

Aggregate Demand and Aggregate Supply

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Macroeconomic Model

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 is consumption?

What is investment?

What are government purchases?

What are net exports?

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



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What are four major components of aggregate demand?

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.

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.

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.



What is the most unstable component of GDP?

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

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



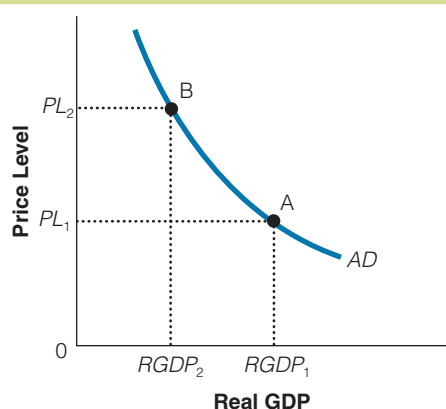
How is the aggregate demand curve different than the demand curve for a particular good?

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.

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.

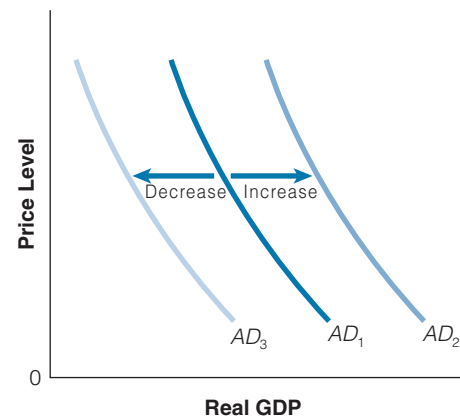
Changing Net Exports ($X - M$)

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.

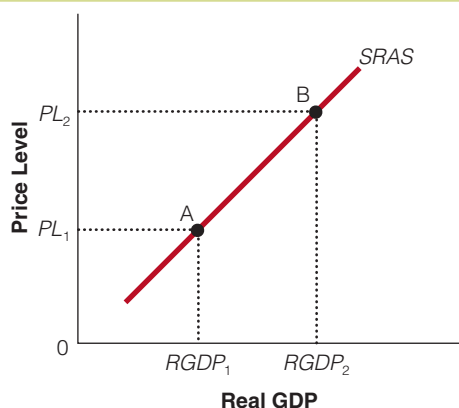
If the price level falls, output prices fall and producers' profits tend to fall. That is, a lower price level leads to a lower profit per unit of output and lower RGDP supplied because wages and other input prices can be slow to adjust in the short run. Again, this is because many input costs, such 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.

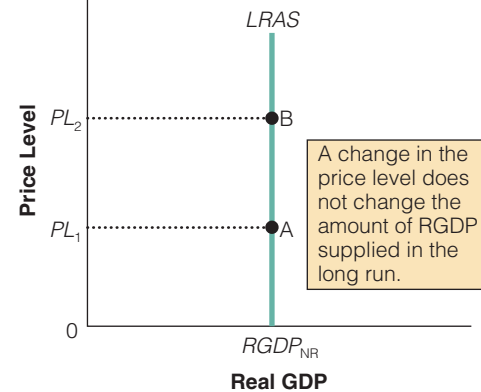
Why Is the Long-Run Aggregate Supply Curve Vertical?

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



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

-
- What relationship does the short-run aggregate supply curve represent?
 - What relationship does the long-run aggregate supply curve represent?
 - Why is focusing on producers' profit margins helpful in understanding the logic of the short-run aggregate supply curve?
 - 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?
 - What would the short-run aggregate supply curve look like if input prices always changed instantaneously as soon as output prices changed? Why?
 - 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)

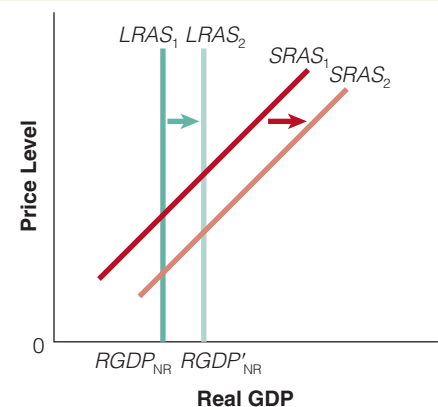
Remember that, in economics, *land* has an all-encompassing definition that includes all natural resources. An increase in natural resources, such as successful oil exploration, would presumably lower the costs of production and expand the economy's sustainable rate of output, shifting both the short-run 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?

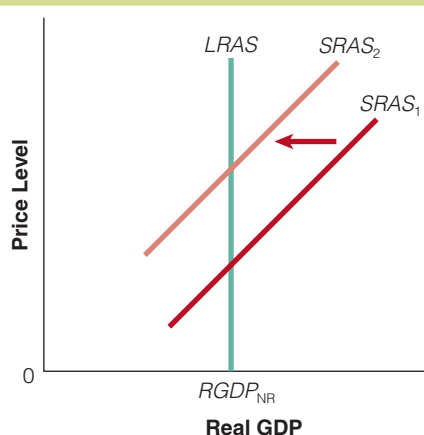
Some factors shift the short-run aggregate supply curve but do not change the long-run aggregate supply curve. The most important of these factors are wages and other input prices, changes in the expected future price level, and unexpected supply shocks. Exhibit 2 illustrates the effect of these factors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

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.

supply shocks

unexpected temporary events that can either increase or decrease aggregate supply

use
what you've learned

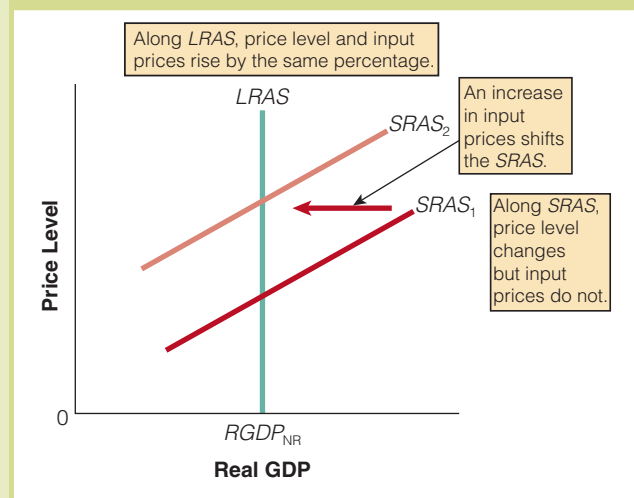
Shifts in the Short-Run Aggregate Supply Curve

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*₁ to *SRAS*₂ 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. d 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

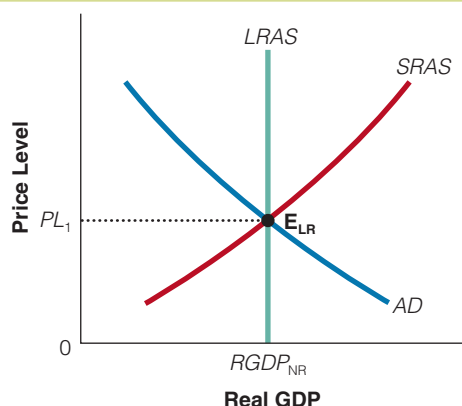
Determining Macroeconomic Equilibrium

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



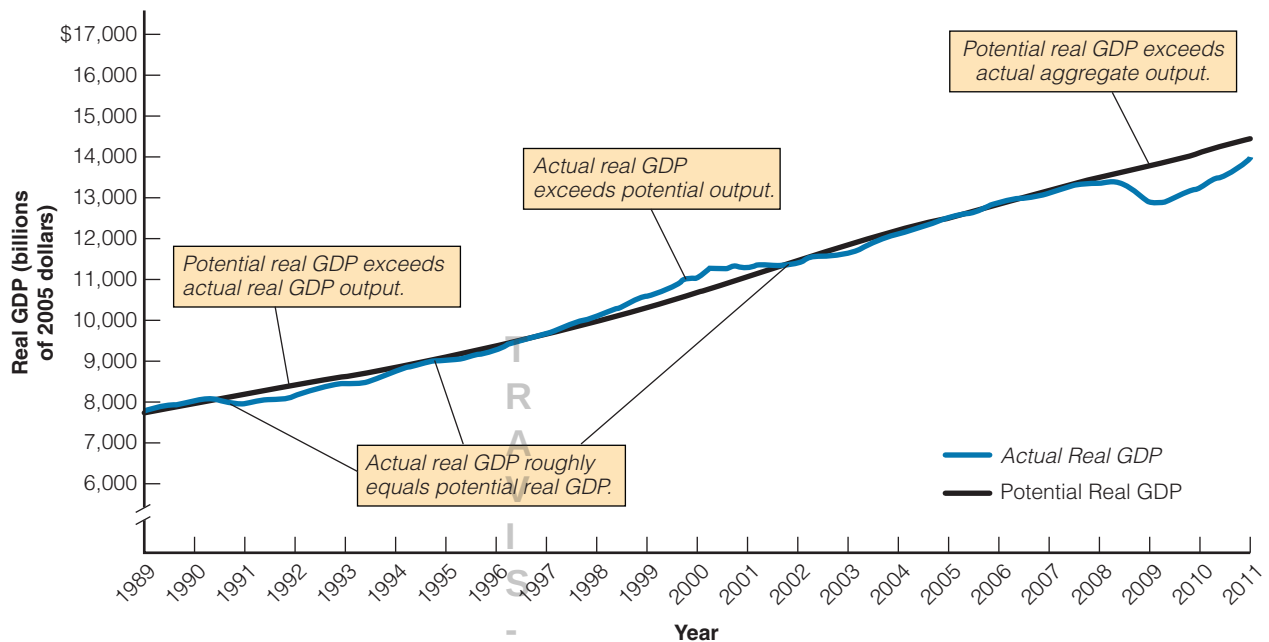
Long-run macroeconomic equilibrium occurs at the level where short-run aggregate supply and aggregate demand intersect at a point on the long-run aggregate supply curve. At this level, real GDP will equal potential GDP at full employment ($RGDP_{NR}$).

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

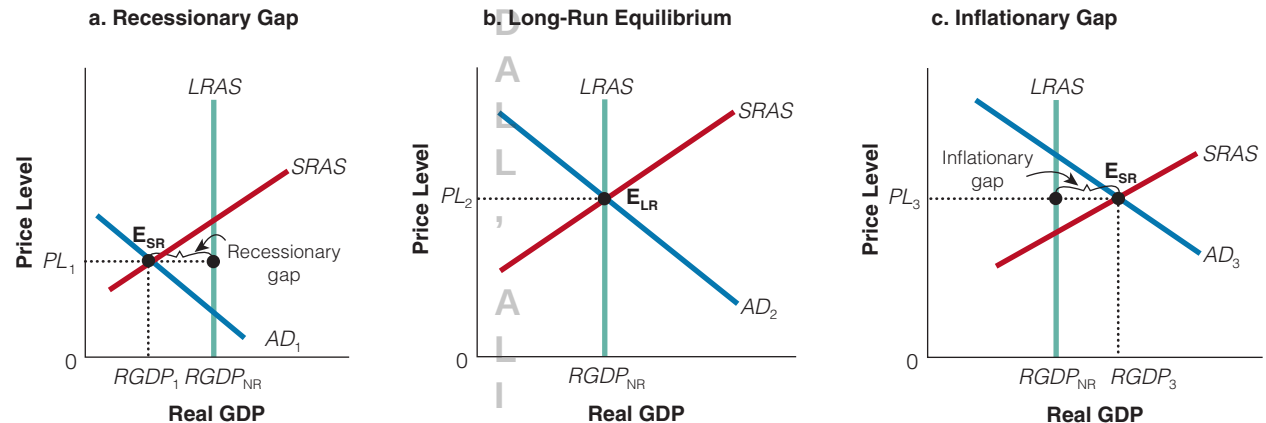
Actual and Potential Real GDP from 1989 to 2011



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section 22.6
exhibit 3

Recessionary and Inflationary Gaps



In (a), the economy is currently in short-run equilibrium at E_{SR} . At this point, $RGDP_1$ is less than $RGDP_{NR}$. That is, the economy is producing less than its potential output and is in a recessionary gap. In (c), the economy is currently in short-run equilibrium at E_{SR} . At this point, $RGDP_3$ is greater than $RGDP_{NR}$. The economy is temporarily producing more than its potential output, and we have an inflationary gap. In (b), the economy is in long-run equilibrium and is not experiencing an inflationary or a recessionary gap.

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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

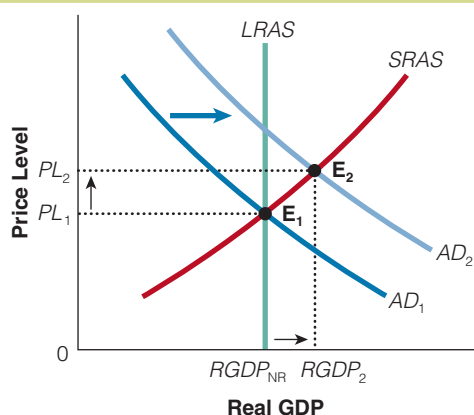
The 1970s and early 1980s witnessed a phenomenon known as **stagflation**, where lower growth and higher prices occurred together. Some economists believe that this situation was caused by a leftward shift in the short-run aggregate supply curve, as shown in Exhibit 5. If the aggregate demand curve did 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

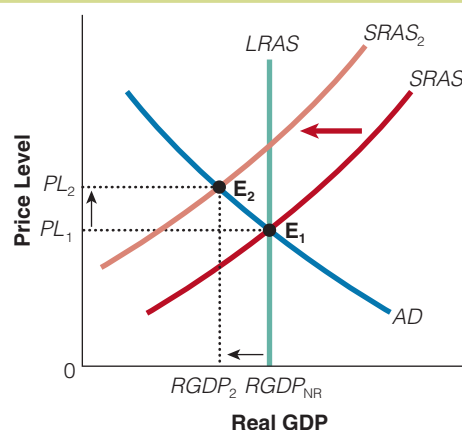
Demand-Pull Inflation



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.

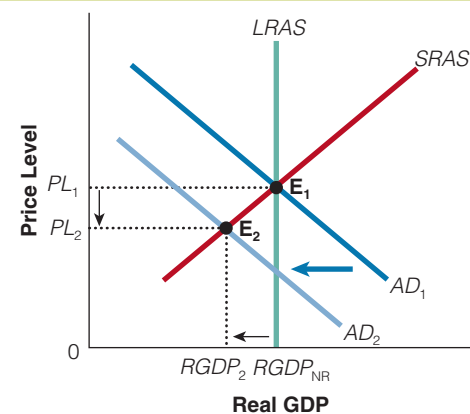
During the financial crisis of 2008, both consumers and firms reduced their spending, and this caused the aggregate demand curve to shift to the left, in turn leading to a recessionary gap. In short, real estate and financial market wealth decreased, precautionary saving by consumers increased as confidence 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

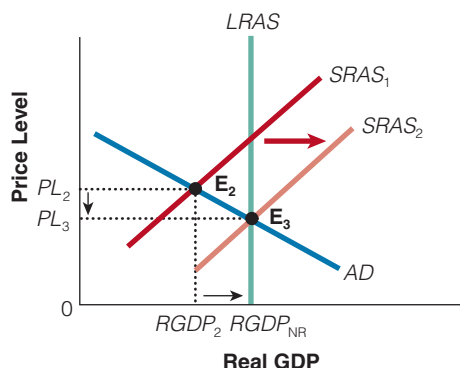
Short-Run Decrease in Aggregate Demand



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 .

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.

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



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



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

(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.

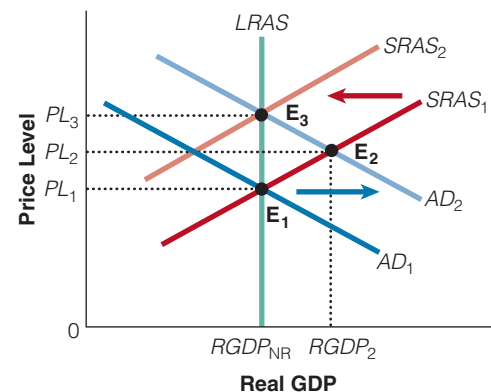
Suppose aggregate demand unexpectedly decreases. This change could lower the price level. Some firms may adjust to the change quickly. Others, however, may move more slowly because of menu costs, causing their prices to become too high (above equilibrium). Ultimately, the sales and outputs will fall, 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 .

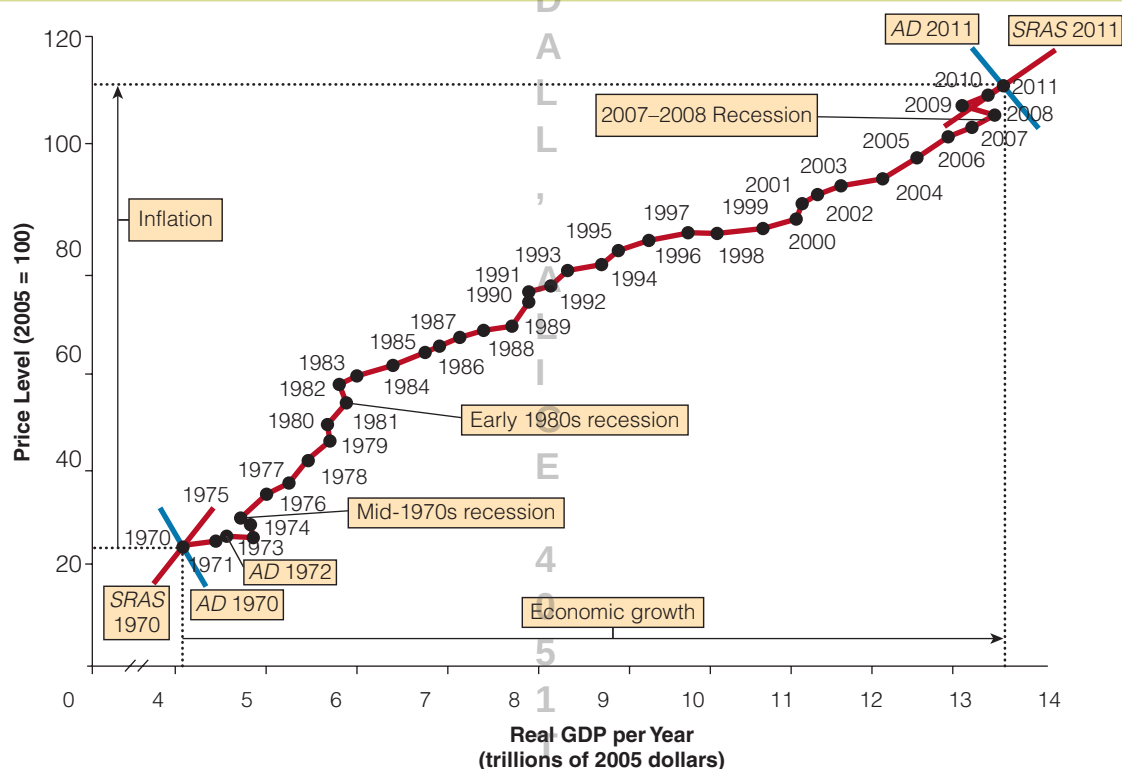
be constant. Therefore, workers' and input suppliers' purchasing power falls as output prices rise. Real (adjusted for inflation) wages have fallen. Consequently, workers and other suppliers demand higher prices if they are to be willing to supply their inputs. As input prices respond to the higher level 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

What is the classical school?

What is Say's law?

What was Keynes's criticism of the classical school?

What is the full-employment classical school model?

What is the Keynesian short-run supply curve?

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.

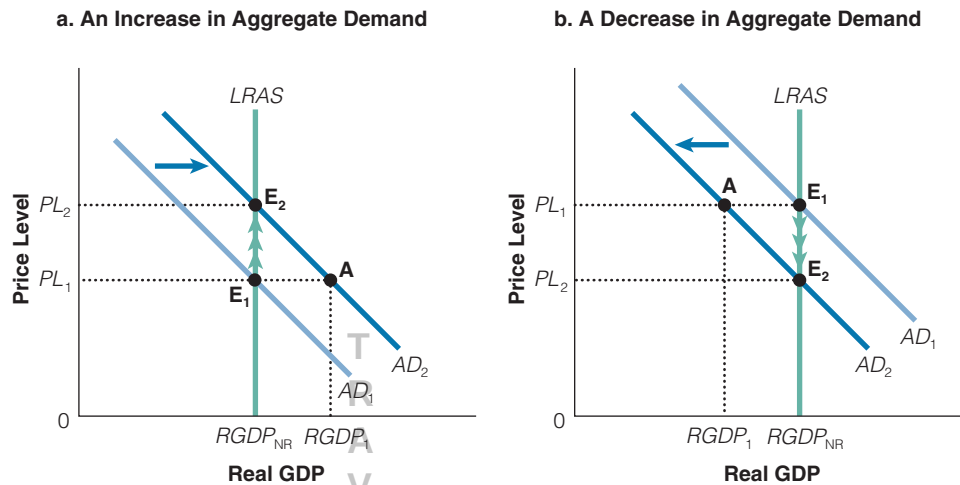
Earlier in this chapter we discussed monetary and fiscal policy, using the *AS/AD* model to examine business cycles and short-run policy prescriptions that involve government intervention to help the economy get back to its long-run growth trajectory.

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 .

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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



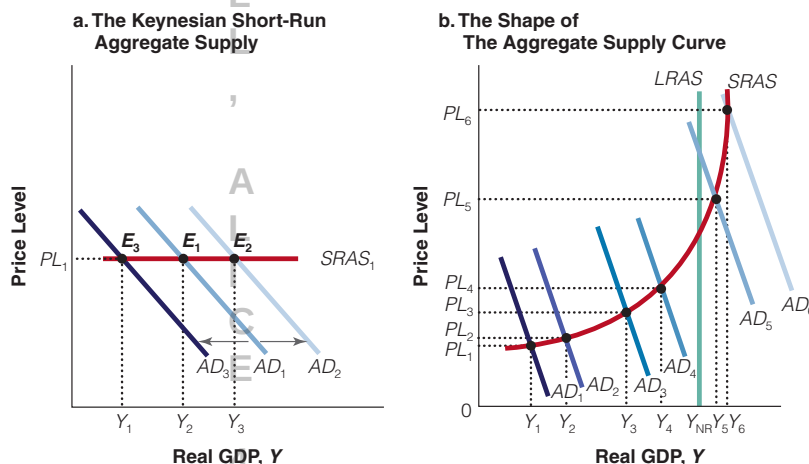
What would make the short-run aggregate supply curve flat?

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_1 to AD_2 . In the middle range, a change in aggregate demand leads to an appreciable change in both the price level and RGDP(Y)— 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, full capacity— AD_5 to AD_6 . 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 rates; open economy 8. rises; increase 9. reduced; reduced; reduced 10. rises; fewer; lower 11. increases; increases; reduces 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. output; 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. shocks 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

- Describe what the effect on aggregate demand would be, other things being equal, if
 - exports increase.
 - both imports and exports decrease.
 - consumption decreases.
 - investment increases.
 - investment decreases and government purchases increase.
 - the price level increases.
 - the price level decreases.

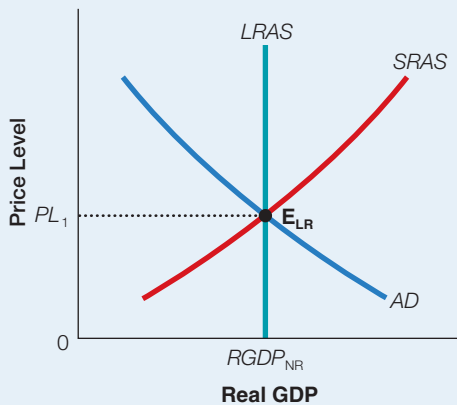
2. Fill in the blanks in the following explanations:

- 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.
- 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.
- 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?

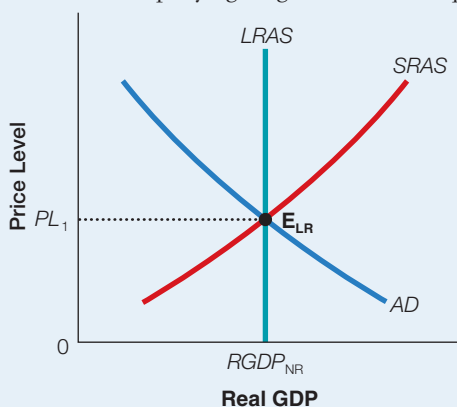
Change	Short-Run Aggregate Supply	Long-Run Aggregate Supply
An increase in aggregate demand	_____	_____
A decrease in aggregate demand	_____	_____
An increase in the stock of capital	_____	_____
A reduction in the size of the labor force	_____	_____
An increase in input prices (that does not reflect 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.

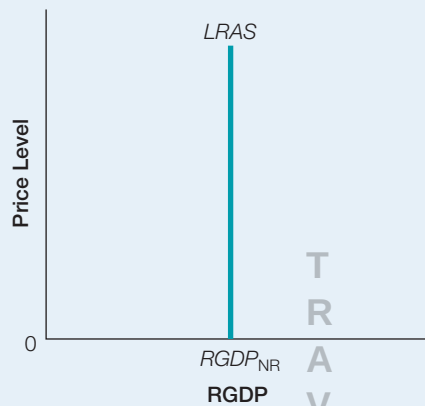


- On the exhibit provided, illustrate the short-run effects of an increase in aggregate demand. What happens to the price level, real output, employment, and unemployment?
- On the exhibit provided, illustrate the long-run effects of an increase in aggregate demand. What happens to the price level, real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

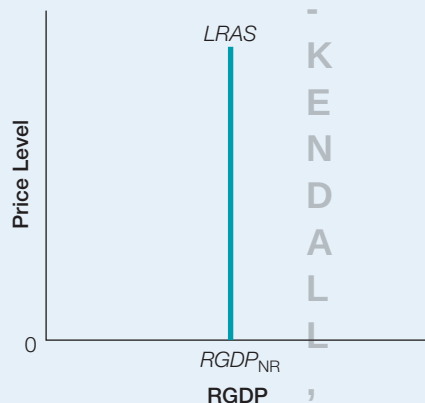
5. Use the accompanying diagram to answer questions a and b.



- 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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