CHAPTER 5

**GDP and Economic Growth**

This chapter introduces different economic measures used to assess the economy. The first measure is the ***gross domestic product*** (GDP). It is an important economic statistic because it provides the best estimate of the total market value of all final goods and services produced by our economy in one year. GDP is a monetary measure that counts only the value of final goods and services and excludes nonproductive transactions such as secondhand sales.

GDP is composed of four expenditure categories: personal consumption expenditures (***C***), gross private domestic investment (***Ig***), government purchases (***G***), and net exports (***Xn***). The chapter also describes how to calculate *real* GDP from *nominal GDP*. This adjustment is important because nominal GDP is measured in monetary units, so if accurate comparisons are to be made for GDP over time, these monetary measures must be adjusted to take account of changes in the price level.

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. It also presents data on the long-term growth record of the United States. This record has been interrupted by periods of economic instability.

The next section begins by discussing the six main ingredients of economic growth. The four ***supply factors*** increase the output potential of the economy. Whether the economy actually produces its full potential depends upon two other factors: the ***demand factor*** and the efficiency with which the economy allocates resources (the ***efficiency factor***).

The sixth section of the chapter places the factors contributing to economic growth in graphical perspective using the production possibilities model, which 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.

The ***growth record*** of the United States has been impressive both in terms of increases in real GDP and in real GDP per capita. What accounts for this long-term economic growth of the United States? First, the size of its labor force has grown. Second and more important, the ***productivity*** of the labor force in the United States has increased. The increase in the productivity of labor is the result of technological advances, the expansion of the stock of capital goods in the U.S. economy, the improved education and training of its labor force, economies of scale, the reallocation of resources, institutional structures that promote growth, and the supportive social, cultural, and political environments.

Increases in productivity have a direct effect on real output, real income, and real wages. A major development in recent years was the doubling in the rate of labor productivity from 1995–2005 compared with that in the 1973–1995 period. This ***productivity acceleration*** is characterized by advances in technology, more entrepreneurship, increasing returns from resource inputs, and greater global competition. The implication is significant: faster growth with low inflation. Whether the productivity acceleration has permanence remains to be seen because the trend may be short-run rather than long-run.

The 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 pollution 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

* + Give a definition of the gross domestic product (GDP).
	+ Explain why GDP is a monetary measure.
	+ Describe how GDP measures value added and avoids multiple counting.
	+ List the three types of expenditures included in personal consumption expenditures (*C*).
	+ Identify three items included in gross private domestic investment (*Ig*).
	+ Explain why changes in inventories are an investment.
	+ Distinguish between gross and net investment.
	+ List the two components included in government purchases (*G*).
	+ Describe the meaning and calculation of net exports (*Xn*).
	+ Compute GDP when given national income accounting data.
	+ Distinguish between nominal and real GDP.
	+ Define economic growth in two different ways.
	+ Explain why economic growth is an important goal.
	+ Use the rule of 70 to describe how different growth rates affect real domestic output over time.
* Identify four supply factors in economic growth.
* Explain the demand factor in economic growth.
* Describe the efficiency factor for growth.
* Show graphically how economic growth shifts the production possibilities curve.
* Explain the rationale for an equation for real GDP based on labor inputs and productivity.
* Compare the relative importance of the two major means of increasing the real GDP in the United States.
* State the importance of the sources of growth in the productivity of labor in the United States.
* List and describe six institutional structures that promote economic growth.
* Describe the other factors that affect an economy’s growth rate.
* Explain the relationship between productivity growth and the standard of living.
* Describe the growth of labor productivity in the United States since 1973.
* State the major features of the recent productivity acceleration.
* Discuss how the microchip and information technology have contributed to the productivity acceleration.
* Describe the sources of increasing returns and economies of scale in the productivity acceleration.
* Explain how the productivity acceleration increases global competition.
* Discuss the implications of productivity acceleration for economic growth.
* Offer a skeptical perspective on the permanence of the productivity acceleration.
* State the case for and against economic growth.
* **CHAPTER OUTLINE**
1. The market value of all final goods and services produced in the economy during the year is measured by the ***gross domestic product*** (GDP).
	1. GDP is a *monetary measure* that is calculated in dollar terms rather than in terms of physical units of output.
	2. To avoid multiple counting, GDP includes only *final* goods and services (goods and services that will not be processed further during the *current* year).
	3. Secondhand sales are excluded from GDP.
2. Computation of the GDP requires the summation of the total amounts of the four types of spending for final goods and services.
	1. ***Personal consumption expenditures*** (***C***) are the expenditures of households for *durable goods* and *nondurable goods* and for *services*.
	2. ***Gross private domestic investment*** (***Ig***) is the sum of the spending by business firms for machinery, equipment, and tools; spending by firms and households for new buildings; and the changes in the inventories of business firms.
		1. A change in inventories is included in investment because it is the part of the output of the economy that was not sold during the year.
		2. Investment does not include expenditures for stocks or bonds or for secondhand capital goods.
		3. Gross investment exceeds net investment by the value of the capital goods worn out during the year.
	3. ***Government purchases*** (***G***) are the expenditures made by all governments in the economy for products produced by business firms and for resource services from households. They include expenditures the government makes for products and services to provide public services, and spending for social capital (goods with a long lifetime such as highways).
	4. ***Net exports*** (***Xn***) in an economy equal the expenditures made by foreigners for goods and services produced in the economy less the expenditures made by the consumers, governments, and investors of the economy for goods and services produced in foreign nations.
	5. In equation form, ***C* + *Ig* + *G* + *Xn*** = ***GDP***.
3. ***Nominal GDP*** is the total output of final goods and services produced by an economy in one year multiplied by the market prices when they were produced. Prices, however, change each year. To compare total output over time, nominal GDP is converted to ***real GDP*** to account for these price changes.To find real GDP, nominal GDP is broken down into prices and quantities for each year. Real GDP is found by multiplying the physical quantities for each year’s production of final goods and services by the prices of those goods and services in the constant or base year.
	1. *Applying the Analysis* (The Underground Economy). Real GDP measures the market value of final goods and services produced by the economy in a year. Some illegal production of goods and services, however, does not show up in GDP statistics because it is not reported by households or businesses which engage in illegal activity, so GDP may be understated by about 8 percent.
4. ***Economic growth*** can be defined as an increase in real GDP over some time period. It can also be defined 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.
	1. 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.
	2. ***The rule of 70*** can be used to calculate the number of years it will take for GDP to double at any given rate of growth. One or two percentage point differences in the rate of growth result in substantial differences in annual increases in the economy’s output.
	3. The growth record of the United States over the past 50 years lagged behind other major nations, but in the past decade it has surged ahead of those nations.
5. The ***ingredients of growth*** depend on supply, demand, and efficiency factors.
	1. ***Supply factors*** include the quantity and quality of resources (natural, human, and capital) and technology.
	2. The ***demand factor*** influences the level of aggregate demand in the economy that is important for sustaining full employment of resources.
	3. 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).
6. The ***production possibilities model*** can be used for the analysis of economic growth.
	1. Economic growth shifts the production possibilities curve outward because of improvement in supply factors.
	2. Whether the economy operates on the frontier of the curve or inside the curve depends on the demand factor and efficiency factors.
	3. 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 *productivity of labor*. This relationship can be expressed in equation terms: real GDP = worker-hours X labor productivity.
7. Several factors ***account for U.S. economic growth***.
	1. The two main factors are increases in quantity of labor (hours of work) and increases in labor productivity. In recent years, most of economic growth was the result of the increased ***productivity of labor***. Five factors account for most of this growth in labor productivity.
	2. ***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% of the increase in productivity growth.
	3. The ***quantity of capital*** has expanded with the increase in saving and investment spending in capital goods. The increase in the quantity of capital goods explains about 30% of productivity growth. This investment has increased the quantity of each worker’s tools, equipment, and machinery. There is also public investment in infrastructure in the United States.
	4. Increased investment in ***human capital*** (the training and education of workers) has expanded the productivity of workers, and accounted for about 15% of productivity growth.
	5. ***Improved allocation of resources*** (workers shifting to higher-productivity employment) and ***economies of scale*** (reductions in the per-unit cost to firms achieved from larger-sized markets) have also expanded the productivity of workers. Together, these factors contribute about 15% to explaining productivity growth.
	6. ***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, free trade, and a competitive market system.
	7. Other factors that are difficult to quantify, such as the ***social-cultural-political environment*** of the United States, have contributed to economic growth. These factors have fostered growth of the market system under a stable political system and developed positive attitudes towards work, investing, and risk taking.
8. 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 1973–1995, labor productivity grew by an average of 1.4% annually, but from 1995–2007 it grew by 2.7% annually. This demonstrates a recent ***productivity acceleration***.
	1. This productivity acceleration has several characteristics.
		1. It is based on 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.
	2. One implication from the productivity acceleration and increased global competition is that the economy will be able to achieve a higher rate of economic growth.
	3. Questions remain about whether the productivity acceleration is long term or just a temporary boost in productivity. 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.
9. There is an ongoing debate about whether economic growth is desirable and sustainable.
	1. The antigrowth view sees several problems: Growth pollutes the environment; may produce more goods and services, but does not create a better life; and doubts remain about whether growth is sustainable at the current rate of resource depletion.
	2. 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.
* **HINTS AND TIPS**
1. This chapter defines two important economic measures: GDP and economic growth. Make sure you know precisely what each one means.
2. In the past decade, most of U.S. economic growth came from factors affecting increases in labor productivity. These factors include technological advance, quantity of capital, education and training, economies of scale, resource allocation, and institutional structures.
3. Several sections of the chapter focus on major economics issues about which there is some debate. You will want to evaluate the evidence for and against the idea that the recent productivity acceleration is permanent. You will also want to understand the advantages and disadvantages of economic growth.
* **IMPORTANT TERMS**

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| --- | --- |
| **national income and product accounts (NIPA)****gross domestic** **product (GDP)****intermediate goods****final goods****personal consumption expenditures (*C*)****gross private domestic investment (*Ig*)****government** **purchases (*G*)****net exports (*Xn*)****nominal GDP** | **real GDP****economic growth****real GDP per capita****labor productivity****labor-force** **participation rate****growth accounting****infrastructure****human capital****economies of scale****information** **technology****start-up firms****increasing returns****network effects****learning by doing** |

**SELF-TEST**

* **FILL-IN QUESTIONS**
1. Gross domestic product (GDP) measures the total (market, nonmarket) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ value of all (intermediate, final) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ goods and services produced in a country (in 1 year, over 2 years) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
2. GDP is a (monetary, nonmonetary) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ measure that permits comparison of the (relative, absolute) \_\_\_\_\_\_\_\_\_\_\_\_\_\_ worth of goods and services.
3. In measuring GDP, only (intermediate, final) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ goods and services are included; if \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ goods and services were included, the accountant would be (over-, under-) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_stating GDP, or (single, multiple) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ counting.
4. Personal consumption expenditures are the expenditures of households for goods such as automobiles, which are (durable, nondurable) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, and goods such as food, which are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, plus expenditures for (housing, services) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
5. Gross private domestic investment basically includes the final purchases of (capital, consumer) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ goods by businesses, all
(construction of new, sales of existing) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ buildings and houses, and changes in (services, inventories) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
6. An economy’s *net* exports equal its exports (minus, plus) \_\_\_\_\_\_\_\_\_ its imports. If exports are less than imports, net exports are (positive, negative) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, but if exports are greater than imports, net exports are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
7. A GDP that reflects the prices prevailing when the output is produced is called unadjusted, or (nominal, real) \_\_\_\_\_\_\_\_\_\_ GDP, but a GDP figure that is deflated or inflated for price level changes is called adjusted or \_\_\_\_\_\_\_\_\_\_ GDP.
8. Economic growth is best measured either by an increase in (nominal, real) \_\_\_\_\_\_\_\_\_\_ GDP over a time period or by an increase in \_\_\_\_\_\_\_\_\_\_ GDP per capita over a time period. A rise in real
 output per capita (increases, decreases) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the standard of living and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the burden of scarcity in the economy.
9. Economic growth means that real output in the economy (increases, decreases) \_\_\_\_\_\_\_\_\_\_\_\_\_ and produces a standard of living that is (higher, lower) \_\_\_\_\_\_\_\_\_\_ with (more, less) \_\_\_\_\_\_\_\_\_\_ material abundance.
10. The four supply factors in economic growth are
	1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
11. To realize its growing production potential, a nation must fully employ its expanding supplies of resources, which is the (efficiency, demand) \_\_\_\_\_\_\_\_\_\_\_\_\_ factor in economic growth, and it must also achieve productive and allocative \_\_\_\_\_\_\_\_\_\_\_\_\_\_, the other factor contributing to economic growth.
12. In the production possibilities model, economic growth increases primarily because of (demand, supply) \_\_\_\_\_\_\_\_\_\_\_\_\_ factors that shift the production possibilities curve to the (left, right) \_\_\_\_\_\_\_\_\_\_\_\_; but if there is less than full employment and production, the economy (may, may not) \_\_\_\_\_\_\_\_\_\_\_ realize its potential.
13. Real GDP of any economy in any year is equal to the quantity of labor employed (divided, multiplied) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ by the productivity of labor. The quantity of labor is measured by the number of (businesses, hours of labor) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Productivity is equal to real GDP per (capita, worker-hour) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
14. The quantity of labor employed in the economy in any year depends on the size of the (unemployed, employed) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ labor force and the length of the average workweek. The size element depends on the size of the working-age population and the labor-force (unemployment, participation) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ rate.
15. Factors contributing to labor productivity include
	1. technological \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	2. increases in the quantity of \_\_\_\_\_\_\_\_\_ and in the quantity available per \_\_\_\_\_\_\_\_\_\_\_\_\_\_
	3. the improved \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of workers
	4. economies of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, and
	5. the improved \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of resources.
	6. institutional \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
16. An increase in the quantity of the capital stock of a nation is the result of saving and (consumption, investment) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. A key determinant of labor productivity is the amount of capital goods available per (consumer, worker) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
17. Infrastructure, such as highways and bridges, is a form of (private, public) \_\_\_\_\_\_\_\_\_\_\_\_ investment that complements \_\_\_\_\_\_\_\_\_\_\_\_ capital goods.
18. The knowledge and skills that make a productive worker are a form of (physical, human) \_\_\_\_\_\_\_\_\_\_\_\_ capital. This type of capital is often obtained through (consumption, education) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
19. Reductions in per-unit costs that result from the increase in the size of markets and firms are called (improved resource allocation, economies of scale) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, but the movement of a worker from a job with lower productivity to one with higher productivity would be an example of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
20. Other factors that have led to economic growth in the United States are its social-cultural-political (parties, environment) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and (negative, positive) \_\_\_\_\_\_\_\_\_\_\_\_\_\_ attitudes toward work and risk taking that increase the supply of willing workers and innovative entrepreneurs.
21. An increase in labor productivity will (increase, decrease) \_\_\_\_\_\_\_\_\_\_\_\_\_ real output, real income, and real wages. Assuming an economy has an increase in labor productivity of 1.5%, it will take (28, 47) \_\_\_\_\_ years for its standard of living to double, but an increase in labor productivity of 2.5% annually will increase its standard of living in \_\_\_\_\_ years.
22. The characteristics of the recent productivity acceleration are (advances, declines) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in information technology, business firms that experience returns to scale that are (decreasing, increasing) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, and global competition that is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
23. An implication in the recent productivity acceleration is a growth rate that is (faster, slower) \_\_\_\_\_\_\_\_\_\_ with low inflation.
24. Skeptics of the permanency of the productivity acceleration argue that the rapid increase in the rate of productivity growth may be a (short-run, long-run) \_\_\_\_\_\_\_\_\_\_\_\_\_ trend that is not sustainable over a \_\_\_\_\_\_\_\_\_\_\_\_\_ period.
25. Critics of economic growth contend that it (cleans up, pollutes) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the environment, it (does, does not) \_\_\_\_\_\_\_\_\_\_\_\_ solve problems such as poverty and homelessness, and (is, is not) \_\_\_\_\_\_\_\_\_\_\_ sustainable. Defenders of economic growth say that it creates (less, greater) \_\_\_\_\_\_\_\_\_\_\_\_ material abundance, results in a (higher, lower) \_\_\_\_\_\_\_\_\_\_\_ standard of living,
and an efficient and sustainable allocation of resources based on price (discounts, incentives) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* **TRUE–FALSE QUESTIONS**

*Circle T if the statement is true, F if it is false.*

1. Gross domestic product measures at their market values the total output of all goods and services produced in the economy during a year. **T F**
2. GDP includes the sale of intermediate goods and excludes the sale of final goods. **T F**
3. The sale of stocks and bonds is excluded from GDP. **T F**
4. Personal consumption expenditures only include expenditures for durable and nondurable goods. **T F**
5. The expenditure made by a household to have a new home built is a personal consumption expenditure. **T F**
6. Any increase in the inventories of business firms is included in gross private domestic investment. **T F**
7. The net exports of an economy equal its exports of goods and services less its imports of goods and services. **T F**
8. A GDP that has been deflated or inflated to reflect changes in the price level is called real GDP.

 **T F**

1. Economic growth is measured as either an increase in real GDP or an increase in real per capita GDP. **T F**
2. The more useful of the two definitions of economic growth for comparing living standards across economies is an increase in real GDP per capita.

 **T F**

1. Changes in the physical and technical agents of production are supply factors for economic growth that enable an economy to expand its potential GDP. **T F**
2. The demand factor in economic growth refers to the ability of the economy to expand its production as the demand for products grows. **T F**
3. An increase in the quantity and quality of natural resources is an efficiency factor for economic growth. **T F**
4. A shift outward in the production possibilities curve is the direct result of improvements in supply factors for economic growth. **T F**
5. The real GDP of an economy in any year is equal to its input of labor divided by the productivity of labor. **T F**
6. The hours of labor input depend on the size of the employed labor force and the length of the average workweek. **T F**
7. One determinant of labor productivity is the quantity of capital goods available to workers. **T F**
8. The largest factor increasing labor productivity in the U.S. economy has been technological advance. **T F**
9. Education and training contribute to a worker’s stock of human capital. **T F**
10. Economies of scale are reductions in per-unit cost that result in a decrease in the size of markets and firms. **T F**
11. The social, cultural, and political environment in the United States has fostered economic growth.

 **T F**

1. If the rate of growth in labor productivity averages 2.5% a year, it will take about 50 years for the standard of living to double. **T F**
2. Productivity growth is the basic source of improvements in real wage rates and the standard of living. **T F**
3. Critics of economic growth say that it adds to environmental problems, increases human stress, and exhausts natural resources. **T F**
4. Defenders of economic growth say it is sustainable in the short run, but not in the long run. **T F**
* **MULTIPLE-CHOICE QUESTIONS**

*Circle the letter that corresponds to the best answer.*

1. Gross domestic product (GDP) is defined as
	1. personal consumption expenditures and gross private domestic investment
	2. the sum of wage and salary compensation of employees, corporate profits, and interest income
	3. the market value of final goods and services produced within a country in 1 year
	4. the market value of all final and intermediate goods and services produced by the economy in 1 year
2. GDP provides an indication of society’s valuation of the relative worth of goods and services because it
	1. provides an estimate of the value of secondhand sales
	2. gives increased weight to security transactions
	3. is an estimate of income received
	4. is a monetary measure
3. To include in GDP both the value of the parts used in producing a car during a year and the value of the car purchased by a consumer would be an example of
	1. a noninvestment transaction
	2. secondhand sales
	3. multiple counting
	4. depreciation
4. Which would be considered an investment according to economists?
	1. the purchase of newly issued shares of stock in Microsoft
	2. the construction of a new computer chip factory by Intel
	3. the resale of stock originally issued by the General Motors Corporation
	4. the sale of a retail department store building by Sears to Wal-Mart
5. A refrigerator was produced by its manufacturer in year 1 and sold to a retailer in year 1. The retailer then sold the refrigerator to a consumer in year 2. The refrigerator was counted as
	1. consumption in year 1
	2. savings in year 1
	3. investment in year 1
	4. secondhand sales in year 1
6. The annual charge that estimates the amount of capital equipment used up in each year’s production is called
	1. noninvestment transaction
	2. inventory reduction
	3. depreciation
	4. investment
7. GDP in an economy is $3452 billion. Consumer expenditures are $2343 billion, government purchases are $865 billion, and gross investment is $379 billion. Net exports are
	1. + $93 billion
	2. + $123 billion
	3. – $45 billion
	4. – $135 billion
8. Which is a benefit of real economic growth to a society?
	1. The society is less able to satisfy new wants.
	2. Everyone enjoys a greater nominal income.
	3. The burden of scarcity increases.
	4. The standard of living increases.
9. If the real output of an economy were to increase from $2000 billion to $2100 billion in 1 year, the rate of growth of real output during that year would be
	1. 1%
	2. 5%
	3. 10%
	4. 50%
10. What is one major measure of economic growth?
	1. the supply of money
	2. the demand for money
	3. nominal GDP per capita
	4. real GDP per capita
11. A supply factor in economic growth would be
	1. an increase in the efficient use of resources
	2. a decline in the rate of resource depletion
	3. an improvement in the quality of labor
	4. an increase in consumption spending
12. Which is a demand factor in economic growth?
	1. an increase in the purchasing power of the economy
	2. an increase in the economy’s stock of capital goods
	3. more natural resources
	4. technological progress
13. Assume that an economy has 1000 workers, each working 2000 hours per year. If the average real output per worker-hour is $9, then total output or real GDP will be
	1. $2 million
	2. $9 million
	3. $18 million
	4. $24 million
14. Total output or real GDP in any year is equal to
	1. labor inputs divided by resource outputs
	2. labor productivity multiplied by real output
	3. worker-hours multiplied by labor productivity
	4. worker-hours divided by labor productivity
15. The factor accounting for the largest increase in the productivity of labor in the United States has been
	1. economies of scale
	2. technological advance
	3. the quantity of capital
	4. the education and training of workers
16. How does a nation typically acquire more capital goods?
	1. by reducing the workweek and increasing leisure
	2. by saving income and using it for capital investment
	3. by increasing government regulation on the capital stock
	4. by reducing the amount of capital goods available per worker
17. An example of U.S. public investment in infrastructure would be
	1. an airline company
	2. a natural gas pipeline
	3. an auto and truck plant
	4. an interstate highway
18. Economists call the knowledge and skills that make a productive worker
	1. the labor-force participation rate
	2. learning by doing
	3. human capital
	4. infrastructure
19. What economic concept would be most closely associated with a situation where a large manufacturer of food products uses extensive assembly lines with computerization and robotics that serve to reduce per-unit costs of production?
	1. economies of scale
	2. sustainability of growth
	3. network effects
	4. simultaneous consumption
20. The decline of discrimination in education and labor markets increased the overall rate of labor productivity in the economy by giving groups freedom to move from jobs with lower productivity to ones with higher productivity. This development would be an example of a(n)
	1. learning by doing
	2. economies of scale
	3. technological advance
	4. improvement in resource allocation
21. If the annual growth in a nation’s productivity is 2% rather than 1%, then the nation’s standard of living will double in
	1. 25 years
	2. 35 years
	3. 50 years
	4. 70 years
22. Increasing returns would be a situation where a firm
	1. triples its workforce and other inputs and its output doubles
	2. doubles its workforce and other inputs and its output triples
	3. doubles its workforce and other inputs and its output doubles
	4. quadruples its workforce and other inputs and its output triples
23. Which would be a source of increasing returns and economies of scale within productivity acceleration?
	1. social environment
	2. noninflationary growth
	3. simultaneous consumption
	4. less specialized inputs
24. A skeptic of the permanency of productivity acceleration would argue that it
	1. is based on learning by doing instead of infrastructure
	2. raises tax revenues collected by government
	3. lowers the natural rate of unemployment
	4. is based on a short-run trend
25. Defenders of rapid economic growth say that it
	1. produces an equitable distribution of income
	2. creates common property resources
	3. leads to higher living standards
	4. spreads costs of development
* **PROBLEMS**
1. Given the hypothetical data in the table below, calculate the annual rates of growth in real GDP and real per capita GDP over the period given. The numbers for real GDP are in billions.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Year** | **Real****GDP** | **Annual****growth in %** | **Real GDP per capita** | **Annual growth in %** |
| 1 | $2,416 |  | $11,785 |  |
| 2 | 2,472 | \_\_\_\_\_ | 11,950 | \_\_\_\_\_ |
| 3 | 2,563 | \_\_\_\_\_ | 12,213 | \_\_\_\_\_ |

1. In the graph below, show an increase in economic growth using a hypothetical production possibilities curve.
2. Suppose the real GDP and the population of an economy in four different years were those shown in the following table.

|  |  |  |  |
| --- | --- | --- | --- |
| **Year** | **Population, million** | **Real GDP, billions****of dollars** | **Per capita real GDP** |
| 1 | 30 | $ 9 | $ 300 |
| 2 | 60 | 24 | \_\_\_\_\_ |
| 3 | 90 | 45 | \_\_\_\_\_ |
| 4 | 120 | 66 | \_\_\_\_\_ |

* 1. How large would the real per capita GDP of the economy be in each of years 2, 3, and 4? Put your figures in the table.
	2. What was the *amount* of growth in real GDP between year 1 and year 2? $\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	3. What was the rate of growth in real GDP between year 3 and year 4? \_\_\_\_\_%
1. The table below shows the quantity of labor (measured in hours) and the productivity of labor (measured in real GDP per hour) in a hypothetical economy in three different years.

|  |  |  |  |
| --- | --- | --- | --- |
| **Year** | **Quantity****of labor** | **Productivity****of labor** | **Real GDP** |
| 1 | 1000 | $100 | $\_\_\_\_\_ |
| 2 | 1000 | 105 | \_\_\_\_\_ |
| 3 | 1100 | 105 | \_\_\_\_\_ |

* 1. Compute the economy’s real GDP in each of the three years and enter them in the table.
	2. Between years 1 and 2, the quantity of labor remained constant, but
		1. the productivity of labor increased by \_\_\_\_\_%, and
		2. as a consequence, real GDP increased by \_\_\_\_\_%.
	3. Between years 2 and 3, the productivity of labor remained constant, but
		1. the quantity of labor increased by \_\_\_\_\_%, and
		2. as a consequence, real GDP increased by \_\_\_\_\_%.
	4. Between years 1 and 3
		1. real GDP increased by \_\_\_\_\_%, and
		2. this rate of increase is approximately equal to the sum of the rates of increase in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of labor.
1. In the table below, indicate how may years it will take to double the standard of living (Years) in an economy given different annual rates of growth in labor productivity.

|  |  |
| --- | --- |
| **Productivity** | **Years** |
| 1.0% | \_\_\_\_\_ |
| 1.4 | \_\_\_\_\_ |
| 1.8 | \_\_\_\_\_ |
| 2.2 | \_\_\_\_\_ |
| 2.6 | \_\_\_\_\_ |
| 3.0 | \_\_\_\_\_ |

What can you conclude about the importance of small changes in the growth rate of productivity on the standard of living?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* **SHORT ANSWER AND ESSAY QUESTIONS**
1. What is the definition of GDP? How are the values of output produced at a U.S.-owned factory in the United States and a foreign-owned factory in the United States treated in GDP accounting?
2. Why is GDP a monetary measure?
3. How does GDP accounting avoid multiple counting and exaggeration of the value of GDP?
4. What would be included in personal consumption expenditures by households?
5. How is gross private domestic investment defined?
6. What do government purchases include and what do they exclude?
7. How are imports and exports handled in GDP accounting?
8. What is the difference between real and nominal GDP? Use an example to determine real GDP.
9. Why should the citizens of the United States be concerned with economic growth?
10. What are the six basic ingredients of economic growth? What are the essential differences between the supply, demand, and efficiency factors?
11. How does economic growth affect production possibilities? What demand and efficiency assumptions are necessary to achieve maximum productive potential?
12. What is the relationship between the real GDP produced in any year and the quantity of labor employed and labor productivity?
13. What determines the number of hours worked each year?
14. Identify and describe the factors that determine labor productivity.
15. What have been the sources of the growth of the real output in the United States?
16. What is technological advance, and why are technological advance and capital formation closely related processes?
17. What is the relationship between investment and the stock of capital? What is the connection between increases in the capital stock and the rate of economic growth?
18. What increases the “quality” or human capital of labor? How is this quality usually measured? What are some of the problems with this path to improving the quality of the labor force?
19. Explain the relationship between productivity growth and the recent productivity acceleration.
20. Discuss how the microchip and information technology contributed to productivity acceleration.
21. Describe at least four sources of increasing returns and economies of scale within productivity acceleration.
22. Identify and explain the implication from productivity acceleration.
23. Is productivity acceleration too good to be true? Present the skeptic’s case.
24. What arguments are made against economic growth in the United States?
25. How can economic growth be defended? What are the reasons given to support this type of growth?

**ANSWERS**

**Chapter 5 GDP and Economic Growth**

**FILL-IN QUESTIONS**

1. market, final, in one year
2. monetary, relative
3. final, intermediate, over, multiple
4. durable, nondurable, services
5. capital, construction of new, inventories
6. minus, negative, positive
7. nominal, real
8. real, real, increases, decreases
9. increases, higher, more
10. *a.* quantity and quality of natural resources; *b.* quantity and quality of human resources; *c.* the supply or stock of capital goods; *d.* technology (any order for *a–d*)
11. demand, efficiency
12. supply, right, may not
13. multiplied, hours of labor, worker-hour
14. employed, participation
15. *a.* advance; *b.* capital, worker; *c.* education, training (either order); *d.* scale; *e.* allocation
16. investment, worker
17. public, private
18. human, education
19. economies of scale, improved resource allocation
20. environment, positive
21. increase, 47, 28
22. advances, increasing, increasing
23. faster
24. short-run, long-run
25. pollutes, does not, is not, greater, higher, incentives

**TRUE–FALSE QUESTIONS**

|  |  |  |
| --- | --- | --- |
| **1.** F, p. 98 | **10.** T, pp. 104–105 | **19.** T, pp. 112–114 |
| **2.** F, p. 98 | **11.** T, p. 108 | **20.** F, pp. 114–115 |
| **3.** T, p. 100 | **12.** F, pp. 108–110 | **21.** T, pp. 115–116 |
| **4.** F, p. 100 | **13.** F, pp. 109–110 | **22.** F, pp. 116–117 |
| **5.** F, p. 100 | **14.** T, pp. 109–110 | **23.** T, p. 116 |
| **6.** T, p. 100 | **15.** F, pp. 110–111 | **24.** T, pp. 120–121 |
| **7.** T, pp. 101–102 | **16.** T, pp. 110–111 | **25.** F, pp. 120–122 |
| **8.** T, pp. 103–104 | **17.** T, p. 111 |  |
| **9.** T, pp. 104–105 | **18.** T, pp. 111–112 |  |

**MULTIPLE-CHOICE QUESTIONS**

|  |  |  |
| --- | --- | --- |
| **1.** c, p. 98 | **10.** d, p. 107 | **19.** a, pp. 114–115 |
| **2.** d, p. 98 | **11.** c, p. 108 | **20.** d, pp. 114–115 |
| **3.** c, pp. 98–99 | **12.** a, pp. 108–110 | **21.** b, pp. 116–117 |
| **4.** b, p. 100 | **13.** c, pp. 110–111 | **22.** b, p. 117 |
| **5.** c, p. 100 | **14.** c, pp. 110–111 | **23.** c, pp. 117–118 |
| **6.** c, p. 101 | **15.** b, pp. 111–112 | **24.** d, pp. 119–120 |
| **7.** d, pp. 101–102 | **16.** b, pp. 112–113 | **25.** c, pp. 120–122 |
| **8.** d, pp. 104–106 | **17.** d, pp. 112–113 |  |
| **9.** b, p. 107 | **18.** c, pp. 112–114 |  |

**PROBLEMS**

1. *real GDP*: years 1–2 (2.3%); years 2–3 (3.7%); *real GDP per capita*: years 1–2 (1.4%); years 2–3 (2.2%)
2. See Figure 5.1 in the text.
3. *a.*400, 500, 550; *b.*15 billion; *c.*46.7%
4. *a.*100,000, 105,000, 115,500; *b.*(1) 5, (2) 5; *c.*(1) 10, (2) 10; *d.*(1) 15.5, (2) quantity, productivity
5. 70, 50, 39, 32, 27, 23. Small changes make a large difference in the number of years it takes for the standard of living to double in an economy, especially at very low rates of growth in productivity.

**SHORT ANSWER AND ESSAY QUESTIONS**

|  |  |  |
| --- | --- | --- |
| **1.** p. 98 | **10.** pp. 108–110 | **19.** pp. 116–117 |
| **2.** p. 98 | **11.** pp. 109–110 | **20.** p. 117 |
| **3.** pp. 98–99 | **12.** pp. 110–111 | **21.** pp. 117–118 |
| **4.** p. 100 | **13.** p. 111 | **22.** p. 119 |
| **5.** p. 100 | **14.** p. 111 | **23.** pp. 119–120 |
| **6.** p. 101 | **15.** pp. 111–112 | **24.** pp. 120–121 |
| **7.** pp. 101–102 | **16.** pp. 112–113 | **25.** pp. 120–122 |
| **8.** pp. 103–104 | **17.** pp. 112–113 |  |
| **9.** pp. 104–105 | **18.** pp. 112–114 |  |