

12 Gross Domestic Product and Growth



Essential Question, Chapter 12
How do we know if the economy is healthy?

- Section 1: Gross Domestic Product
- Section 2: Business Cycles
- Section 3: Economic Growth

Economics
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SECTION 1 Gross Domestic Product

OBJECTIVES

1. Explain how gross domestic product (GDP) is calculated.
2. Distinguish between nominal and real GDP.
3. List the main limitations of GDP.
4. Identify factors that influence GDP.
5. Describe other output and income measures.

ECONOMIC DICTIONARY

As you read the section, look for the definitions of these **Key Terms**:

- national income accounting
- gross domestic product
- intermediate goods
- durable goods
- nondurable goods
- nominal GDP
- real GDP
- gross national product
- depreciation
- price level
- aggregate supply
- aggregate demand



Guiding Question What does the GDP show about the nation's economy?

Copy this chart and fill it in as you read to make four statements about GDP and list four drawbacks to this economic measure.

About GDP

- Describes total output of economy
-
-
-

Drawbacks to GDP

- Both methods of calculating are inaccurate
- Normal GDP misleading
-
-

Gross Domestic Product (GDP)

► **Economics and You** How much attention do you pay to the economic news? If you're like most people your age—or most Americans in general—your answer is probably, “Not much.” After all, you'd have to be some kind of genius to keep track of the GDP, the GNP, the NNP, the NI, the DPI, and the rest of the economic alphabet soup. Who has the time? And who cares anyway?

But, whether you care or not, the GDP, the NI, and the rest do affect you. What's more, you affect them. Every time you buy a shirt or rent a movie or get a paycheck, you toss your bit into the alphabet soup.

Principles in Action Economists have developed many tools to monitor the nation's economic performance. They even have a way to measure how much money families like yours have to spend. You will learn what these measures tell us—and don't tell us—about the economy.

Gross Domestic Product

Economists use a system called **national income accounting** to monitor the U.S. economy. They collect and organize macroeconomic statistics on production, income, investment, and savings. The Department of Commerce then presents this data in the form of National Income and Product Accounts (NIPA). The government uses NIPA data to determine economic policies, as you will read about in Chapters 15 and 16.

national income accounting a system economists use to collect and organize macroeconomic statistics on production, income, investment, and savings

Visual Glossary online

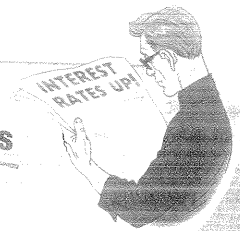
Go to the Visual Glossary Online for an interactive review of **Gross Domestic Product**.

Action Graph online

Go to Action Graph Online for animated versions of key charts and graphs.

How the Economy Works online

Go to How the Economy Works Online for an interactive lesson on what causes a **recession**.



VISUAL GLOSSARY

Reviewing Key Terms

To understand *gross domestic product*, review these terms:

goods, p. 3
services, p. 3

What is Gross Domestic Product?

◀ **gross domestic product** the dollar value of all final goods and services produced within a country's borders in a given year

Dollar Value

YES Cash value of all goods and services sold

NO Cost of producing goods and services

Final Goods & Services


YES Goods and services offered to consumers


NO Intermediate goods used to produce other goods and services


Within a Country's Borders


YES American or foreign companies producing in the United States


NO American companies producing overseas


- 

Money paid by shoppers in New York for corn grown in Iowa **YES**
- 

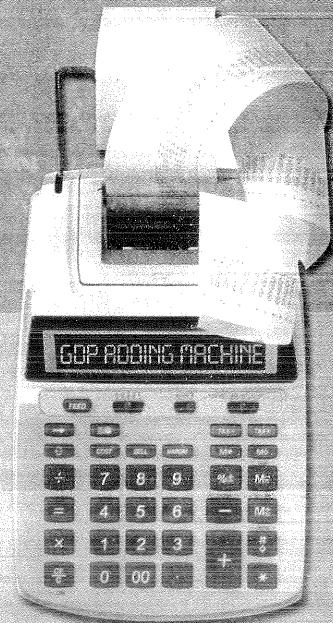
Money paid by buyers in Indiana for cars made by a Japanese company at a factory in Kentucky **YES**
- 

Fees charged to patients by a dentist in Texas **YES**
- 

Money paid by a computer factory in New Mexico for computer chips produced in California **NO**
- 

Cost of processing wood pulp into paper at a factory in Maine **NO**
- 

Money paid by shoppers in Florida for jeans manufactured in Mexico by a company headquartered in North Carolina **NO**



▲ Basically, gross domestic product tracks exchanges of money. To understand GDP, you need to understand which exchanges are included in the final calculation—and which ones are not. **Look at the six examples shown here. Compare each one to the definition of gross domestic product and explain why it is or is not included in the GDP.**

Visual Glossary online

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Defining GDP

The most important measure in NIPA is **gross domestic product (GDP)**, which is the dollar value of all final goods and services produced within a country's borders in a given year. To help you understand GDP, let us examine each part of this definition:

- **Dollar value** refers to the total cash value of the sales of all goods and services produced in a country's households, firms, and government in a calendar year. Since different quantities of goods such as oranges, computers, and movie tickets are sold at different prices, economists figure out the average prices of these items and the total number sold during the year. These cash figures are then used to calculate GDP.
- **Final goods and services** are products in the form sold to consumers. They differ from **intermediate goods**, which are products used in the production of final goods. The memory chips that a computer maker buys to put into its machines are intermediate goods; the computer is a final good.
- **Produced within a country's borders** is especially important to remember. Because we are trying to find the country's *gross domestic product*, we can look only at the goods and services produced within that country. For example, the GDP of the U.S. economy includes cars made in Ohio by a Japanese car company but not cars made in Brazil by an American automaker.
- **In a given year** takes into account when a good was produced. Suppose your neighbor sells you his used car. When the car was originally made, it was counted in the GDP of that year. Thus, it would be inaccurate to count it toward GDP again this year when it was resold.

Expenditure Approach

Government economists calculate GDP two ways. In one method, they use the expenditure approach, sometimes called the output-expenditure approach. First, economists estimate the annual expenditures, or amounts spent, on four categories of final goods and services:

1. consumer goods and services
2. business goods and services
3. government goods and services
4. net exports

Two of these categories need explanation. First, bear in mind that consumer goods include two kinds of goods. They are **durable goods**—those that last for a relatively long time, such as refrigerators and DVD players—and **nondurable goods**—those that last a short period of time, such as food, light bulbs, and sneakers.

Net exports are found by adding up exports—goods produced in the country but purchased in other countries—and then subtracting imports. Imports, of course, were produced in another country.

After finding the value of those four categories, economists add them together to arrive at the total expenditures on goods and services produced during the year. This total equals GDP. **Figure 12.1** provides a simplified example of calculating GDP with the expenditure approach.

Income Approach

The second method to calculate GDP, known as the income approach, calculates GDP by adding up all the incomes in the economy. The rationale for this approach is that when a firm sells a product or service, the selling price minus the dollar value of goods and services purchased

gross domestic product the dollar value of all final goods and services produced within a country's borders in a given year

intermediate goods products used in the production of final goods

durable goods those goods that last for a relatively long time, such as refrigerators, cars, and DVD players

nondurable goods those goods that last a short period of time, such as food, light bulbs, and sneakers

Figure 12.1 Expenditure Approach

- 1 Suppose an economy's entire output is cars and trucks.
- 2 This year the economy produces:



$$\begin{array}{r} 10 \text{ cars at } \$15,000 \text{ each} = \$150,000 \\ + 10 \text{ trucks at } \$20,000 \text{ each} = \$200,000 \\ \hline \text{Total} = \$350,000 \end{array}$$

- 3 The economy's GDP for this year is \$350,000.

CHART SKILLS

The expenditure approach is a practical way of calculating GDP.

1. What would the economy's GDP be if the entire output was 15 cars at \$15,000 each and 11 trucks at \$20,000 each?
2. Using the expenditure approach, explain how a new housing complex would add to the GDP.

Figure 12.2

Income Approach

- 1 Suppose an economy's entire output is cars and trucks.
- 2 All employed citizens, therefore, would work in the car and truck industry, or for its suppliers.
- 3 The combined selling price of all the cars and trucks reflects the money paid to all the people who helped build the vehicles.
- 4 The economy's GDP for this year, then, is the sum of the income of all its working citizens, or \$350,000.

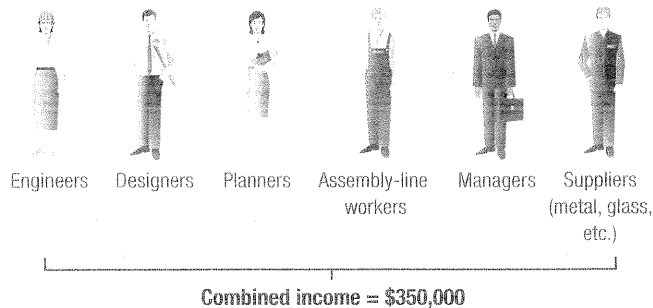


CHART SKILLS

The income approach is generally a more accurate way of calculating GDP than the expenditure approach.

1. What would the economy's GDP be if the auto company in the example also had to pay the \$15,000 in fees to an advertising agency?
2. Using the income approach, explain how a new housing complex would add to the GDP.

from other firms represents income for the firm's owners and employees.

Suppose your neighbor bought a newly built house for \$200,000. That \$200,000 (minus what the builder spent on lumber, plaster, etc.) is income shared by all of the people who helped build and sell the house—including the contractor, the bricklayer, the roofers, and the real estate broker. Each of these people may get only a small share of the house's selling price. However, if we added up all those shares, we would arrive at \$200,000 (minus what the builder spent on lumber, plaster, etc.) worth of income generated by the sale. In other words, the house's selling price is equal to the amount of income earned by all of the people who helped build and sell it.

This same logic holds for all goods and services. Thus, we may calculate GDP by adding up all income earned in the economy, as shown in Figure 12.2.

In theory, calculating GDP with the income approach and the expenditure approach should give us the same total. In

fact, there are usually differences because of errors in the underlying data. Economists who work in the federal government take those differences into account. They first determine GDP using both approaches. Then they compare the two totals and make adjustments to offset the differences. This gives them a more accurate result.

CHECKPOINT Why are imports not included in gross domestic product?

Nominal Versus Real GDP

Government officials use gross domestic product to find out how well the economy is performing. To help them understand what is really going on in the economy, economists distinguish between two measures of GDP, nominal and real.

Nominal GDP

In Figures 12.1 and 12.2, we calculated **nominal GDP**—that is, GDP measured in current prices. Because it is based on current prices, this type of GDP is also called “current GDP.” To calculate nominal GDP, we simply use the current year's prices to calculate the value of the current year's output. Figure 12.3 shows how the definition of nominal GDP applies to the small economy that produces only cars and trucks.

Real GDP

The data in Figure 12.3 reveal a problem with nominal GDP. The GDP of Year 2 is higher than that of Year 1 even though the output of cars and trucks in the two years is the same. The difference is due to an increase in prices. As a result of these price increases, the higher GDP figure in the second year is misleading. To correct for this distortion, economists determine **real GDP**, which is GDP expressed in constant, or unchanging, prices.

Look at the third section of Figure 12.3. Notice that GDP in Year 2 is based on the prices from Year 1. By using real GDP, economists can discover whether an economy is actually producing more goods and services, regardless of changes in the prices of those items. In Figure 12.3, we can quickly see that output did not increase in Year 2.

CHECKPOINT What problem is solved by using real GDP?

nominal GDP GDP measured in current prices

real GDP GDP expressed in constant, or unchanging, prices

Limitations of GDP

Even though GDP is a valuable tool, it is still not a perfect yardstick. For instance, GDP does not take into account certain economic activities or aspects of life. These include nonmarket activities, the underground economy, negative externalities, and quality of life.

Nonmarket Activities

GDP does not measure goods and services that people make or do themselves, such as caring for children, mowing the lawn, cooking dinner, or washing the car. GDP does rise, however, when people pay someone else to do these things for them. When these nonmarket activities are shifted to the market, GDP goes up, even though production has not really increased.

The Underground Economy

A large amount of production and income is never recorded or reported to the government. For instance, transactions on the black market—the market for illegal goods—are not counted. Income from illegal gambling goes unreported. So do “under the table” wages that some

companies pay workers to avoid paying business and income taxes.

Many legal, informal transactions are also not reported, for example, selling your bike to a friend or trading that bike for a stereo. If you earned money baby-sitting, mowing lawns, or shoveling snow, those payments are not included in the GDP either, even though goods and services were produced and income was earned.

Unintended economic side effects, or externalities, have a monetary value that often is not reflected in GDP. (See Chapter 3, Section 3, for a discussion of externalities.) For example, a power plant that emits smoke and dust is polluting the air. That negative result is not subtracted from GDP.

Quality of Life

Although some economists and politicians interpret rising GDP as a sign of rising well-being, we should remember that additional goods and services do not necessarily make people any happier. In fact, some things that are not counted in GDP contribute greatly to most people’s quality

Figure 12.3 Nominal and Real GDP

Year 1: Nominal GDP

- Suppose an economy’s entire output is cars and trucks.
- This year the economy produces:

10 cars at	
\$15,000 each =	\$150,000
+ 10 trucks at	
\$20,000 each =	\$200,000
Total =	\$350,000
- Since we have used the current year’s prices to express the current year’s output, the result is a nominal GDP of \$350,000.

Year 2: Nominal GDP

- In the second year, the economy’s output does not increase, but the prices of the cars and trucks do:

10 cars at	
\$16,000 each =	\$160,000
+ 10 trucks at	
\$21,000 each =	\$210,000
Total =	\$370,000
- This new GDP figure of \$370,000 is misleading. GDP rises because of an increase in prices. Economists prefer to have a measure of GDP that is not affected by changes in prices. So they calculate real GDP.

Year 2: Real GDP

- To correct for an increase in prices, economists establish a set of constant prices by choosing one year as a base year. When they calculate real GDP for other years, they use the prices from the base year. So we calculate the real GDP for Year 2 using the prices from Year 1:

10 cars at	
\$15,000 each =	\$150,000
+ 10 trucks at	
\$20,000 each =	\$200,000
Total =	\$350,000
- Real GDP for Year 2, therefore, is \$350,000.

CHART SKILLS

Real GDP reflects actual changes in output without the misleading effects of price increases.

- How much did the real GDP increase by in the second year if output stayed the same but prices increased by \$1,000 for each car and \$1,500 for each truck?
- Using the figures from Year 1 as your base, calculate the real GDP for Year 2 in which 15 cars and 14 trucks were sold.

Figure 12.4

Measurements of the Macroeconomy

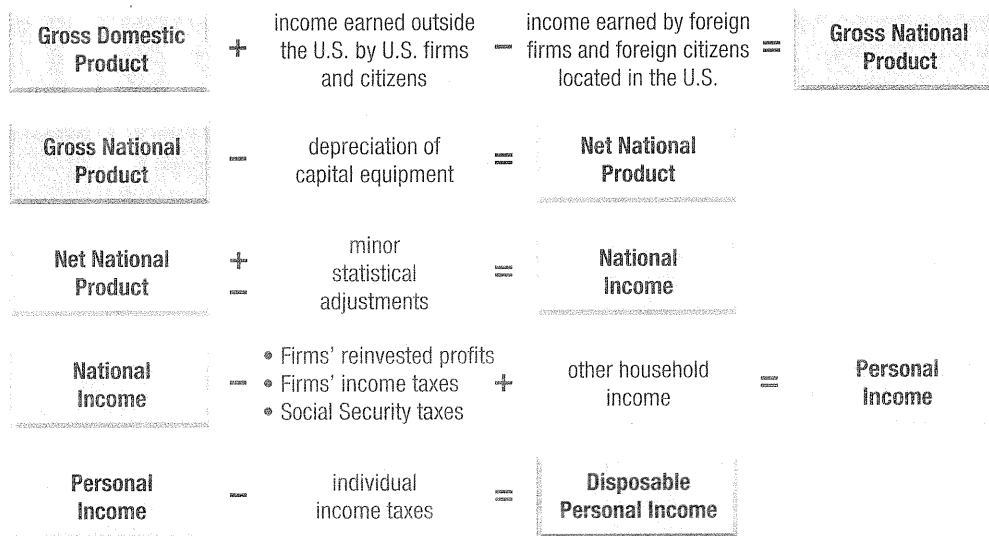
CHART SKILLS

These equations summarize the formulas for calculating some of the key macroeconomic measurements.

- Using the information on the chart, define gross national product.
- Why might economists track so many different indicators of the nation's economic health?

Action Graph online

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of life, such as pleasant surroundings, ample leisure time, and personal safety.

All of these limitations suggest that GDP is a somewhat flawed measure of output and income and a poor measure of people's well-being. Nevertheless, while the measure may be imperfect, when calculated consistently over a period of time, GDP helps reveal economic growth rates. For this reason, economists and policymakers closely watch the nation's GDP.

CHECKPOINT What are two economic activities that GDP does not include?

Other Output and Income Measures

As you have read, our system of National Income and Product Accounts provides numerous measurements of the performance of the nation's economy. While gross domestic product is the primary measure of income and output, economists also look at other measures to focus on specific parts of the economy. Many of these other yardsticks are derived from GDP. Figure 12.4 shows how GDP is used to determine five other economic measures.

The first is **gross national product (GNP)**, the annual income earned by a nation's

firms and citizens. GNP is a measure of the market value of all goods and services produced by Americans in one year. Study the chart above to see how GNP is related to GDP.

GNP does not account for **depreciation**, or the loss of the value of capital equipment that results from normal wear and tear. The cost of replacing this physical capital slightly reduces the value of what we produce. GNP minus the cost of depreciation of capital equipment is called net national product (NNP). NNP measures the net output for one year, or the output made after the adjustment for depreciation.

Once they have calculated NNP, government economists adjust their figures to account for minor discrepancies between different sources of data. After making these minor adjustments to NNP, they get another measure, called national income (NI).

From NI, we can find out how much pretax income businesses actually pay to U.S. households. This is found by subtracting profits that firms reinvest in the business and the income taxes and Social Security taxes they pay out. What remains is called personal income (PI).

Finally, we want to know how much money people actually have to spend after

gross national product the annual income earned by a nation's firms and citizens

depreciation the loss of the value of capital equipment that results from normal wear and tear

they pay *their* taxes, a figure called disposable personal income (DPI). To find DPI, we take personal income and subtract individual income and Social Security taxes.

See how far we have come. Beginning with GDP, the value of all goods and services produced in a year, we wind up knowing how much cash Americans have to spend or put in the bank.

✓ CHECKPOINT What does disposable personal income show?

Influences on GDP

So far, we have defined GDP, calculated it, and learned about its limitations. One important issue remains, however: What influences GDP? That is, in a real economy, what factors can make GDP go up or down? These questions go to the heart of macroeconomics.

Aggregate Supply

As you read earlier, market supply is the amount of a particular good or service available for purchase at all possible prices

in an individual market. But how do we look at supply and prices on a macroeconomic level? Think of aggregate supply as a supply curve for the whole economy.

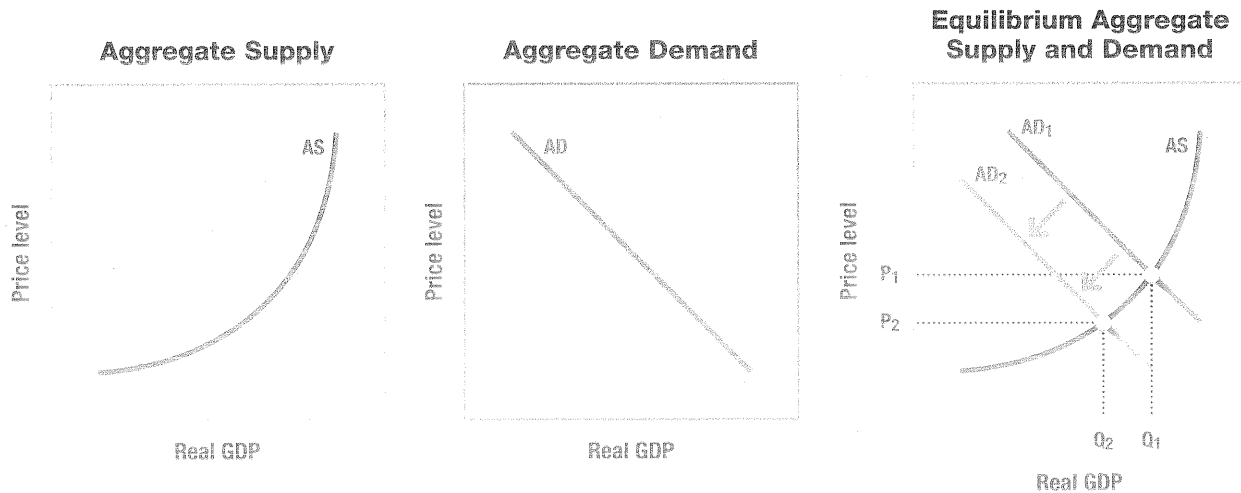
First, economists add up the total supply of goods and services produced for sale in the economy—in other words, GDP. Then they calculate the **price level**, the average of all prices in the economy. Now they can determine **aggregate supply**, the total amount of goods and services in the economy available at all possible price levels.

In a nation's economy, as the prices of most goods and services change, the price level changes. Firms respond by changing their output. For example, if the price level rises, which means that the prices of most goods and services are rising, firms have an incentive to increase their output. Similarly, as prices throughout the economy fall, companies' profits shrink. In response, they reduce output. You can see this effect in the aggregate supply (AS) curve in **Figure 12.5**. As the price level rises, real GDP, or aggregate supply, rises. As the price level falls, real GDP falls.

price level the average of all prices in the economy

aggregate supply the total amount of goods and services in the economy available at all possible price levels

Figure 12.5 Aggregate Supply and Demand



GRAPH SKILLS

Aggregate supply and demand represent supply and demand on a nationwide scale. The far right-hand chart shows what happens to GDP and price levels when aggregate demand shifts from AD_1 to AD_2 .

1. What do the positive (upward to the right) and negative (downward to the right) slopes of these curves mean?
2. If a country goes to war, causing an increase in government demand for all kinds of goods, how might real GDP and price levels be affected?

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aggregate demand the amount of goods and services in the economy that will be purchased at all possible price levels

Aggregate Demand

Aggregate demand is the amount of goods and services in the economy that will be purchased at all possible price levels. As price levels in the economy move up and down, individuals and businesses change how much they buy—in the opposite direction that aggregate supply changes.

For example, a lower price level translates into greater purchasing power for households, because the real value of money rises as price levels drop. The dollars that we hold are worth more at lower price levels than they are at higher price levels. Therefore, falling prices increase wealth and demand. This scenario is called the wealth effect.

On the other hand, as the price level rises, purchasing power declines, causing a reduction in the quantity of goods and services demanded. The aggregate demand (AD) curve shows this relationship between price and real GDP demanded. As you can see from **Figure 12.5**, this curve is negatively sloped; that is, it moves downward to the right. Consumers account for most of aggregate demand, but business spending on capital

investment, government spending, and foreigners' demand for export goods all play roles, too.

Aggregate Supply/Aggregate Demand Equilibrium

When we put together the aggregate supply (AS) and aggregate demand (AD) curves, we can find the AS/AD equilibrium in the economy as a whole. Look at **Figure 12.5**. The intersection of the AS and AD_1 curves indicates an equilibrium price level of P_1 and an equilibrium real GDP of Q_1 .

Now consider how GDP might change. Any shift in either the AS or AD curve will cause real GDP to change. For example, the graph shows aggregate demand falling from line AD_1 to line AD_2 . As a result, the equilibrium GDP (Q_2) falls, and so does the equilibrium price level (P_2).

Any shift in aggregate supply or aggregate demand will have an impact on real GDP and on the price level. In the next section, we will discuss some factors that may cause such shifts.

CHECKPOINT What four types of demand are included in aggregate demand?

SECTION 1 ASSESSMENT

Guiding Question

1. Use your completed chart to answer this question: What does the GDP show about the nation's economy?
2. **Extension** Your purchasing choices help reflect economic trends. Suppose that you are among the many consumers who choose the same model of a new U.S.-made cell-phone in a given year. How does that affect the GDP?
3. (a) What is the difference between **intermediate goods** and final goods? (b) Why are intermediate goods not included in GDP?
4. How does **nominal GDP** differ from **real GDP**?
5. (a) If **aggregate demand** rises, what happens to real GDP? (b) What happens to the **price level**?

6. How does **gross domestic product** differ from **gross national product**?

Critical Thinking

7. **Describe** (a) List four factors that make up the GDP. (b) Describe how economists use this information to determine the GDP for a specific year.
8. **Analyze** (a) Why do economists calculate GDP by both the expenditure approach and the income approach? (b) Why is the expenditure approach sometimes called the "output expenditure approach"?
9. **Interpret** (a) What incentive do rising prices give to firms? (b) What might prevent firms from earning increased profits during a time of rising prices?

10. **Identify** In addition to declining business investments, what other factors lead to negative changes in aggregate demand?

Math Skills

11. Suppose that a very small economy produces only televisions and computers. Determine nominal GDP and real GDP in Year 4, using the following chart:

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Production	Year 1 (base)	Year 4
Computers	10 sold at \$2,000 each	17 sold at \$2,500 each
Televisions	15 sold at 500 each	20 sold at \$550 each

Essential Questions Journal

To continue to build a response to the Essential Question, go to your Essential Questions Journal.

SECTION 2 Business Cycles

OBJECTIVES

1. **Identify** the phases of a business cycle.
2. **Describe** four key factors that keep the business cycle going.
3. **Explain** how economists forecast fluctuations in the business cycle.
4. **Analyze** the impact of business cycles in U.S. history.

ECONOMIC DICTIONARY

As you read the section, look for the definitions of these **Key Terms**:

- business cycle
- expansion
- economic growth
- peak
- contraction
- trough
- recession
- depression
- stagflation
- leading indicators



Guiding Question
What factors affect the phases of a business cycle?

Copy this table and fill it in as you read to explain what economic factors influence the phases of a business cycle.

Business Investment	Interest Rates and Credit	Consumer Expectations	External Shocks
• Increased investment boosts aggregate demand, gross GDP	•	•	•
• Decreased investment cuts AD, causing GDP decline			

Economics and You Sometimes, you don't have to read the newspaper to tell how the economy is doing. You can see the signs all around you. They may be *Help Wanted* signs in front of local stores and factories—when the economy is doing well, businesses hire and it's easier for you to find a part-time job. Or they may be *Closed* or *Going Out of Business* signs in the windows of those same businesses. You might even get an idea by counting the number of *For Sale* or *Foreclosure* signs where you live. The ups and downs of the economy affect us all.

Principles in Action The national economy undergoes periodic cycles of good times, then bad times, and then good times again. Recognizing this pattern, economists try to predict what the economy will do in the future—what can be done to make the good times last longer and keep the bad times brief. In this section, you will learn what factors affect these ups and downs and how they have shaped the country's economy. You will also see how the actions of ordinary consumers and borrowers can affect the phases of the economy and how long these phases last.

Phases of a Business Cycle

As you read in Chapter 3, a **business cycle** is a period of macroeconomic expansion followed by a period of macroeconomic contraction. Economists also call these periods of change “economic fluctuations.”

Business cycles are not minor, day-to-day ups and downs. They are major changes in real gross domestic product above or below normal levels. The typical business cycle consists of four phases: expansion, peak, contraction, and trough.

1. **Expansion** An **expansion** is a period of economic growth as measured by a rise in real GDP. To economists, **economic growth** is a steady, long-term increase in real GDP. In the expansion phase, jobs are plentiful, the unemployment rate falls, and businesses prosper.
2. **Peak** When real GDP stops rising, the economy has reached its **peak**, the height of an economic expansion.

business cycle a period of macroeconomic expansion followed by one of macroeconomic contraction

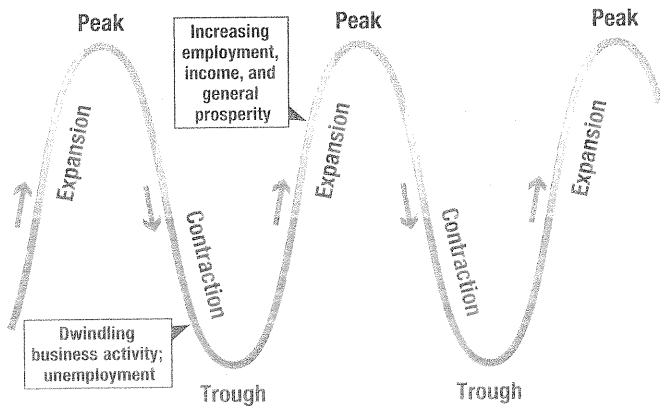
expansion a period of economic growth as measured by a rise in real GDP

economic growth a steady, long-term increase in real GDP

peak the height of an economic expansion, when real GDP stops rising

Figure 12.6

Tracking a Business Cycle



GRAPH SKILLS

A business cycle reaches a peak, then falls into a contraction. When the contraction reaches the low point, a new expansion begins.

1. What is the low point of the cycle called? What is the period of increasing business activity called?
2. In which part of a business cycle do you think the United States is right now? Give evidence to support your conclusion.

Action Graph online

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3. **Contraction** After reaching its peak, the economy enters a period of **contraction**, an economic decline marked by falling real GDP. Falling output generally causes unemployment to rise.
4. **Trough** When the economy has “bottomed out,” it has reached the **trough** (trawf), the lowest point in an economic contraction. At that point, real GDP stops falling and a new period of expansion begins.

During a contraction, GDP is always falling. But other economic conditions, such as price levels and the unemployment rate, may vary. Economists created terms to describe contractions with different characteristics and levels of severity. They include:

- **Recession** If real GDP falls for two consecutive quarters (at least six straight months), the economy is said to be in a recession. A **recession** is a prolonged economic contraction. Generally lasting from 6 to 18 months, recessions are typically marked by unemployment reaching the range of 6 percent to 10 percent.

- **Depression** If a recession is especially long and severe, it may be called a **depression**. The term has no precise definition but usually refers to a deep recession with features such as high unemployment and low economic output.
- **Stagflation** This term combines parts of *stagnant*—a word meaning unmoving or decayed—and *inflation*. **Stagflation** is a decline in real GDP (output) combined with a rise in the price level (inflation).

Although economists know much about business cycles, they cannot predict how long the phases in a particular cycle will last. The only certainty is that a growing economy will eventually experience a downturn, and that a contracting economy will eventually bounce back.

✓ **CHECKPOINT** What are the four phases of a business cycle?

What Keeps a Business Cycle Going?

The shifts that occur during a business cycle have many causes, some more predictable than others. Often, two or more factors will combine to push the economy into the next phase of a business cycle. Typically, a sharp rise or drop in some important economic variable will set off a series of events that bring about the next phase. Business cycles are affected by four main economic variables:

1. business investment
2. interest rates and credit
3. consumer expectations
4. external shocks

When the economy is expanding, businesses expect their sales and profits to keep rising. Therefore, they may invest heavily in building new plants and buying new equipment. Or they may invest in the expansion of old plants in order to increase the plants' productive capacity. All of this investment spending creates additional output and jobs, helping to increase GDP and maintain the expansion.

contraction a period of economic decline marked by falling real GDP

trough the lowest point of an economic contraction, when real GDP stops falling

recession a prolonged economic contraction

depression a recession that is especially long and severe

stagflation a decline in real GDP combined with a rise in the price level

At some point, however, firms may decide that they have expanded enough or that demand for their products is dropping. They cut back on investment spending; as a result, aggregate demand falls. The result is a decline in GDP and also in the price level. The drop in business spending reduces output and income in other sectors of the economy.

When that occurs, industries that produce capital goods slow their own production and begin to lay off workers. Other industries might follow, causing overall unemployment to rise. Jobless workers cannot buy new cars, eat at restaurants, or perhaps even pay their rent. If the downward spiral picks up speed, a recession results.

Interest Rates and Credit

In the United States economy, consumers often use credit to purchase “big ticket” items—from new cars and houses to home electronics and vacations. The cost of credit is the interest rate that financial institutions charge their customers. If the interest rate rises, consumers are less likely to buy those new cars and appliances.

Businesses, too, look to interest rates in deciding whether or not to purchase new equipment, expand their facilities, or make many other large investments. When interest rates are low, companies are more willing to borrow money. When interest rates climb, business borrowing falls. One result of rising interest rates, then, is less output. Such a result may lead to a contraction phase.

Consider one example of the impact of interest rates on the business cycle. In the early 1980s, high consumer interest rates helped bring on the worst economic

slump in the United States since the Great Depression. Some credit-card interest rates reached 21 percent. As a result, the cost of expensive items usually purchased using credit was too high for many Americans. With reduced consumer spending, the economy entered a recession that pushed unemployment rates over 9 percent—the highest since the Depression.

Consumer spending is determined partly by consumers’ expectations. If people expect the economy to begin contracting, they may reduce their spending because they expect layoffs and lower incomes.

This reduced spending can actually help bring on a contraction, as firms respond to reduced demand for their products. Thus consumer expectations often become self-fulfilling prophecies, creating the very outcome that consumers fear. In the summer of 2007, consumer confidence fell. By September, consumer confidence was the lowest it had been in two years. This low level of consumer confidence affected the holiday shopping season at the end of the year.

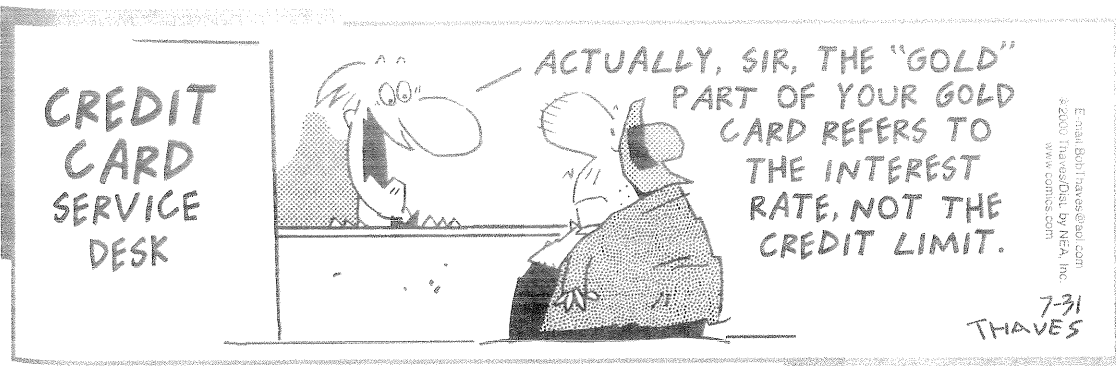
High consumer confidence has the opposite effect on the economy. If people expect a rapidly growing economy, they will also expect abundant job opportunities and rising incomes. Thus, they will buy more goods and services, pushing up gross domestic product.

Of all the factors that affect the business cycle, perhaps most difficult to predict are external shocks, which you read about in Chapter 6. External shocks can dramatically affect an economy’s

Simulation Activity

Ups and Downs

You may be asked to take part in a role-playing game about the ups and downs of the business cycle.



◀ High interest rates are one of the pitfalls of easy access to credit. **How do high interest rates affect businesses as well as individuals?**

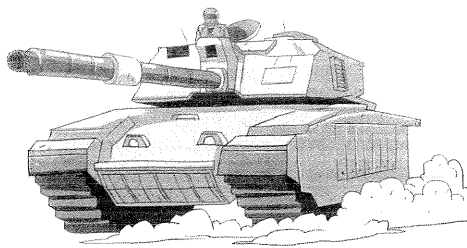
What causes a recession?

Recessions are an inevitable part of the business cycle. A number of conditions and events may trigger a recession—or deepen a recession that has already begun.

1 The economy has enjoyed an extended period of growth. Businesses are expanding, spending is up, and unemployment and inflation are largely under control.



External shock War breaks out in a nation where U.S. banks and businesses have invested heavily. This nation is also an important supplier of goods to the U.S.



Business investment The war cuts into the assets of many U.S. firms. They lay off workers and cut back on plans to expand.



aggregate supply. Examples of negative external shocks include disruptions of the oil supply, wars that interrupt trade, and droughts that severely reduce crop harvests.

Let's consider what might happen if a shock occurred. Suppose that the nation's supply of imported oil was suddenly cut off. Immediately, the price of any remaining oil would skyrocket. This rapid increase would have a powerful ripple effect on the economy. Oil is used to produce many goods, and petroleum products fuel the trucks, trains, and airplanes that transport goods from factories to stores. The oil shortage and high prices would force firms to reduce production and raise prices. In other words, GDP declines and the price level rises. This economic condition is particularly harmful to businesses and households and difficult for policy-makers to fix.

Of course, an economy may also enjoy positive external shocks. The discovery of a large deposit of oil or minerals will contribute to a nation's wealth. A growing season with a perfect mix of sun and rain may create bountiful harvests that drive food prices down. Positive shocks tend to shift the AS curve to the right, lowering the price level and increasing real GDP.

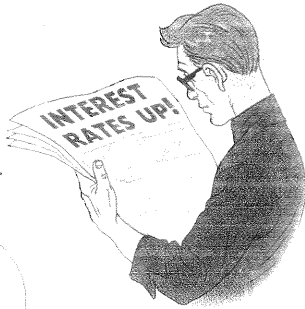
External shocks usually come without much warning. The other key factors capable of pushing an economy from one phase of the business cycle to another are more predictable. So economists track business investment, interest rates, and consumer expectations in order to more accurately forecast new stages of the business cycle.

✓ CHECKPOINT How are external shocks different from the other factors that affect the business cycle?

How the Economy Works online

For an animated, interactive version of this feature, visit PearsonSchool.com/PHecon

Interest rates and credit
As the war and threat of recession continue, banks are slower to extend credit. Interest rates creep up.



CONCERN ?



Consumer expectations
Predictions about a long recession discourage people from spending.



E As these factors feed into one another, unemployment rises and business activity dwindles. In time, though, the cycle will move into a new phase of expansion.



Check Your Understanding

1. How can interest rates help bring on a recession?
2. Look at the four headings under #2. For each one, identify a condition that might lead to an economic expansion.

Trough

Business Cycle Forecasting

Predicting changes in a business cycle is difficult. For example, in the summer of 1929, John J. Raskob, Senior financial officer of General Motors, declared his firm belief that the United States was on the verge of the greatest industrial expansion in its history.

“In my opinion the wealth of the country is bound to increase at a very rapid rate...

Anyone who believes that opportunities are now closed and that from now on the country will get worse instead of better is welcome to the opinion—and whatever increment it will bring. I think that we have scarcely started... I am firm in my belief that anyone not only can be rich but ought to be rich.”

—John Jakob Raskob, Interview in the *Ladies Home Journal*, August 1929

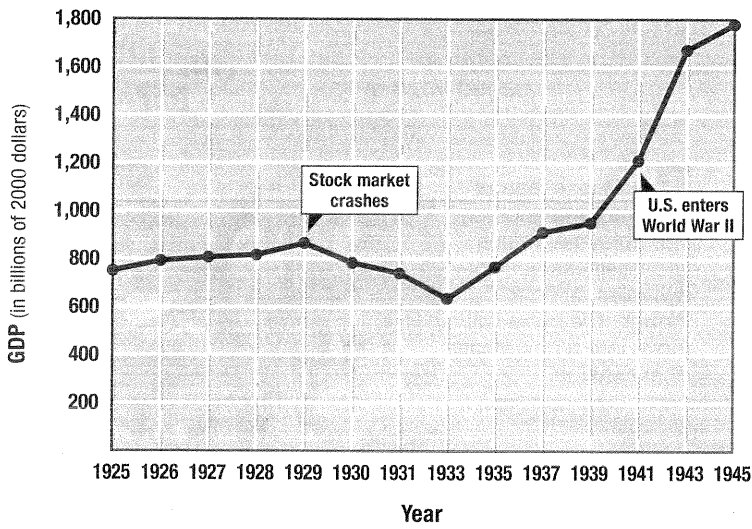
Less than two months later, the stock market crashed, setting off the worst depression in American history.

Economists today know a lot more about the workings of our economy than Raskob did in 1929. However, economic predictions are still tricky. To predict the next phase of a business cycle, forecasters must anticipate movements in real GDP before they occur. This is no easy task, given the large number of factors that influence the level of output in a modern economy.

Government and business decision makers need economic predictions to be accurate, however, so they can respond properly to changes in a business cycle. If businesses expect a contraction, they may postpone building new factories. If government policymakers expect a contraction, they may take steps to try to prevent a recession.

FREE COFFEE & DOUGHNUTS FOR THE UNEMPLOYED

United States Real GDP, 1925–1945



SOURCE: Louis D. Johnston and Samuel H. Williamson, "The Annual Real and Nominal GDP for the United States, 1790–Present." Economic History Services, October 2005, URL: <http://www.eh.net/hmit/gdp/>



▲ Declining GDP and high unemployment were two major signs of the Great Depression, the longest recession in U.S. history. *In what year did the Great Depression hit its trough? How long did it take for GDP to return to its pre-Depression peak?*

Economists have many tools available for making these predictions. The **leading indicators** are a set of key economic variables that economists use to predict future trends in a business cycle.

The stock market is one leading indicator. Typically, the stock market turns sharply downward before a recession begins. For example, the crash of the Nasdaq exchange in 2000 preceded the recession of 2001. Interest rates are another indicator. As you have seen, interest rates have a strong effect on consumer and business spending.

The Conference Board, a private business research organization, maintains an index of ten leading economic indicators, including stock prices, interest rates, and manufacturers' new orders of capital goods. Economists and policy-makers closely watch this index, which is updated monthly. However, like the other important tools used to forecast changes in the business cycle, it is not altogether reliable.

leading indicators
a set of key economic variables that economists use to predict future trends in a business cycle

CHECKPOINT Why is it difficult to predict the future of a business cycle?

Business Cycles in American History

Economic activity in the United States has indeed followed a cyclical pattern. Periods of GDP growth alternate with periods of GDP decline.

The Great Depression

As you read earlier, before the 1930s many economists believed that when an economy declined, it would quickly recover on its own. This explains why, when the U.S. stock market crashed in 1929, and the economy took a nosedive, President Herbert Hoover felt little need to change his economic policies.

However, the Great Depression did not rapidly cure itself. Rather, it was the most severe economic downturn in the history of industrial capitalism. Between 1929 and 1933, GDP fell by about a quarter, and unemployment rose sharply. In fact, one out of every four workers was jobless, and those who could find work often earned very low wages.

As the effects of the Great Depression spread throughout the world, it affected

economists' beliefs about the macro-economy. The depression, along with the publication of John Maynard Keynes's *The General Theory of Employment, Interest, and Money*, pushed economists to consider the idea that modern market economies could fall into long-lasting contractions. In addition, many economists accepted Keynes's idea that government intervention might be needed to pull an economy out of a depression. You will read more about Keynes and his ideas in Chapter 15.

The depression also affected American politics. Rejecting Hoover, voters in 1932 elected the Democratic governor of New York, Franklin Delano Roosevelt, to the presidency. Roosevelt soon began a series of government programs, known as the New Deal, designed to get people back to work.

Programs such as the Works Progress Administration and the Civilian Conservation Corps got able-bodied workers back on the job and earning income, which they then spent supporting their families. In this way, spending increased throughout the economy.

Still, although the New Deal relieved some of the effects of hard times, it did not end the Great Depression. Not until the United States entered into World War II did the economy achieve full recovery. The sudden surge in government defense spending boosted real GDP well above pre-depression levels.

Some Later Recessions

Thankfully, no economic downturns since the 1930s have been nearly as severe as the Great Depression. We have had recessions, though.

In the 1970s, an international cartel, the Organization of Petroleum Exporting Countries (OPEC), placed an embargo on oil shipped to the United States and quadrupled the price of its oil. These actions caused external shocks in the American oil market. As oil prices skyrocketed, raw material costs rose, and the economy quickly contracted into a period of stagflation.

Reeling from higher-than-ever prices for gasoline and heating fuel prices, Americans began looking for ways to

conserve energy. They turned down their heat; bought smaller, more fuel-efficient cars; and began researching energy alternatives to petroleum. When the United States and other nations developed more of their own energy resources, OPEC finally lowered its oil prices.

As you read earlier, there was another recession in the early 1980s. High interest rates and other factors caused real GDP to fall and the unemployment rate to rise to over 9 percent in the early 1980s.

Following a brief recession in 1991, the U.S. economy grew steadily, with real GDP rising each year during the 1990s.

FUTURE WATCH

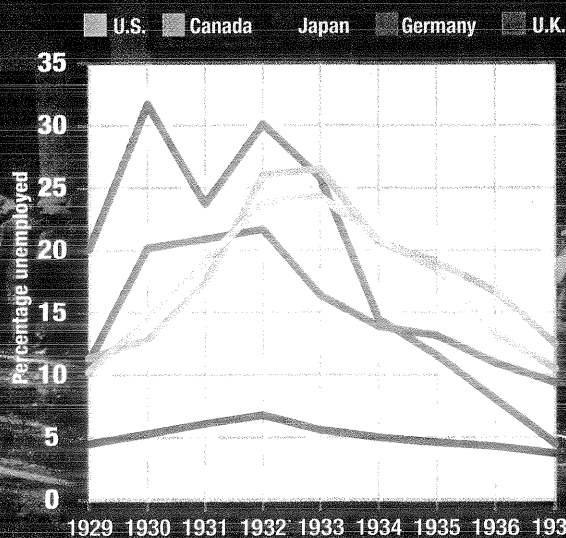


Global Impact

A Global Depression

The impact of the Great Depression spread far beyond the United States. American banks stopped making loans abroad and demanded repayment of foreign loans. And when the U.S. raised taxes on imported goods, a trade war resulted that had a disastrous impact on the world economy. **How might banking problems and reduced trade lead to higher unemployment?**

Unemployment From 1929-1937



SOURCE: *Statistical Yearbook of the League of Nations, 1930-1938*

The country enjoyed record growth, low unemployment, and low inflation. Some economists began to suggest that the nature of the business cycle had changed. Perhaps we had learned how to control recessions and promote long-term growth.

Much of this growth was fueled by the rise of Internet companies, called dot.coms, after part of their Internet address. As the dot.com boom of the 1990s ended, however, the U.S. growth slowed. Businesses and individuals invested billions of dollars in new technology that proved to be unprofitable and, in some cases, worthless. The negative effects of the technology crash spread throughout the economy to other industries. In March 2001, the country slipped into a recession.

Economists hoped this decline would prove short-lived, but then the terrorist attacks of September 11, 2001, resulted in a sharp drop in consumer spending. The hotel, airline, and tourism industries were especially affected. Many companies blamed their performance problems on September 11.

The Business Cycle Today

The recession ended in November 2001 when the economy began to grow slowly. Historically low interest rates prevented the economy from slipping back into a recession. However, unemployment continued to rise steadily over the following years as companies laid off more workers and kept spending low. Growth was not strong enough to dispel the feeling of bad times even though the recession had ended.

The economy did recover, though. By late 2003, it was surging, with GDP growing at a rate of 7.5 percent over three months. After that, growth slowed, though it did continue. High gasoline prices in 2006 caused the economy's growth to slow even further. Difficulties in the home mortgage market spiraled into a financial crisis and economic recession in 2008. In the following years the economy improved slowly, though the unemployment rate remained high.

CHECKPOINT What was a lasting effect of the Great Depression?

SECTION 2 ASSESSMENT

Essential Questions Journal

To continue to build a response to the Essential Question, go to your Essential Questions Journal.

Guiding Question

1. Use your completed table to answer this question: What factors affect the phases of a business cycle?
2. **Extension** High interest rates affect individuals as well as the business cycle itself. Suppose you wanted to purchase a new cellphone but did not have the money to pay for it. If someone offered you the money at 15 percent interest over a six-month period, would you be interested? What might you do instead of borrowing the money?

Key Terms and Main Ideas

3. (a) What is a **business cycle**?
(b) In its **trough** phase, what has happened to the economy?
4. How can interest rates push a business cycle into a **contraction**?
5. What is the difference between a **recession**, **depression**, and **stagflation**?

6. Why is the stock market considered to be a **leading indicator** of economic change?

Critical Thinking

7. **Analyze** As a consumer, at which point in a business cycle would you prefer to be, the peak or the trough? Why? As a producer, at which point would you prefer to be?
8. **Research** (a) Select the recession of the 1970s, 1980s, or early 1990s. Explain what economic activity triggered it. (b) How did the economy recover? (c) Can such recessions be prevented?
9. **Identify** (a) What role did World War II play in ending the Great Depression? (b) Were the New Deal programs of Franklin Delano Roosevelt effective? Explain.

10. **Differentiate** (a) What factors other than declining business investments lead to changes in aggregate demand? (b) Is the price level a cause or an effect?

Math Skills

11. (a) Draw a line graph plotting four quarters of a year showing the real GDP. The first quarter reports 4.6 trillion, the second 4.3 trillion, the third 4.5 trillion, and the fourth 4.9 trillion. (b) On the graph, label the expansion, peak, contraction, and trough.

Visit PearsonSchool.com/PHEcon for additional math help.

SECTION 3 Economic Growth

OBJECTIVES

1. **Analyze** how economic growth is measured.
2. **Explain** what capital deepening is and how it contributes to economic growth.
3. **Analyze** how saving and investment are related to economic growth.
4. **Summarize** the impact of population growth, government, and foreign trade on economic growth.
5. **Identify** the causes and impact of technological progress.

ECONOMIC DICTIONARY

As you read the section, look for the definitions of these **Key Terms**:

- real GDP per capita
- capital deepening
- saving
- savings rate
- technological progress



Guiding Question

How does the economy grow?

Copy this table and fill it in as you read to explain how an economy grows.

Changes in Real GDP	
Causes of Growth	Causes of Decline
<ul style="list-style-type: none"> • Capital deepening (more business investment) • Higher saving rate • Population growth with capital growth • • 	<ul style="list-style-type: none"> • Less business investment • Lower saving rate • • •

Economics and You If you had lived in a typical American home 125 years ago, you would have owned a box filled with ice to preserve food, a wood-burning stove, and a horse or bicycle for transportation. For most of us today, those necessities of life have turned into a refrigerator-freezer; a furnace powered by gas, oil, or electricity; and a car. Clearly, as far as material possessions go, Americans of your generation are generally much better off today than they were 100 years ago. The biggest reason is economic growth.

Principles in Action Economic growth, allows successive generations to have more and better goods and services than their parents had. In this section, we will describe how economic growth enables an entire society to make major improvements in its quality of life. Economics & You shows how you both benefit from and contribute to economic growth.

real GDP per capita
real GDP divided by the total population of a country

Measuring Economic Growth

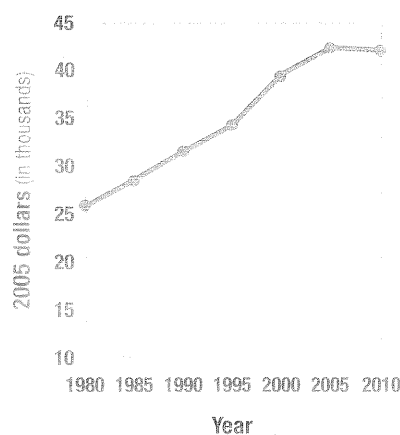
The basic measure of a nation's economic growth rate is the percentage of change in real GDP over a period of time. For example, real GDP in 1996 was \$8.3 trillion, and in 2006, it was \$11.3 trillion. The economic growth rate for this decade was about 36 percent ($\$11.3 \text{ trillion} - \$8.3 \text{ trillion} \div \$8.3 \text{ trillion} \times 100$).

GDP

To satisfy the needs of a growing population, real GDP must grow at least as fast as the population does. This is one reason that economists prefer a measure that takes population growth into account. For this, they rely on **real GDP per capita**, which is real GDP divided by the total population of a country (*per capita* means "for each person"). Figure 12.7 shows growth in real GDP per capita.

Figure 12.7

Real GDP per Capita



SOURCE: Economic Report of the President

GRAPH SKILLS

Americans have seen a fairly steady rise in their standard of living.

1. What has been the most recent trend in change in GDP?
2. Does this graph indicate that every American family improved its standard of living? Explain.

Action Graph online

For an animated version of this graph, visit PearsonSchool.com/PHecon

capital deepening the process of increasing the amount of capital per worker

Real GDP per capita is considered the most accurate measure of a nation's standard of living. As long as real GDP is rising faster than the population, real GDP per capita will rise, and so will the standard of living. Economists can see how the standard of living has changed over time by comparing real GDP per capita from two different time periods. They can also examine the growth rates of real GDP per capita to compare the economic strength of two different nations.

GDP measures standard of living, which relates to material goods. We cannot use it, however, to measure people's quality of life. As you read in Section 1, GDP excludes many factors that affect the quality of life, such as the state of the environment or the level of stress people feel in their daily lives.

In addition, while real GDP per capita represents the average output per person in an economy, it tells us nothing about how that output is distributed across the population. There are a number of ways that economists measure how income is distributed in the United States, such as "personal income distribution" and

"functional income distribution." These measures, while complicated, are important. If most of the income in a nation goes to relatively few people while the majority earn next to nothing, the typical person will not enjoy a very high standard of living even if the real GDP per capita figure is high.

Despite these facts, real GDP per capita is a good starting point for measuring a nation's quality of life. Nations with greater availability of goods and services usually enjoy better nutrition, safer and more comfortable housing, lower infant mortality, longer life spans, better education, greater job opportunities, and other indicators of a favorable quality of life.

Since economic growth has an enormous impact on quality of life, economists devote significant resources to figuring out what causes a nation's real GDP to rise. They focus on the roles of capital goods, technology, and a few related factors.

CHECKPOINT How is high GDP per capita linked to quality of life?

Capital Deepening

Physical capital, the equipment used to produce goods and services, makes an important contribution to the output of an economy. With more physical capital, each worker can be more productive, producing more output per hour of work. Economists use the term *labor productivity* to describe the amount of output produced per worker.

Even if the size of the labor force does not change, more physical capital will lead to more output—in other words, to economic growth. This process of increasing the amount of capital per worker, called **capital deepening**, is one of the most important sources of growth in modern economies. (See Figure 12.8.)

Human capital, the productive knowledge and skills acquired by a worker through education and experience, also contributes to output. Firms, and employees themselves, can deepen human capital through training programs and on-the-job experience. Better-trained and more-experienced workers can produce more output per hour of work.

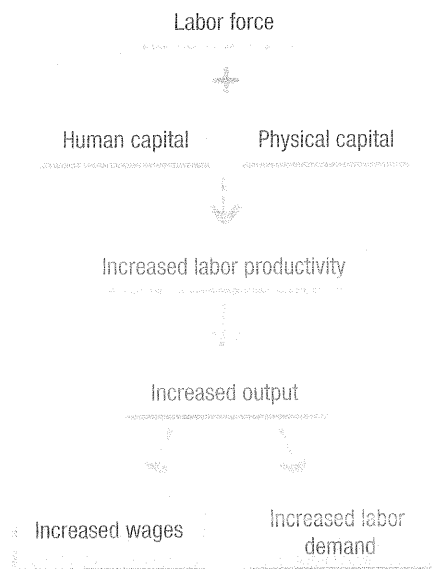
Figure 12.8

Capital Deepening

GRAPH SKILLS

There are many benefits of capital deepening, as shown here.

1. What is capital deepening?
2. Suppose you own a small clothing shop. Why should buying a new line of clothes and providing special training for sales staff result in capital deepening?



Along with increasing output per worker, capital deepening tends to increase job opportunities and workers' earnings. To understand why this happens, consider the effect of greater worker productivity on the demand for workers. As you read in Chapter 9, if workers can produce more output per hour, they become more valuable to their employers. As a result, employers will demand more workers. This increase in demand will increase the equilibrium wage rate in the labor market.

Therefore, with a labor force of a given size, capital deepening will increase output and workers' wages. How, then, does an economy increase its stock of capital per worker? It does so through saving and investment.

✓ **CHECKPOINT** Why does capital deepening work with human capital?

Saving and Investment

To see how saving and investment are related, consider an economy with no government sector and no foreign trade. In this simplified economy, consumers and business firms purchase all output. In other words, output can be used for consumption (by consumers) or investment (by firms). Income that is not used for consumption is called **saving**.

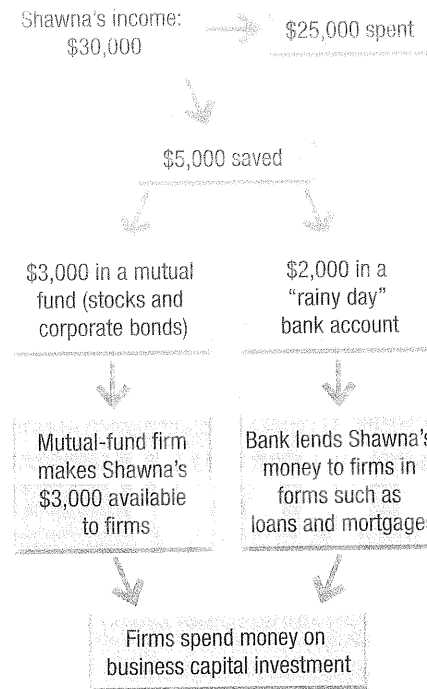
Since output can only be consumed or invested, whatever is not consumed must be invested. Therefore, in this simplified economy, saving is equal to investment. The proportion of disposable income that is saved is called the **savings rate**.

To see this another way, look at an individual's decision, as shown in Figure 12.9. Shawna had an after-tax income of \$30,000 last year, but she spent only \$25,000. That left her with \$5,000 available for saving. She used some of her leftover income to purchase shares in a mutual fund, giving her ownership of some stocks and bonds. She put the rest of the money into a savings account at her bank.

Through her mutual-fund firm, her bank, and other intermediaries, Shawna's \$5,000 was made available to businesses. The firms used the money to invest in new plants and equipment. So, when Shawna chose not to spend her entire income but

Figure 12.9

How Saving Leads to Capital Deepening



GRAPH SKILLS

Saving leads to capital deepening by providing funds for financial institutions to invest.

1. How much money has Shawna made available for investment in this example?
2. If people saved a high proportion of their incomes, how might the economy be affected?

to save a share, the amount that she saved became available for business investment.

If we consider the economy as a whole, the process works the same way. If total saving rises, more investment funds become available to businesses. Those firms will use most of these funds for capital investment. That is, they will expand the stock of capital in the business sector.

Higher saving, then, leads to higher investment, and thus to higher amounts of capital per worker. In other words, higher saving leads to capital deepening. Now we can understand why most nations promote saving. In the long run, more saving will lead to higher output and income for the population, raising GDP and the standard of living.

The United States has a low savings rate. To obtain the investment funds they need, businesses and the government borrow from other countries with higher savings rates.

✓ **CHECKPOINT** How is saving linked to capital deepening?



Personal Finance

For tips on savings and investment, see your Personal Finance Handbook in the back of the book or visit PearsonSchool.com/PHecon

saving income not used for consumption

savings rate the proportion of disposable income that is saved

Population, Government, and Foreign Trade

Now we will consider a slightly more realistic economy that has population growth, a government sector, and foreign trade. First, think about the effect of population growth on capital accumulation.

Population growth does not necessarily preclude economic growth. However, if the population grows while the supply of capital remains constant, the amount of capital per worker will shrink. This process, the opposite of capital deepening, leads to lower living standards. In fact, some relatively poor countries, such as

Bangladesh, have large labor forces but small capital stocks.

The result is that output per worker—and earnings per worker—are relatively low. Conversely, a nation with low population growth and expanding capital stock will enjoy significant capital deepening.

GOVERNMENT

Government can affect capital deepening in several ways. If government raises tax rates to pay for additional services or to finance a war, households will have less money. People will reduce saving, thus reducing the money available to businesses for investment. In these cases, the government is taxing households in order to pay for its own consumption spending. The net effect is reduced investment.

On the other hand, a different result occurs if government invests the extra tax revenues in public goods, such as roads and telecommunications. These public goods are called infrastructure, the underlying necessities of modern life. Spending on infrastructure increases investment. To see why, consider what share of income the average household saves.

Suppose that, on average, households save 10 percent of their income. In this case, for every extra dollar in tax revenue the government collects, household saving (and investment) drops by 10 cents. However, government investment in infrastructure rises by \$1. The net result is an increase in total investment of 90 cents. This kind of spending, then, is capital deepening, since the government is taxing its citizens to provide investment goods.

Foreign trade can result in a trade deficit, a situation in which the value of goods a country imports is higher than the value of goods it exports. (You will read more about trade deficits in Chapter 17.) Running a trade deficit may not seem like a wise practice, but if the imports consist of investment goods, the practice can foster capital deepening. Investment goods are the structures and equipment purchased by businesses.

Capital deepening can offset the negative effects of a trade deficit by helping generate economic growth, helping a

Economics & YOU

Economic Growth

When the economy is on the upswing, financial institutions are more likely to lend money. **A strong economy means you have greater access to loans that help pay for education.**



Many economists see teen spending as a huge source of future economic growth. **When you spend money responsibly, you help the economy expand.**

▲ Economic growth has enabled our high standard of living. **How would you be affected if the economy stopped growing?**

CAREER CENTER

CONSTRUCTION

Possible Careers

- Architect
- Civil engineer
- Cost estimator
- Landscape architect
- Naval architect
- **Construction manager**
- Engineering manager

Profile: Construction Manager

Duties:

- plan, direct, and coordinate a wide variety of construction projects, including the building of all types of structures, roads, and bridges

Education:

- Employers prefer individuals who combine construction industry work experience with a bachelor's degree in construction science, management, or civil engineering.

Skills:

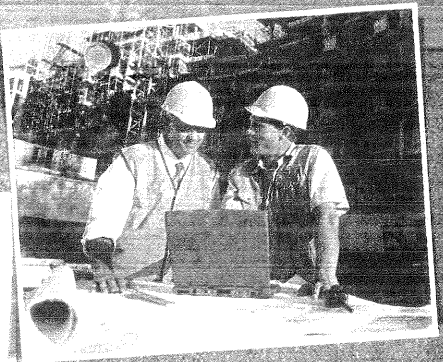
- understanding of engineering construction drawings
- ability to establish a good working relationship with many different people

Median Annual Salary:

- \$76,230 (2007)

Future prospects:

- The increasing complexity of many construction projects will require more managers to oversee them.



Career Link Activity

Choose another career in construction sciences from the list of possible careers. Create a profile for that career similar to the one for Construction Manager.

country pay back the money it borrowed in the first place. In the mid-1800s, for example, the United States financed the building of the transcontinental railroad in part by borrowing funds from investors in other countries. The borrowing created a trade deficit, but it also helped create a much higher rate of economic growth than would have occurred otherwise. The railroad promoted new industries and opened up vast areas to farming, leading to a huge increase in the nation's farm output.

Of course, not all trade deficits promote capital deepening. In this regard, trade deficits are similar to government taxation. Whether they encourage capital deepening and economic growth depends on how the funds are used. If they are used for short-term consumption, the economy will not grow any faster, and it will not have any additional GDP to pay back the debts. If the funds are used for long-term investment, however, they will foster capital deepening. The resulting economic growth will bring the country prosperity in the future.

CHECKPOINT Do higher tax rates increase or reduce investment?

Technological Progress

Another key source of economic growth is technological progress. This term usually brings to mind new inventions or new ways of performing a task, but in economics, it has a more precise definition. **Technological progress** is an increase in efficiency gained by producing more output without using more inputs.

Technological progress occurs in many ways. It can result from new scientific knowledge—for example, nano-technology, making computer chips smaller and smaller—that has practical uses. It can be a new invention that allows workers to produce goods more efficiently. It could even be a new method for organizing production. All of these advances raise a nation's productivity. Increased productivity means producing more output with the same amounts of land, labor, and capital. With technological progress, a society enjoys higher real GDP per capita, which leads to a higher standard of living.

Measuring Technological Progress

In most modern economies, the amount of physical and human capital changes

technological progress an increase in efficiency gained by producing more output without using more inputs

all the time. So does the quantity and quality of labor and the technology used to produce goods and services. These interconnected variables work together to produce economic growth. How then can we isolate and measure the effects of technological progress?

Robert Solow, a Nobel Prize-winning economist from the Massachusetts Institute of Technology, developed a method for doing so. Solow's method was to determine how much growth in output comes from increases in capital and how much comes from increases in labor. He concluded that any remaining growth in output must then come from technological progress.

Between 1929 and 1982, the average annual growth rate of real GDP was 2.92 percent. Using Solow's method, economist Edward Denison has estimated that technological progress boosted the real GDP 1.02 percent per year, on average. Denison determined that increases in capital and labor were responsible for 0.56 percent and

1.34 percent of the average annual growth, respectively ($2.92 - 0.56 - 1.34 = 1.02$). Technological progress, then, was the second most important factor in promoting economic growth in that period.

Causes of Technological Progress

Since technological progress is such an important source of economic growth, economists have looked for its causes. They have found a variety of factors that influence technological progress.

1. **Scientific research** Scientific research can generate new or improved production techniques, improve physical capital, and result in better goods and services.
2. **Innovation** When new products and ideas are successfully brought to the market, output goes up, boosting GDP and business profits. Yet innovation often requires costly research. Companies willing to carry out that research need assurance that they will profit from the products they develop.

Innovators

Jerry Yang

YAHOO!

“On the outside, Yahoo is a fun and irreverent place, but on the inside we are extremely competitive.”

It has become a familiar story. Two engineering students meet in college and turn their personal hobby into a technology-based start-up company. The company grows beyond all expectations and alters the lives of its founders, employees, users, and shareholders. And in this case the company, Yahoo! Inc., changes the face of business on a global scale.

Jerry Yang was born in Taiwan in 1968 and moved to the U.S. with his mother and brother at the age of 10. He co-founded Yahoo! with another Stanford student, David Filo, while studying for a doctoral degree at Stanford University in 1994. By 2008, Microsoft, the giant software company, had offered more than \$45 billion to take it over.

Yang and Filo created Yahoo! to organize their own internet searches. When they showed their new program to friends, Yang and Filo realized its huge business potential. Today Yahoo! is an internet giant with more than 500 million users worldwide and a well-respected brand name. It is a starting point for many consumers as they search the Web. Yahoo! offers personalized home pages, e-mail, music, news, and more. In a global economy that requires many office workers to access, organize and manage information on a daily basis, Yahoo! has proved its great value to society.

Critical Thinking: How does technological progress, such as the development of internet search engines like Yahoo!, affect the nation's GDP and overall economic growth?



Fast Facts

Jerry Yang

Born: 1968, in Taipei, Taiwan

Education: Stanford University, B.S. and M.S. in Electrical Engineering

Claim to Fame: Founder of internet search engine Yahoo.com

**7 Most Networked Economies
in 2007–2008**
(ranked by Internet use and innovation)

Ranking	Country
1	Denmark
2	Sweden
3	Switzerland
4	United States
5	Singapore
6	Finland
7	Netherlands

SOURCE: World Economic Forum, *Global Information Technology Report, 2007–2008*

Off the Beaten Superhighway

TECHNOLOGICAL PROGRESS

Some small cities, tired of waiting for faster Internet service, are beginning to build their own.

By Christopher Rhoads
The Wall Street Journal

Internet traffic is growing faster than at any time since the boom of the late-1990s. Places like Chattanooga, Tenn., are trying hard not to get stuck in the slow lane.

Some 60 towns and small cities, including Bristol, Va., Barnsville, Minn., and Sallisaw, Okla., have built state-of-the-art fiber networks, capable of speeds many times faster than most existing connections from cable and telecom companies. Many others, including Chattanooga, have launched or are considering similar initiatives.

The efforts highlight a battle over Internet policy in the U.S. Once the undisputed leader in the technological revolution, the U.S. now lags a growing number of countries in the speed, cost and availability of high-speed Internet.

While cable and telecom companies are spending billions to upgrade their service, they're focusing their efforts mostly on larger U.S. cities for now.

Smaller ones such as Chattanooga say they need to fill the vacuum themselves or risk falling further behind and losing better-paying jobs. Chattanooga's city-owned electric utility began offering ultrafast Internet service to downtown business customers five years ago. Now it plans to roll out a fiber network to deliver TV, high-speed Internet and phone service to some 170,000 residential customers. The city has no choice but to foot the bill itself for a high-speed network—expected to cost \$230 million—if it wants to remain competitive in today's global economy, says Harold DePriest, the utility's CEO.

Mr. DePriest compares his agency's plan for high-speed Internet to the rollout of electricity, which came to many parts of Tennessee only in the 1930s as a result of the federal government's Tennessee Valley Authority project. That was three decades after many businesses and homes in major urban areas were first electrified.

It's a risky bet. Some municipal Internet efforts, including wireless projects known as Wi-Fi, have failed in recent months. And some private-sector Internet providers, like phone and cable companies, are raising opposition, saying the initiatives are a poor use of taxpayer money and create unfair competition.

Mr. DePriest remains undeterred. He expects to have most of the network completed within three years, serving 80% of the city. "The issue is, does our community control our own fate," says Mr. DePriest. "Or does someone else control it?"

Applying Economic Principles

What are the potential benefits and drawbacks of a small city investing in high-speed Internet? Would such an investment promote capital deepening?

Video News Update Online
Powered by
The Wall Street Journal
Classroom Edition

Use videos at PearsonSchool.com/PHecon as a springboard for a discussion on a current topic.


The government issues patents to provide that assurance. A patent is a set of exclusive rights to produce and sell a product for a particular period of time. It is given to people who can show that they have discovered or invented a new product or process. Currently, patents last 20 years. A patent helps companies recover the cost of research by earning profits before its competitors can copy its new products.

Government aids innovation in several other ways as well. Through organizations such as the National Science Foundation and the National Institutes of Health, the United States government sponsors *basic research*. This term describes theoretical research that is often expensive and might not bring a new product to market in a timely way.

3. **Scale of the market** Larger markets provide more incentives for innovation, since the potential profits are greater. For this reason, larger economies will come up with more technological advances.
4. **Education and experience** As you read earlier, firms increase their human

capital by providing education and on-the-job experience for their employees. Human capital makes workers more productive, which accelerates economic growth. It can also stimulate growth in another way. A more educated and experienced workforce can more easily handle technological advances and may well create some new advances, too.

5. **Natural resource use** Increased use of natural resources can create a need for new technology. For example, new technology can turn previously useless raw materials into usable resources. It can also allow us to obtain and use resources more efficiently, develop substitute resources, and discover new resource reserves. Because price is based on the cost of obtaining a resource (and not necessarily on its scarcity), new technology can also lead to lower prices.

 **CHECKPOINT** How is technological progress related to the economic growth of a nation?

SECTION 3 ASSESSMENT

Essential Questions Journal

To continue to build a response to the Essential Question, go to your Essential Questions Journal.

Guiding Question

1. Use your completed table to answer this question: How does the economy grow?
2. **Extension** Suppose an uncle left you \$500 and you had three choices to use the money. You could (1) save the \$500 in a bank, (2) buy computer equipment, or (3) keep it in your closet. How would each of these actions affect the growth of the economy?

Key Terms and Main Ideas

3. (a) What is **real GDP per capita**?
(b) Why do economists measure it?
4. (a) What is **capital deepening**?
(b) How does it contribute to economic growth?
5. What role does **saving** play in the process of economic growth?
6. What is the effect of the United States having a low **savings rate**?

7. How do patents encourage **technological progress**?

Critical Thinking

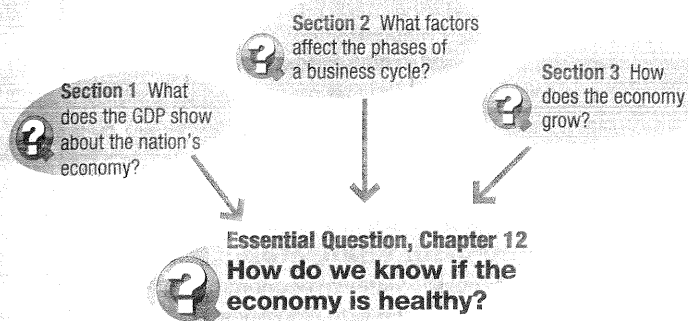
8. **Examine (a)** What is real GDP per capita unable to measure? **(b)** How does that limit economists' knowledge of individuals' standard of living? **(c)** Why do economists use it anyway?
9. **Connect (a)** What is the connection between saving and capital deepening? **(b)** Is it possible for capital deepening to occur without saving? Explain.
10. **Explain (a)** How can foreign trade lead to a trade deficit? **(b)** Explain why a trade deficit caused by foreign trade may not necessarily be bad for the economy.
11. **Describe (a)** Identify five factors that influence technological progress. **(b)** Which of these factors is the most important? Explain your answer.

Quick Write

12. In the mid-1800s, railroad companies borrowed money from foreign investors to create a transcontinental rail line. The completed railroad made enough money to pay off the loans and return a profit. Identify a possible transportation or communications project that might benefit the country or your community. Write an outline for a proposal relating to this project. Explain what benefits the project would provide and whether you favor borrowing money in order to accomplish the project.

QUICK STUDY GUIDE

Chapter 12: Gross Domestic Product and Growth



Important Measures of Economic Growth

	Definition	Does Not Include	How Compiled?
Gross Domestic Product (GDP)	Dollar value of all final goods and services produced within a country's borders in a year	Products made in another country by an American manufacturer	Expenditure Approach Income Approach Variations: Nominal GDP Real GDP
Gross National Product (GNP)	Annual income earned by U.S.-owned firms and U.S. citizens	Depreciation	GDP plus income earned outside U.S. by U.S. firms and citizens minus income earned by foreign firms and foreign citizens located in the U.S.
Net National Product (NNP)	GNP with the cost of replacing the physical capital	Taxes	GNP minus cost of depreciation
National Income (NI)	How much pretax income businesses actually pay to U.S. households		NNP minus taxes

Economic Dictionary

national income accounting, p. 307
 gross domestic product, p. 309
 intermediate goods, p. 309
 durable goods, p. 309
 nondurable goods, p. 309
 nominal GDP, p. 310
 real GDP, p. 310
 gross national product, p. 312
 depreciation, p. 312
 price level, p. 313
 aggregate supply, p. 313
 aggregate demand, p. 314
 business cycle, p. 315
 expansion, p. 315
 economic growth, p. 315
 peak, p. 315
 contraction, p. 316
 trough, p. 316
 recession, p. 316
 depression, p. 316
 stagflation, p. 316
 leading indicators, p. 320
 real GDP per capita, p. 323
 capital deepening, p. 324
 saving, p. 325
 savings rate, p. 325
 technological progress, p. 327

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How the Economy Works
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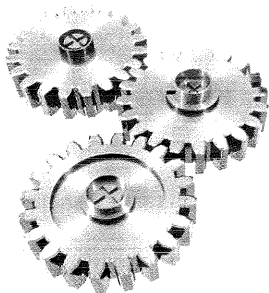
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Key Terms and Main Ideas

To make sure you understand the key terms and main ideas of this chapter, review the Checkpoint and Section Assessment questions and look at the Quick Study Guide on the preceding page.

Critical Thinking

- Connect (a)** Why is it important for economists to determine the influences on a nation's real GDP? **(b)** Identify two of the factors on which they focus. **(c)** Select one and give an example of how it affects the nation's GDP.
- Compare (a)** Compare the factors that affect the phases of a business cycle in peak periods. **(b)** Which factor is the most difficult to predict? **(c)** How do economists attempt to understand the timing of a business cycle?
- Interpret (a)** What major event allowed the U.S. to recover from the Great Depression? **(b)** With regard to this event, what sector, government or private, saw the greater spending increase? Why? **(c)** Name goods and services that would have been a part of this increased spending.
- Infer (a)** Why did a 21 percent credit card interest rate in the 1980s create a problem within the business cycle? **(b)** What happened to the unemployment rate during this period? **(c)** Why might the government not lower interest rates to spur the economy when inflation is high?



- Infer (a)** Why is real GDP per capita used to measure economic growth? **(b)** In what ways is this measure more effective than other measures?
- Graph** Review the circular flow diagram on page 40. Redraw it to add the flow of personal savings from households to financial institutions and lending by financial institutions to firms.

Applying Your Math Skills

Interpreting Data From Graphs

How do you measure a nation's economic health? Use the chart below to answer the following questions.

Visit PearsonSchool.com/PHecon for additional math help.

Economic Health of Selected Countries

Country	GDP Per Capita (2007, in thousands)	Unemployment Rate (% of labor force, 2007)
Czech Rep.	\$24.2	6.6
Germany	\$34.2	9.1
U. K.	\$35.1	5.4
U. S.	\$45.8	4.6

SOURCE: World Bank

- Which country has the lowest unemployment rate? Which country has the highest unemployment rate?
- What information would you need to know in order to find out which country had the highest total GDP?
- How does the economic health of the United States compare with that of the other countries shown? On what evidence do you base your answer?



Essential Question Activity

Essential Questions Journal

To respond to the chapter Essential Question, go to your **Essential Questions Journal**.

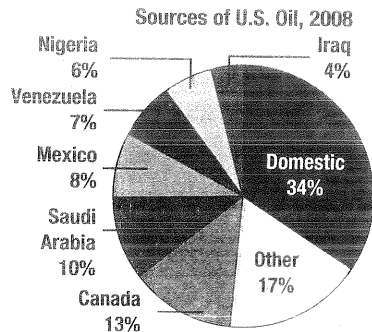
- Complete the activity to answer the Essential Question **How do we know if the economy is healthy?** Work in groups to gather information to take the current pulse of the American economy. Track your data over a three-year period. Using the worksheet in your Essential Questions Journal or the electronic worksheet available at PearsonSchool.com/PHecon, gather the following information:
 - What trend does the real Gross Domestic Product of the United States reveal?
 - Was there an business cycle contraction phase? If so, how long did it last?
 - At what point during these three years did the rate of inflation peak?
- Modify** Once you have collected your information, provide a forecast for the next three months (quarter).
 - Select one of the economic indicators used.
 - In which phase of the business cycle does the graph end? Do you anticipate a change? If so, to which phase?
 - Determine the pattern that this indicator has followed over the past three years. Indicate what you think it might do within the next quarter.

DOCUMENT-BASED ASSESSMENT

How can economic growth be balanced with environmental concerns?

The economy of the United States depends heavily on foreign oil. Some American leaders want to limit this economic dependence by allowing greater domestic oil drilling, especially in the protected Arctic National Wildlife Refuge (ANWR) in Alaska.

Document A



SOURCE: U.S. Department of Energy

Document B

"REASONS TO SUPPORT ANWR DEVELOPMENT"

- Only 8% of ANWR would be considered for exploration....

ANALYZING DOCUMENTS

Use your knowledge of economic concerns, the environmental effects of oil drilling, and Documents A, B, and C to answer questions 1–3.

1. Document A best supports the conclusion that the United States
 - A. has limited reserves of oil.
 - B. depends on foreign sources for most of its oil supply.
 - C. has sufficient oil available for its immediate needs.
 - D. should not use foreign sources of oil.
2. According to Document B, oil drilling would support economic growth by
 - A. enabling the United States to sell oil to foreign countries.
 - B. creating government and private revenue.
 - C. leading to tax cuts.
 - D. increasing U.S. oil imports.
3. What is the main point of Document C?
 - A. Drilling in ANWR would increase dependence on foreign oil.
 - B. Drilling in ANWR would be too expensive to be profitable.
 - C. The environmental costs of drilling in ANWR would outweigh the benefits.
 - D. U.S. dependence on foreign oil is not a major economic problem.

- Federal revenues would be enhanced by billions of dollars from bonus bids, lease rentals, royalties and taxes....
- Materials, services and infrastructure needed for oil production...will create hundreds of thousands of... jobs nationwide.
- Between 1977 and 2004 the Arctic oil industries spent over \$50 billion within the nation's economy....
- Today the US imports 60% of our oil from abroad. That represents over \$400 billion dollars a year being sent abroad. Oil imports are the single largest contributor to our national debt. Every barrel of ANWR oil would replace a barrel imported from abroad. With ANWR oil the jobs, the money, and the infrastructure stay at home."
—"Top ten reasons to support ANWR development," anwr.org

Document C

"What would America gain by allowing heavy industry into the refuge? Very little. Oil from the refuge would hardly make a dent in our dependence on foreign oil.... Oil produced from the Arctic Refuge would come at enormous, and irreversible, cost. The refuge is among the world's last true wildernesses, and it is one of the largest sanctuaries for Arctic animals.... Only by reducing American reliance on oil—foreign and domestic—and investing in cleaner, renewable forms of power will our country achieve true energy security.... If America made the transition to more efficient vehicles, far more oil would be saved than the Arctic Refuge is likely to produce."

—Natural Resources Defense Council, 2005

WRITING ABOUT ECONOMICS

Maintaining our energy supplies and natural resources is at the forefront of the news today. Use the documents on this page and other resources on the Web site below to answer the question: **How can economic growth be balanced with environmental concerns?**

In Partnership

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