



Chapter 21 Exercises

Self-Check Questions

1. What is the Industrial Revolution? Where did it begin?
2. Explain the difference between property rights and contractual rights. Why do they matter to economic growth?
3. Are there other ways we can measure productivity besides the amount produced per hour of work?
4. Assume that South Korea grows at 4%, and the United States grows at 1%. For the sake of simplicity, assume they both start from the same fictional income level of \$10,000. What will the incomes of the United States and South Korea be in 20 years? By how many multiples will each country's income grow in 20 years?
5. What do the growth accounting studies conclude are the determinants of growth? Which is more important, the determinants or how they are combined?
6. What policies can the government of a free-market economy implement to stimulate economic growth?
7. List the areas where government policy can help economic growth.
8. Would the following events usually lead to capital deepening? Why or why not?
 - a. A weak economy in which businesses become reluctant to make long-term investments in physical capital
 - b. A rise in international trade
 - c. A trend in which many more adults participate in continuing education courses through their employers
9. What are “the advantages of backwardness” for economic growth?
10. Would you expect capital deepening to result in diminished returns? Why or why not? Would you expect improvements in technology to result in diminished returns? Why or why not?
11. Why does productivity growth in high-income economies not slow down as it runs into diminishing returns from additional investments in physical capital and human capital? Does this show one area where the theory of diminishing returns fails to apply? Why or why not?

Review Questions

12. How did the Industrial Revolution increase the rate of economic growth and income levels in the United States?
13. How much should a nation be concerned if its rate of economic growth is just 2% slower than other nations?
14. How is GDP per capita calculated differently from worker productivity?
15. How do gains in worker productivity lead to gains in GDP per capita?
16. What is an aggregate production function?
17. What is capital deepening?
18. What do economists mean when they refer to improvements in technology?
19. For a high-income economy, what elements of the aggregate production function are most important in bringing about growth in GDP per capita? What about a middle-income country? A low-income country?
20. List some arguments for and against the likelihood of convergence.

Critical Thinking Questions

21. Over the past fifty years, many countries have experienced an annual growth rate in real GDP per capita greater than that of the U.S. Some examples are China, Japan, South Korea, and Taiwan. Does that mean the U.S. is regressing relative to other countries? Does that mean these countries will eventually overtake the U.S. in terms of the growth rate of real GDP per capita? Explain.
22. This chapter has outlined the logic of how increased productivity is associated with increased wages. Detail a situation where this is not the case, and explain why it is not.
23. Change in labor productivity is one of the most watched international statistics of growth. Visit the St. Louis Federal Reserve Bank's FRED database (hawkes.biz/fred) and find international comparisons of worker productivity (growth rate of total labor productivity). Choose two countries and examine their data. How are they similar? How are they different?
24. Education seems to be important for human capital deepening. As people become better educated and more knowledgeable, are there limits to how much additional benefit education can provide? Why or why not?
25. Describe some of the political and social tradeoffs that might occur when a less developed country adopts a strategy to promote labor force participation and economic growth via investment in girls' education.
26. Why is investing in girls' education beneficial for growth?
27. How is the concept of technology as defined with the aggregate production function different from our everyday use of the word?
28. What sorts of policies can governments implement to encourage convergence?
29. As technological change makes us more sedentary and food costs increase, obesity is likely. What factors do you think may limit obesity?

Problems

30. Suppose an economy starts off with a GDP per capita of \$5,000. How large will the GDP per capita be if it grows at an annual rate of 2% for 20 years? 2% for 40 years? 4% for 40 years? 6% for 40 years?
31. Suppose an economy starts off with a GDP per capita of 12,000 euros. How large will the GDP per capita be if it grows at an annual rate of 3% for 10 years? 3% for 30 years? 6% for 30 years?
32. Say that the average worker in Canada has a productivity level of \$30 per hour, while the average worker in the United Kingdom has a productivity level of \$25 per hour (both measured in U.S. dollars). Over the next five years, say that worker productivity in Canada grows at 1% per year, while worker productivity in the UK grows at 3% per year. At that point, who will have the higher productivity level, and by how much?
33. Say that the average worker in the New Zealand economy is eight times as productive as an average worker in Mexico. If the productivity of New Zealand's workers grows at 2% for 25 years and the productivity of Mexico's workers grows at 6% for 25 years, which country will have higher worker productivity at that point?