

ECONOMIC GROWTH

STUDY GUIDE

The economic health of a nation relies on economic growth because it reduces the burden of scarcity. Small differences in real growth rates result in large differences in the standards of living in nations. The first short section of the chapter describes how economists measure economic growth, explains why economic growth is important, and presents some basic facts about the U.S. growth rates.

What is especially fascinating about this topic is that continuous and sustained increases in economic growth and the resulting significant improvements in living standards within a lifetime are a relatively new development from a historical perspective. As described in the second section of the chapter, the era of **modern economic growth** began with the invention of the steam engine in 1776 and the Industrial Revolution that followed it. Not all nations, however, experienced such modern growth at the same time or period, which explains why some nations have a higher standard of living than other nations. As you will learn, it is possible for the poorer nations to catch up with the richer nations if they can sustain a higher level of growth.

The chapter next describes the institutional structures that also promote and sustain modern economic growth in the richer, **leader countries**. These structures involve establishing strong property rights, protecting patents and copyrights, maintaining efficient financial institutions, providing widespread education, advocating free trade among nations, and using a system of markets and prices to allocate scarce resources. The poorer, **follower countries** are often missing one or more of these institutional features.

A major purpose of the chapter is to explain the factors that contribute to this economic growth. The third section presents the six main determinants of economic growth. The four **supply factors** increase the output potential of the economy. Whether the economy actually produces its full potential—that is, whether the economy has both full employment and full production—depends upon two other factors: the level of aggregate demand (the **demand factor**) and the efficiency with which the economy allocates resources (the **efficiency factor**).

The chapter then places the factors contributing to economic growth in graphical perspective with the use of the production possibilities model that was originally presented in Chapter 1. It is now used to discuss how the two major supply factors—labor input and labor productivity— shift the production possibilities curve outward.

Growth accounting is discussed in the fourth section of the chapter. Economic growth in the United States depends on the increase in the size of its labor force and on the increase in labor productivity. This latter element has been especially important in recent years and is attributed to five factors: technological advances, the expansion of the stock of capital goods, the improved education and training of its labor force, economies of scale, and the reallocation of resources.

The fifth section of the chapter evaluates the recent rise in the average rate of **productivity growth**. A major development in recent years was the almost doubling of the rate of labor productivity from 1995–2012 compared with that in the 1973–1995 period. This change heralded to some observers that the United States had achieved a recent rise in the average rate of productivity growth that is characterized by advances in technology, more entrepreneurship, increasing returns from resource inputs, and greater global competition. Whether this higher rate of growth is a long-lasting trend remains to be seen because the trend may simply be a short-run rather than a long-run change.

The sixth and last section of the chapter raises an important question: Is more **economic growth desirable and sustainable**? This controversy has two sides. The antigrowth view is based on the environmental problems it creates, its effects on human values, and doubts about whether growth can be sustained. The defense of growth is based in part on its contribution to higher standards of living, improvements in worker safety and the environment, and history of sustainability.

■ CHECKLIST

When you have studied this chapter you should be able to

- Define economic growth in two different ways.
- Explain why economic growth is an important goal.
- Use the rule of 70 to show how different growth rates affect real domestic output over time.
- Describe the growth record of the U.S. economy since 1950.
- Explain how modern economic growth changed work, living standards, and societies.
- Discuss reasons for the uneven distribution of economic growth in modern times.
- Describe the differences in economic growth for leader countries and follower countries.
- Explain how substantial differences in living standards can be caused by differences in labor supply.
- List and describe six institutional structures that promote economic growth.
- Identify four supply factors that are determinants of economic growth.
- Explain the demand factor as a determinant of economic growth.
- Describe the efficiency factor as a determinant of economic growth.
- Show graphically how economic growth shifts the production possibilities curve.
- Explain the rationale for an equation for real GDP that is based on labor inputs and labor productivity.
- Compare the relative importance of the two major means of increasing the real GDP in the United States.
- Describe the main sources of growth in the productivity of labor in the United States and state their relative importance.

- Describe the rise in the average rate of productivity growth in the United States since 1973.
 - Explain the relationship between productivity growth and the standard of living and state why it is important.
 - Discuss how the microchip and information technology contributed to the recent rise in the average rate of productivity growth.
 - Describe the sources of increasing returns and economies of scale within the recent rise in the average rate of productivity growth.
 - Explain how the rise in the average rate of productivity growth increases global competition.
 - Discuss the implications from the rise in the average rate of productivity growth for long-term economic growth.
 - Offer a skeptical perspective on the longevity of the rise in the average rate of productivity growth.
 - Present several arguments against more economic growth.
 - Make a case for more economic growth.
 - Discuss how the decline in population growth will affect economic growth in the future (*Last Word*).
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■ CHAPTER OUTLINE

1. ***Economic growth*** can be defined in two ways: as an increase in real GDP over some time period or as an increase in ***real GDP per capita*** over some time period. This second definition takes into account the size of the population. With either definition economic growth is calculated as a percentage rate of growth per year.
 - a. Economic growth is important because it lessens the burden of scarcity; it provides the means of satisfying economic wants more fully and fulfilling new wants.
 - b. One or two percentage point differences in the rate of growth result in substantial differences in annual increases in the economy's output. The approximate number of years required to double GDP can be calculated by the ***rule of 70***, which involves dividing 70 by the annual percentage rate of growth.
 - c. In the United States, the rate of growth in real GDP has been about 3.2 percent annually since 1950. The growth rate for real GDP per capita in the United States has been about 2.0 percent annually since 1950.
 1. The growth record, however, may be understated because it does not take into account improvements in product quality or increases in leisure time. The effects of growth on the environment or quality of life could be negative *or* positive.
 2. U.S. growth rates vary quarterly and annually depending on a variety of factors; sustained growth is both a historically new occurrence and also one that is not shared equally by all countries.

2. **Modern economic growth** can be described as an improvement in living standards that is continual and sustained over time. The result is a substantial improvement in the standard of living in less than a human lifetime. Such modern economic growth began in England around 1776 with the invention and use of the steam engine, the mass production of goods, and expanded trade among nations. Subsequent developments include the use of electric or other sources of power, more technological development, and new products and services. This modern economic growth contributed to the transformation of the culture, society, and politics of nations.
- a. There has been an uneven distribution of this modern economic growth among nations, and such a distribution accounts for the large differences in per capita GDP among nations. The United States and nations of western Europe experienced modern economic growth many years earlier than did other nations, and as a result have standards of living that are much higher than most other nations.
 - b. It is possible for poorer countries with a lower per capita income (**follower countries**) to catch up with richer nations that have a higher per capita income (**leader countries**). Leader countries must invent and implement new technology to grow their economies, but such a process means the growth rates in leader nations will be slow. Follower countries can have a faster growth rate because they simply adopt the existing technologies and apply them to the country, thereby skipping the lengthy process of technological development of the leader countries.
 1. Small differences in growth rates can lead to the eventual convergence and similarity in real GDP per capita of leader countries and follower countries over time (see Table 26.2).
 2. *Consider This* (Economic Growth Rates Matter). Even a one percentage point difference in economic growth rates matters based on the rule of 70. Consider the example of three hypothetical economies with three different growth rates: Sluggo (2 percent), Sumgo (3 percent), and Speedo (4 percent). The size of the economy will double in 35 years for Sluggo ($70/2$), in 23.3 years for Sumgo, and in 17.5 years for Speedo. If each economy started with \$6 trillion for real GDP, then over 70 years, real GDP would grow to \$24 trillion in Sluggo, \$47 trillion in Sumgo, and \$93 trillion in Speedo. If the population grew in each economy by 1 percent a year, then the real per capita GDP would be \$60,000 in Sluggo, \$188,000 in Sumgo, and \$233,000 in Speedo.
 3. The real GDP per capita of the United States is higher than for other leader countries (e.g., France) because of differences in labor supply: a larger fraction of the U.S. population is employed and U.S. employees work more hours per week.
 - c. Institutional structures are important for starting and sustaining modern economic growth because they increase saving and investment, develop new

technologies, and promote more efficient allocation of resources. Such institutional structures include strong support for property rights, the use of patents and copyrights, efficient financial institutions, widespread education and literacy, free trade, and a competitive market system. There are other factors that also contribute, such as a stable political system and positive social or cultural attitudes toward work and risk taking.

1. *Consider This* (Patents and Innovations). Drug companies spend billions on research and development for new drugs. Only a few drugs, however, get approved by the U.S. government and become profitable for the companies. Without patent protection (20 years from the time of the patent application), these companies have little incentive to develop new drugs because the profit from the few successful ones must cover the losses from all the many unsuccessful ones. India does not recognize U.S. patent protection for drugs and has allowed Indian drug companies to copy successful U.S. drugs. As a result, Indian drug companies have little incentive to develop their own new drugs. Recognizing the problem, India has increased its patent protection to stimulate more drug research in India.
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3. The **determinants of growth** depend on supply, demand, and efficiency factors.
 - a. The **supply factors** include the quantity and quality of resources (natural, human, and capital) and technology.
 - b. The **demand factor** influences the level of aggregate demand in the economy that is important for sustaining full employment of resources.
 - c. The **efficiency factor** affects the efficient use of resources to obtain maximum production of goods and services (productive efficiency) and to allocate them to their highest and best use by society (allocative efficiency).
 - d. A familiar **economic model** can be used for the analysis of economic growth.
 1. In the **production possibilities model**, economic growth shifts the production possibilities curve outward because of improvement in supply factors. Whether the economy operates on the frontier of the curve or inside the curve depends on the demand and efficiency factors.
 2. Discussions of growth, however, focus primarily on supply factors. From this perspective, economic growth is obtained by increasing the *labor inputs* and by increasing the labor productivity. This relationship can be expressed in equation terms: $\text{Real GDP} = \text{Worker-hours} \times \text{Labor productivity}$.
 - a. The hours of work are determined by the size of the working-age population and the **labor-force participation rate** (the percentage of the working age population in the labor force).
 - b. **Labor productivity** (real output per work hour) is determined by many factors such as technological advance, the quantity

of capital goods, the quality of labor, and the efficiency in the use of inputs.

4. Several factors are important in *growth accounting*.
 - a. The two main factors are increases in quantity of labor (hours of work) and increases in labor productivity. In recent years the most important factor has been increased labor productivity, so it is worthwhile identifying the main *five factors* to help increase labor productivity.
 - b. **Technological advance** is combining given amounts of resources in new and innovative ways that result in a larger output. It involves the use of new managerial methods and business organizations that improve production. Technological advance is also embodied in new capital investment that adds to the productive capacity of the economy. It accounted for about 40 percent of the recent increase in productivity growth.
 - c. The **quantity of capital** has expanded with the increase in saving and investment spending in capital goods. This private investment has increased the quantity of each worker's tools, equipment, and machinery. There is also public investment in *infrastructure* in the United States. The increase in the quantity of capital goods explains about 30 percent of productivity growth.
 - d. Increased investment in *human capital* (the training and education of workers) has expanded the productivity of workers, and has accounted for about 15 percent of productivity growth.
 - e. Two other factors, taken together, account for about 15 percent of productivity growth.
 1. **Economies of scale** means that there are reductions in the per-unit cost for firms as output expands. These economies occur as the market for products expands and firms have the opportunity to increase output to meet this greater demand.
 2. **Improved allocation of resources** occurs when workers are shifted from lower-productivity employment to higher-productivity employment in an economy. Included in this category would be reductions in discrimination in labor markets and reduced barriers to trade, both of which increase the efficient use of labor resources.
 - f. *Consider This* (Women, the Labor Force, and Economic Growth). A larger percentage of women are working in the labor force in the past 50 years. As women increased their education and training, they increased their productivity and earnings. The opportunity cost of staying home and not working also increased. Changes in lifestyles related to birth control and child-rearing encouraged greater participation of women in the labor force. More job opportunities led to a better allocation of women in the workforce throughout the economy. The increased number of women working, improved education and productivity, and more efficient employment contributed to U.S. economic growth over the past 50 years.

5. Increases in **productivity growth**, even small ones, can have a substantial effect on average real hourly wages and the standard of living in an economy. From 1973 to 1995, labor productivity grew by an average of 1.5 percent yearly, but from 1995 to 2012 it grew by 2.4 percent yearly. Clearly, productivity has accelerated since 1995. The recent rise in the average rate of productivity growth means there can be a faster rate of economic growth and improvement in standards of living.
 - a. The reasons for the rise in the average rate of productivity growth are based on several factors.
 1. There has been a dramatic rise in entrepreneurship and innovation based on the microchip and *information technology*.
 2. The new *start-up firms* often experience *increasing returns*, which means a firm's output increases by a larger percentage than the increase in its resource inputs. These increasing returns have been achieved by more specialized inputs, the spreading of development costs, simultaneous consumption, *network effects*, and *learning by doing*.
 3. The new technology and improvements in communication have increased global competition, thus lowering production costs, restraining price increases, and stimulating innovation to remain competitive.
 - b. The recent rise in the average rate of productivity growth means there can be a faster rate of economic growth and improvement in standards of living. This development does not mean that the business cycle is dead, but rather that the trend line for productivity growth and economic growth has become steeper.
 - c. Questions remain about whether there is a new trend of higher productivity rates or just a short upturn in the business cycle. Skeptics wonder whether the increase in productivity growth can be sustained over a longer period of time or whether the economy will return to its long-term trend in productivity.
 - d. The conclusion is that the prospects for productivity growth to continue are good because of the wider use of information technology, yet in the past few years productivity growth has slowed, which raises questions about whether the rise in the average rate of productivity growth is a long-run trend and sustainable.

6. There is an ongoing debate about whether economic growth is **desirable and sustainable**.
 - a. The antigrowth view sees several problems: Growth pollutes the environment; may produce more goods and services but does not create a better life; and may not be sustainable at the current rate of resource depletion.

- b. The defense of economic growth is based on several considerations: Growth produces a higher standard of living and reduces the burden of scarcity; the technology it creates improves people's lives and can reduce pollution; and it is sustainable because market incentives encourage the use of substitute resources.
7. *Last Word* (Can Economic Growth Survive Population Decline?). Real GDP is equal to the number of work hours multiplied by productivity. As nations experience population decline, there can be a loss in work hours that must be offset by an increase in productivity if a nation is to maintain its level of real GDP. The fertility rate must be 2.1 births per woman per lifetime to keep the population stable. A declining population will reduce the number of work hours. A smaller working population will then have to support a growing elderly (nonworking) population. There are concerns about whether productivity can increase to compensate for the loss of work hours. Some economists argue that technological innovation may lag while others are more hopeful.
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■ HINTS AND TIPS

1. Chapter 26 contains very little economics that should be new to you. Chapter 1 introduced you to the production possibilities model that is now discussed in more detail. Chapter 24 introduced you to GDP and modern economic growth.
 2. Table 26.3 is important if you want to understand the factors that influence economic growth in the United States. The figures in the table indicate the relative importance of each major factor in different periods. In recent years, almost all of U.S. economic growth arose from increases in labor productivity. Five factors affecting the growth of labor productivity include technological advance, quantity of capital, education and training, economies of scale, and resource allocation.
 3. The last two sections of the chapter focus on major economic issues about which there is some debate. You will want to evaluate the evidence for and against the idea that there is a lasting increase in productivity growth. You will want to understand the advantages and disadvantages of economic growth.
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■ IMPORTANT TERMS

economic growth

real GDP per capita

rule of 70

modern economic growth

follower countries

leader countries

supply factor

demand factor

efficiency factor

labor-force participation rate

labor productivity

growth accounting

infrastructure

human capital

economies of scale

information technology

start-up firms

increasing returns

network effects

learning by doing