Chapter 19 explores the theory of international trade: Why do economies trade with each other, and what are the consequences of this trade? Chapter 20 studies exchange rates and international finance. Both chapters help us think about the effects of globalization on the macroeconomy and the consequences of the high trade deficits seen in recent years in the United States. Finally, in Chapter 21 we look back at the ground we have covered and consider the important questions that remain.

Macroeconomics is a fascinating and intriguing subject. Understanding the answers to the questions it poses offers the possibility of enormous improvements in welfare throughout the world. If we understand the sources of economic growth, perhaps all countries can unleash its powerful engine. If we understand why hyperinflations or depressions occur, perhaps we can prevent them from recurring. Education is the first step to a better future.

CHAPTER REVIEW

SUMMARY

1. Macroeconomics is the study of collections of people and firms and how their interactions through markets determine the overall performance of the economy.

2. Many of the most important questions in economics require macroeconomic analysis: What determines the wealth of nations? How do we understand the recent global financial crisis and the Great Recession that resulted? What caused the Great Inflation of the 1970s, and why has inflation been so much lower for the past decade? What are the consequences of trade deficits and budget deficits?

3. Macroeconomics studies these questions in four steps: document the relevant facts, develop a model, compare the predictions of the model with the facts, use the model to make and test other predictions.

4. A model is a collection of mathematical equations that are used to study a particular economic issue. Models determine the value of endogenous variables, like the price and quantity of computers sold or the rate of economic growth.

5. This book is organized around a key graph, Figure 1.7. The first part focuses on macroeconomics in the long run, the second part deals with the short run, and the third part takes up a number of important topics that will concern us in the future.

KEY CONCEPTS

endogenous variables	macroeconomics	the short run
exogenous variables	parameters	
the long run	potential output	

REVIEW QUESTIONS

1. Which questions in macroeconomics interest you the most? Why?

2. Given your current knowledge, what do you think are the answers to these questions?

3. How does macroeconomics study these questions?

4. What are the key ingredients of an economic model, and why are models useful?

EXERCISES

1. **Macroeconomic questions and answers:** Select one of the macroeconomic questions in this chapter. Describe what you think the answer is.

2. **The macroeconomics of your favorite country:** Pick a country that you find interesting, and learn some basic facts about its economy. Summarize these facts in a half-page essay. You may find the following resources to be helpful; feel free to explore others on your own.
   —The *CIA World Factbook:* www.cia.gov/cia/publications/factbook
   —Wikipedia: wikipedia.org
   —The "Country Snapshots" file, snapshots.pdf, which should be available on your course Web page or from the Web address in the next question.

3. **Country snapshots:** Download the file snapshots.pdf from www.stanford .edu/~chadj/snapshots.html and answer the following. (At the moment, the latest year in the data file is 2010. Over time, this year will advance, so please use the latest year available in the Country Snapshots file whenever the year 2010 appears in questions below.)

   (a) What was the ratio of per capita income in each of the following countries to that in the United States in the year 2010: Ethiopia, Mexico, India, and Japan?

   (b) Which country had the faster average annual growth rate of per capita GDP between 1960 and 2010, Botswana or China?

   (c) Rank these countries in order of population: Bangladesh, Brazil, Indonesia, Nigeria, Russia, the United States.

   (d) Which is larger as a share of GDP in most rich countries, investment or government purchases? What about in most poor countries?

   (e) Exchange rates are reported as units of domestic currency (like the Japanese yen or the British pound) per U.S. dollar. Look at the exchange rate for several countries. Do you detect any overall pattern? Why might that be?

4. **Making graphs (spreadsheet):** Use the snapshots.pdf file, together with its hyperlinks to the underlying spreadsheet data. Use a spreadsheet program of your choice to complete the following.

   (a) Make a plot of per capita GDP (in dollars) for the years 1950 to 2010 for a country of your choice. Label the *x*-axis "year" and the *y*-axis "per capita GDP."

(b) Make a plot of per capita GDP relative to the United States (U.S. = 100) for the years 1950 to 2010 that includes the United States and three other countries of your choice, all on the same graph. Be sure to label the lines on the graph in some informative way so that each line can be associated with its country.

5. **The labor market model (I):** Suppose the following equations characterize supply and demand in the labor market model:

$$\text{labor supply:} \quad L^s = 2 \times w + 30$$
$$\text{labor demand:} \quad L^d = 60 - w$$

Equilibrium occurs at an employment level L^* and a wage w^*, so that the labor market clears. That is, supply is equal to demand: $L^s = L^d$.

(a) What are the endogenous variables in the labor market model?

(b) Solve for the equilibrium values of these endogenous variables.

6. **The labor market model (II):** Now we add some parameters to the labor market model:

$$\text{labor supply:} \quad L^s = \bar{a} \times w + \bar{\ell}$$
$$\text{labor demand:} \quad L^d = \bar{f} - w$$

The parameters in this setup are $\bar{a}$, $\bar{\ell}$, and $\bar{f}$. (Notice that parameters are denoted with an overbar, a convention we will maintain throughout the book.) The parameter $\bar{\ell}$ represents the number of hours workers would supply to the market even if the wage were zero; it therefore reflects the inherent amount of time people like to work. The parameter $\bar{f}$, in contrast, reflects the amount of labor the firm would like to hire if the wage were zero. It might be thought of as some inherent capacity of the firm (perhaps because the firm owns a given amount of land and capital that cannot be altered).

(a) What is the economic interpretation of $\bar{a}$?

(b) What are the endogenous variables in this model?

(c) Solve for the equilibrium of the labor market. That is, solve for the endogenous variables as a function of the parameters of the model.

(d) If $\bar{\ell}$ increases, what happens to the equilibrium wage and employment levels? Does this make sense? (*Hint:* Think about what happens in the supply-and-demand diagram for the labor market.)

(e) Answer the same questions in (d) for an increase in $\bar{f}$.

7. **Models:** Apply the supply-and-demand model to the following markets. In each case, state the key endogenous variables in the market as well as some important exogenous variables or parameters. Also, express each model as a system of mathematical equations. As an example, $Q = F(P, \bar{X})$ might be the demand curve in the computer market, where $\bar{X}$ captures some exogenous variables like the availability of the iPod or computer games. How many equations are there within each example? How many unknowns?

(a) The computer market.

(b) The market for your favorite music.

(c) The market for a particular currency, such as the dollar, the yen, or the euro. (*Hint:* This last example suggests an important point about "exogenous

variables": what is exogenous in one model, as in a narrow study of the supply and demand for dollars, may be endogenous in a richer model — like a study of the entire U.S. macroeconomy.)

WORKED EXERCISE

Here and in each following chapter, you will find the worked exercises most helpful if you try to work through them completely on your own before consulting the answers.

5. The labor market model (I):

(a) The endogenous variables are the price and quantity: the wage w and the quantity of labor L. Another way to think about this problem is that we have three equations and three unknowns, the unknowns being the wage, labor supply, and labor demand. However, since the "third" equation is that labor supply equals labor demand, this naturally reduces our model to two equations in w and L.

(b) The equilibrium of the labor market is shown in Figure 1.8. To solve for this equilibrium, we first find the wage rate that equates supply and demand. This wage solves

$$2w + 30 = 60 - w.$$

(The left side is labor supply and the right side is labor demand.) The solution to this equation is $w^* = 10$. Substituting this wage into either the labor supply equation or the labor demand equation, we find that the equilibrium quantity of labor is $L^* = 50$.

FIGURE 1.8

The Labor Market