describe the crowding-out effect of an increase in government purchases.
    - b. Why does the magnitude of the crowding-out effect depend on how responsive interest rates are to increased government borrowing and how responsive investment is to changes in interest rates?
    - c. How would the size of the crowding-out effect affect the size of the change in aggregate demand that would result from a given increase in government purchases?

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