Chapter 2: The U.S. Economy: A Global View
Solutions Manual

Learning Objectives for Chapter 2

After reading this chapter, you should know
LO 02-01. The relative size of the U.S. economy.
LO 02-02. How the U.S. output mix has changed over time.
LO 02-03. How the U.S. is able to produce so much output.
LO 02-04. How incomes are distributed in the United States and elsewhere.

Questions for Discussion

1. Americans already enjoy living standards that far exceed world averages. Do we have enough? Should we even try to produce more? **(LO 02-01)**

   Answer: As long as people want more than they have, scarcity exists. If we are interested in increasing our standard of living, then we should consider producing more. Of course, one of the issues we face is that we often measure our standard of living by how much we consume. If, as a society, we decide that the quality of life is not measured by how much we consume, but rather how well we consume what we have, then perhaps we should not produce more. Instead it is conceivable that we can work less and enjoy life more, thus maximizing our total level of satisfaction.

2. Why is per capita GDP so much higher in the United States than in Mexico? **(LO 02-03)**

   Answer: GDP per capita is calculated as GDP/population. Even though the population of the United States is larger than Mexico's population, the U.S. GDP is much larger than Mexico's. Thus GDP per capita is higher in the United States. This is due in large part to the greater use of capital in the U.S. production processes, resulting in higher productivity and output.

3. Can we continue to produce more output every year? Is there a limit? **(LO 02-03)**

   Answer: Our ability to produce output is determined by our resources, our capital investment, our technology, and our human capital investment. To be able to produce more output every year, one or several of these factors need to increase every year. The strength of the U.S. economy has historically improved based on our robust capital investment, our high level of human capital investment, and continual improvements to technology. Given that there are always potential technological improvements and capital investments, there is no reason to believe that we cannot continually improve our productive capabilities.

4. The U.S. farm population has shrunk by over 25 million people since 1900. Where did all the people go? Why did they move? (**LO 02-02)**

   Answer: At one time, farms were relatively small because farming was extremely labor-intensive. Consequently there were many farms and many people working on farms. Often farm families were quite large in order to provide a "free" labor force. Changes in farm technology, like the invention of the tractor, combine, fertilizer, and the like, allowed farmers to work more acres while using less labor. Many farmworkers moved to cities, where factories paid higher wages, and the size of farm families decreased, in part, because less labor was needed.

5. Is the relative decline in U.S. farming and manufacturing (Figure 2.2) a good thing or a bad thing? (**LO 02-02)**

   Answer: The relative decline in farming and manufacturing doesn't mean that we're producing fewer goods today than in earlier decades. In fact, certain industries such as chemicals, publishing, and telecommunications equipment have grown substantially. The result is that manufacturing output has actually increased fourfold since 1950. This same type of growth has occurred in the farm sector. Thus the relative decline in U.S. farming and manufacturing simply implies that our service production has increased at a much faster rate. All three sectors are growing substantially.

6. How many people are employed by your local or state government? What do they produce? What is the opportunity cost of that output? (**LO 02-01)**

   Answer: Answers to this question vary according to your area. In many cities, the government provides such items as public schools, police protection, fire protection, parks, and golf courses. The opportunity cost is the next best alternative use of these resources. For example, the public golf course could be turned into a pasture for cattle, a racetrack, or a housing development.

7. Where do growing companies like Google and Facebook get their employees? What were those workers doing before? (**LO 02-02)**

   Answer: In 1940 only 1 out of 20 young Americans graduated from college; today over 30 percent of young people are college graduates. Companies such as Google and Facebook are hiring these increasing numbers of college graduates. Moreover, our ability to produce the goods and services that consumers demand is due, in large part, to our agility in reallocating resources from one industry to another. Each year some industries expand while others contract. Therefore, workers are leaving firms that are closing and downsizing, and they are moving to growing companies such as Google and Facebook.

8. Should the government try to equalize incomes more by raising taxes on the rich and giving more money to the poor? How might such redistribution affect total output and growth? (**LO 02-04)**

   Answer: The answer to this question depends on your concept of equity. Some people believe the current distribution of income is unfair: the rich are too rich and the poor are too poor. A market-based system operates on incentives communicated through prices in the markets. People who produce more are, in general, likely to be paid more. Imagine for a moment sitting and doing nothing at work while your coworker works hard and produces large quantities of your firm's product. If you are paid the same as that person, it will not take long for that person to also begin doing nothing. Soon the firm will be producing nothing as all workers decide to produce nothing because it pays the same. From a market perspective, equalizing incomes through income transfers is simply a bad idea. From a social perspective, some equalization is appropriate. How much equalization is a good thing continues to be a hot topic for debate.

9. Why are incomes so much more unequal in poor nations than in rich ones? (**LO 02-04)**

   Answer: There are several reasons for this. A major reason is the lack of resources needed for increased productivity—namely capital equipment and basic human necessities such as health care, education, and adequate diet—in poorer nations. Also, the political system may protect the wealthy at the expense of the poor. Another issue is the possibility of a country's population growing faster than its GDP, causing the standard of living to decline.

10. How might free markets help reduce global poverty? How might they impede that goal? (**LO 02-03)**

    Answer: The increased productivity associated with free markets could lead to more jobs and therefore a better standard of living for the population. However, the market system does have market failures, such as inequity, that might improve the standard of living of only part of a country's population.

Problems

1. In 2013 the world's total output (real GDP) was roughly $73 trillion. What percent of this total was produced
   (a) By the three largest economies (World View, p. 31)?
   (b) By the three smallest economies in that World View?
   (c) How much larger is the U.S. economy than the Ethiopian economy? (**LO 02-01)**

   Answers:
   (a) 42.33%.
   (b) 1.11%.
   (c) 336 times larger.

Feedback:
(a) In 2013 the U.S. produced $16.8 trillion, China produced $9.2 trillion and Japan produced $4.9 trillion. These three economies added together produce $30.9 trillion of the world's total output. Since the world's total output was roughly $73 trillion, the largest three countries produce 42.33% (=$30.9 trillion / $73 trillion) of the world's output.
(b) In contrast, the smallest three economies, Haiti ($0.01 trillion), Ethiopia ($0.05 trillion) and Saudi Arabia ($0.75 trillion) only produced $0.81 trillion, which is 1.11% (=$0.81 trillion / $73 trillion) of the world's output.
(c) The size of the U.S. GDP is 336 (16.8 / 0.05) times larger than Ethiopia's. This is partially due to the size of the U.S. With over 3 million acres of land, the U.S. has far greater production possibilities than small nations such as Ethiopia.

2. According to the World View on page 32, how does per capita GDP in the following countries stack up against America's (in percentage terms):
   (a) Russia?
   (b) China?
   (c) Cuba? (**LO 02-01)**

   Answers:
   (a) 25.82%.
   (b) 12.22%.
   (c) 10.62%.

   Feedback: Per capita GDP is an indicator of how much output the average person would get if all output were divided up evenly among the population. Note, however, that even the per capita GDP measure fails to take into account the distribution of income, so it is an imperfect measure.
   (a) Russia's GDP per capita is $13,860, while the U.S. GDP per capita is $53,670, so 13,860/53,670 = 0.2582, or 25.82%.
   (b) China's GDP per capita is $6,560, so 6,560/53,670 = 0.1222, or 12.22%**.**
   (c) Cuba's GDP per capita is $5,700, so 5,700/53,670 = 0.1062, or 10.62%**.**
   Americans have access to far more goods and services than do people in other nations.

3. In 1950, America's GDP per capita was approximately $15,000 (in today's dollars). How much higher in percentage terms is
   (a) America's GDP per capita in 2013 compared to its GDP in 1950?
   (b) America's 1950 GDP per capita compared to
      (i) Cuba's in 2013?
      (ii) China's in 2013? (**LO 02-04)**

   Answers:
   (a) 358%.
   (b) (i) 38%.
   (c) (ii) 44%.

Feedback:
(a) America's GDP per capita in 2013 is 358% ([53,670 / 15,000] × 100) of America's GDP per capita in 1950.
(b) (i) Cuba's GDP per capita in 2013 is 38% ([5,700 / 15,000] × 100) of America's GDP per capita in 1950.
(b) (ii) China's GDP per capita in 2013 is 44% ([6,560 / 15,000] × 100) of America's GDP per capita in 1950.

4. (a) How much more output does the $18 trillion U.S. economy produce when GDP increases by 1.0 percent?
(b) By how much does this increase the average (per capita) income if the population is 320 million? (**LO 02-03)**

Answers:
(a) $0.18 trillion.
(b) $562.50.

Feedback:
(a) The U.S. economy produces $0.18 trillion (0.01 × $18 trillion = $0.18 trillion) worth of additional output when GDP increases by 1.0 percent.
(b) If the $18 trillion U.S. economy increases by 1%, average (per capita) income increases by $562.50 ($0.18 trillion/320 million = $562.50).

5. According to Table 2.1 (p. 34), how fast does total output (GDP) have to grow in order to raise per capita GDP in
(a) China?
(b) Ethiopia? (**LO 02-01)**

Answers:
(a) More than 0.8%.
(b) More than 2.8%.

Feedback:
Per capita GDP is calculated as a nation's total output divided by its total population. In all nations, GDP must grow by more than the growth rate of the population in order for per capita GDP to increase.
(a) Because the population in China is growing at an annual rate of 0.8 percent, GDP must grow by more than 0.8 percent per year for GDP per capita to grow.
(b) In Ethiopia, the population is growing, on average, at an annual rate of 2.8 percent; so GDP must grow by more than 2.8 percent for per capita GDP to grow.

6. (a) If Haiti's per capita GDP of roughly $810 were to DOUBLE every decade, what would Haiti's per capita GDP be in 50 years?
(b) What is U.S. per capita GDP in 2013 (World View, p. 32)? (**LO 02-03)**

Answers:
(a) $25,920.
(b) $53,670.

Feedback:
(a) If Haiti's per capita GDP of roughly $810 were to double every decade for 50 years, it would increase to $1,620 after 10 years, $3,240 after 20 years, $6,480 after 30 years, $12,960 after 40 years, and $25,920 after 50 years.
(b) According to the World View the U.S. per capita GDP in 2013 was $53,670.

7. U.S. real gross domestic product increased from $10 trillion in 2000 to $15 trillion in 2010. During that same decade the share of manufactured goods (e.g., cars, appliances) fell from 16 percent to 12 percent. What was the dollar value of manufactured output
(a) In 2000?
(b) In 2010?
(c) By how much did manufacturing output change? (**LO 02-02)**

Answers:
(a) $1.6 trillion.
(b) $1.8 trillion.
(c) It increased by $0.2 trillion or 12.5%.

Feedback:
(a) $10 trillion × 16% = $1.6 trillion of manufactured output.
(b) $15 trillion × 12% = $1.8 trillion of manufactured output.
(c) The dollar value of the manufactured output increased from $1.6 trillion to $1.8 trillion or a $0.2 trillion increase. The percentage change over this period is (1.8 – 1.6)/1.6 = 0.125, or 12.5%.

8. Using the data in Figure 2.3,
(a) Compute the average income of U.S. households.
(b) If all incomes were equalized by government taxes and transfer payments, how much would the average household in each income quintile gain (via transfers) or lose (via taxes)?
i. Highest fifth.
ii. Second fifth.
iii. Third fifth.
iv. Fourth fifth.
v. Lowest fifth.
(c) What is the implied tax rate (i.e., tax ÷ average income) on the highest quintile?
(**LO 02-04)**

Answers:
(a) $72,800.
(b) i. - $112,200.
ii. - $11,200.
iii. $20,800.
iv. $41,800.
v. $60,800.
(c) 60.1%.

Feedback:
(a) Sum of the average income for each income quintile divided by the total of five quintiles:
185,000 + 84,000 + 52,000 + 31,000 + 12,000 = 364,000
364,000/5 = $72,800
(b) i. The highest quintile (the highest fifth) would lose $112,200 ($72,800 - $185,000 = - $112,200) via taxation.
ii. The second fifth would lose $11,200 ($72,800 - $84,000 = - $11,200) via taxation.
iii. The third fifth would gain $20,800 ($72,800 - $52,000 = $20,800) via transfers.
iv. The fourth fifth would gain $41,800 ($72,800 - $31,000 = $41,800) via transfers.
v. The lowest fifth would gain $60,800 ($72,800 - $12,000 = $60,800) via transfers.
(c) The implied tax rate is the tax divided by the average income within the quintile. For the highest quintile, where the average income is $185,000 and the amount taxed is $112,200 (determined in (b)(i) above), the implied tax rate is 60.1% ($112,200/ $185,000 = 0.601, or 60.1%).

9. If 150 million workers produced America's GDP in 2013 (World View, p. 31), how much output did the average worker produce? (**LO 02-03)**

Answer: $112,000.

Feedback: According to the World View, the United States produced $16.8 trillion in output (GDP). If 150 million workers produced this output, then the average worker produced $112,000 ($16.8 trillion/150 million workers).

10. How much more output (income) per year will have to be produced in the world just to provide the 2.7 billion "severely" poor population with $1 more output per day? (**LO 02-04)**

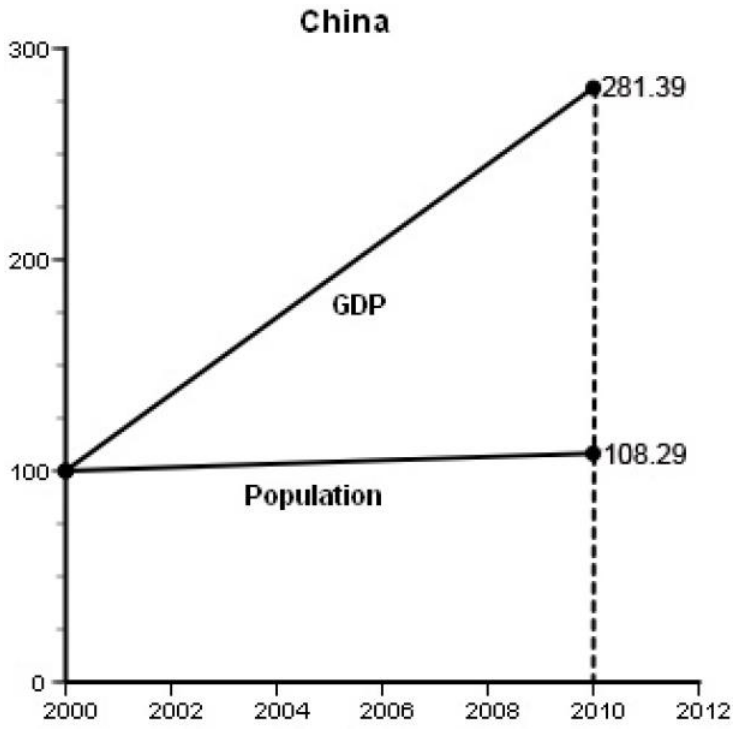
Answers: $985.5 billion.

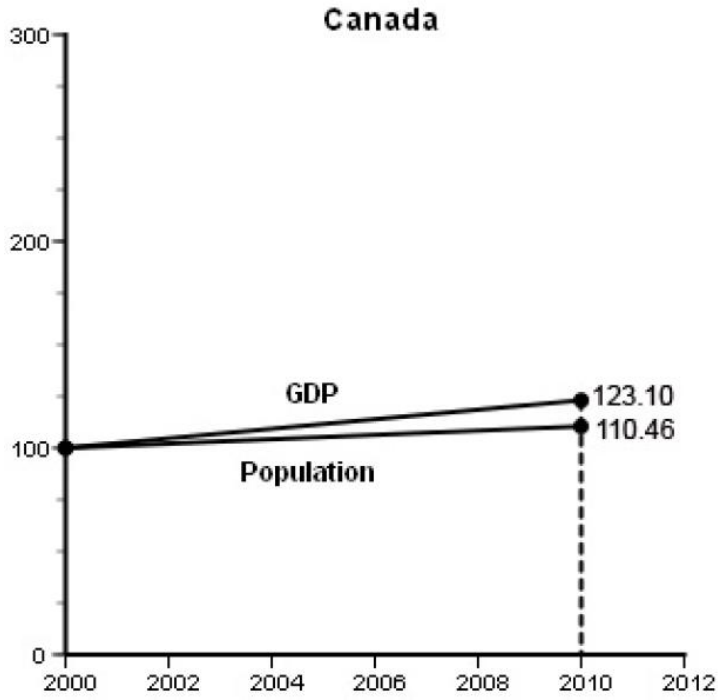
Feedback: 2.7 billion people × $1 /day × 365 days/year = $985.5 billion/year.
How many goods and services one gets depends largely on how much income one has to spend. Those who receive the most income get the most goods. Inequality tends to diminish as a country develops. In poor, developing nations, the richest tenth of the population typically gets 40 to 50 percent of all income. In developed countries, the richest tenth gets 20 to 40 percent of the total income.

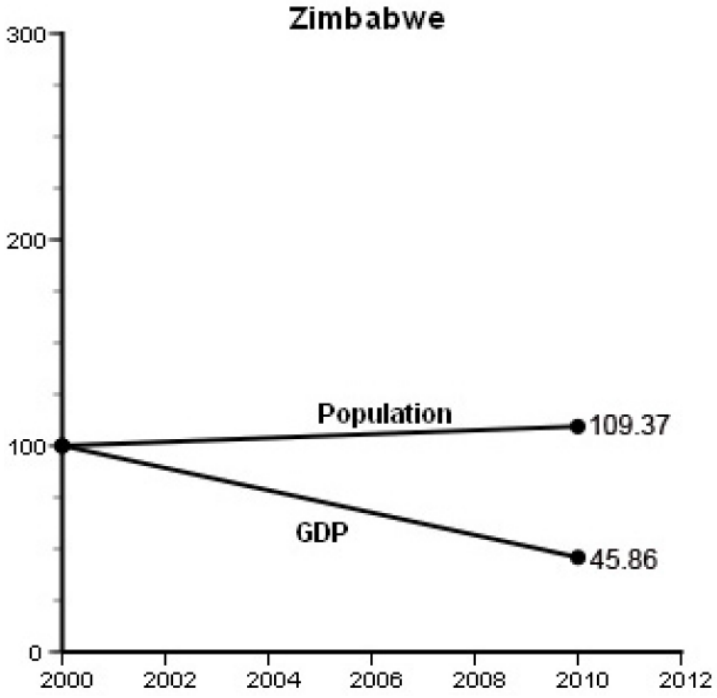
11. Using data from Table 2.1 (p. 34), illustrate on the following graphs real GDP and population growth since 2000 (in the manner of Figure 2.1) for the nations indicated. (**LO 02-01)**

Answer:
The following graphs show the various growth rates for China, Canada, and Zimbabwe from 2000 to 2010.

China: GDP increased from 100 to 281.39, and population increased from 100 to 108.29.
Canada: GDP increased from 100 to 123.10, and population increased from 100 to 110.46.
Zimbabwe: GDP decreased from 100 to 45.86, and population increased from 100 to 109.37.





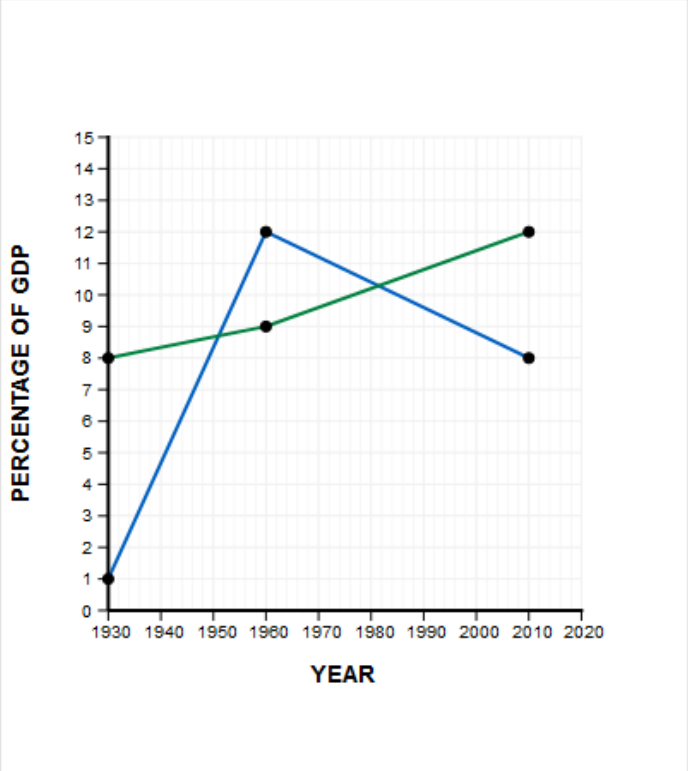


Feedback: To answer this question, use the compounding growth function:
$p^0 \times (1+ r)^t$ where p^0 is the original value, r is the growth rate, and t is the number of years of growth (10 in this case). Therefore, from 2000 to 2010,
GDP growth for China is $100 \times (1 + 0.109)^{10} = 281.39$.
Population growth for China is $100 \times (1 + 0.008)^{10} = 108.29$.
GDP growth for Canada is $100 \times (1 + 0.021)^{10} = 123.10$.

Population growth for Canada is $100 \times (1 + 0.01)^{10} = 110.46$.
GDP decline for Zimbabwe is $100 \times (1 - .075)^{10} = 45.86$.
Population growth for Zimbabwe is $100 \times (1 + 0.009)^{10} = 109.37$.

12. Using data from the endpapers, illustrate on the graph below
    (a) The federal government's share of the total output.
    (b) The state/local government's share of total output. **(LO 02-01)**

Answers:
(a) 1930: 1%, 1960: 12%, 2010: 8%.
(b) 1930: 8%, 1960: 9%, 2010: 12%.



Feedback:
(a) In order to determine the federal government's share of the total output, simply divide the total federal government purchases by GDP (total output) for the year of interest. In 1930 federal government purchases were $1 billion and GDP was $90 billion, yielding a 1% share (1/90). In 1960 federal government purchases were $65 billion and GDP was $527 billion, yielding a 12% share (62/527). In 2010 federal government purchases were $1,223 billion and GDP was $14,527 billion, yielding an 8% share (1,223/14,527).
(b) In order to determine the state/local government's share of the total output, simply divide the total state and local purchases by GDP (total output) for the year of interest. In 1930 the state/local purchases were $7 billion and GDP was $90 billion, yielding an 8% share (7/90).

In 1960 state/local purchases were $47 billion and GDP was $527 billion, yielding a 9% share (47/527). In 2010 state/local purchases were $1,780 and GDP was $14,527, yielding a 12% share (1,780/14,527).