

J. MICHAEL MORGAN

Study Guide
to Accompany

FISCHER/DORNBUSCH



J. Michael Morgan

Western Kentucky University

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Study Guide
to Accompany
FISCHER/DORNBUSCH

Economics

To

JAN, MATT, AND JESSIE

Study Guide
to Accompany
FISCHER/DORNBUSCH
ECONOMICS

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To the Student

This study guide has one purpose: to help you understand and apply the economic principles developed in the textbook *Economics* by Stanley Fischer and Rudiger Dornbusch. It is a supplement to, not a substitute for, the textbook. In writing it, my main objective has been to develop a learning tool which would assist you in a self-paced study of introductory economics. Economics is a fascinating subject. Once you have an understanding of the principles involved, you will have learned a new way of thinking about social relationships.

Each chapter of the study guide corresponds to a chapter in the textbook and contains nine separate components.

1. An *overview* at the beginning of each chapter sets the stage for what you are about to study in the textbook chapter. Each overview offers a brief summary of the text chapter, and some also offer suggestions about what you should look for in that chapter.
2. A *chapter outline* organizes the chapter in two or three pages. Most of the outlines are rather detailed and present a summary of the important points in each section and subsection of the text chapter.
3. *Important terms and their meaning* lists the new vocabulary developed in the chapter. This section of the study guide is more than a simple list of terms. I have used a matching format for the vocabulary drill because you must know how economic terminology is used if you are to understand the principles. A word of caution, though: Don't simply memorize the definitions; understand the meanings.
4. The *exercises* contained in each chapter allow you to apply some of the newly developed principles. This is one of the more rigorous sections; it is also a very important one. Don't be discouraged by the amount of graphical (and in some chapters numerical) analysis required, because it is here that you see the interrelationships of economic principles.
5. The *fill-in questions* are your initial check of the facts and general concepts presented in the text chapter. In many of the questions, you have a selection from which to choose the correct answer; in others, you must supply the answer.
6. The *true-false*, and *multiple choice questions* are the sixth and seventh components of each study guide chapter. These questions serve as a test, a quick indicator of how well you understand the material presented in the textbook.

7. *At this point, you should be able to . . .* is a list of learning objectives. After completing the text chapter and the study guide chapter, you should be able to meet these specified objectives.
8. The *questions for thought* are designed to stimulate class discussion and to identify important concepts in the chapter. Some questions require you to use your imagination, while others are rather straightforward. All answers, except those for *questions for thought*, are presented in the back of the study guide.

As I stated earlier, this study guide is designed to help you learn introductory economics. How should it be used? You should first read the chapter overview, the important terms, and the learning objectives. These components provide a brief idea of what is covered in the chapter and what you are expected to know. Next, carefully read the text, but keep the study guide close by. After reading a major section in the text, write one or two sentences which give the key points, and list any new terms. Then read that section in the chapter outline of the study guide, because it provides a review and summary of what you have just read. When you have completed the chapter, work on your vocabulary. Try to match as many of the terms with their meaning without looking back at the text. After you have completed the terms, refer to the text for the meaning of any new vocabulary you were initially unable to identify. Be sure that you understand all terms.

Next, work the exercises. In many chapters there are several exercises which progress in degree of difficulty. When you begin an exercise, reread the relevant sections of your textbook. Each of the exercises is designed to reveal principles presented in the text. Complete the exercises before checking the answers.

At this point, you should again read the chapter overview and outline, because you are now ready to test yourself on both general and specific points in the text. Answer as many of the fill-in, true-false, and multiple choice questions as you can without looking at the text!

If you cannot complete all of them, go back to the textbook and find the answers. When you have completed these three components of the study guide, check the answers provided. For any questions missed, you should reread the sections of the text covering the particular question. Don't leave these questions before you have mastered them. Read again the learning objectives and ask yourself whether you can do each of the things listed. Be honest. If you have trouble with some, go back to the text. Finally, study the questions for thought. You don't need to write down the answers, but you do need to think about general answers.

There is at least one question (fill-in, true-false, or multiple choice) for each section of the text. Ideally, you should answer all the questions and work all the exercises. Realistically, though, you will often be tempted to answer some questions and omit others. My only advice is to be careful in your selection.

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J. Michael Morgan

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1

An Introduction to Economics and the Economy

In Chapter 1 you begin your study of economics. Human needs are practically unlimited, while the resources available to produce goods which satisfy those needs are limited. The central problem in economics is allocating resources in a manner which satisfies as many of these needs as possible. Every society faces this central economic problem and must answer the following questions: “What is to be produced?” “How is production to take place?” and “For whom are the goods and services produced?” Economics is the study of how society decides these “what,” “how,” and “for whom” questions.

Chapter 1 begins by discussing three economic issues which show how society deals with the problem of scarce resources and unlimited needs. The issues presented are the impact of the oil price increases of the 1970s, the distribution of income, and the role of government in a market economy. Each of these issues causes a response by society as it changes the allocation of its scarce resources, and so the answers to the basic questions change.

An important concept in economics is the production possibilities frontier. This frontier shows that society has a limit to what can be produced with its given resources and that more of one good can be produced only at the expense of other goods. The trade-off illustrated by the production possibilities frontier shows that using resources to produce one type of good costs society other goods. Society must choose where to

be on the frontier. When this choice is made, the “what” and “how” questions are answered.

Society can answer the basic questions in different ways. One way is through markets. In a free market, government does not intervene. Buyers and sellers of goods come together for the purpose of trade. Each buyer and seller tries to maximize his self-interest, and this leads to the best interest of society as well. A command economy is another way in which society can try to promote its best interest, but in this system government decides the “what,” “how,” and “for whom” questions. Most countries have a mixed economy in which both government and markets interact in solving the basic questions.

Economists not only explain how society makes choices about consumption, production, and exchange, they also offer suggestions for improving the economy’s performance. Positive economics deals with objective explanations of how the economy works. Normative economics offers prescriptions for the economy and is based on the economists’ values.

All specialized areas in economics are based on microeconomic and macroeconomic principles. Microeconomic analysis studies the operation and behavior of individual economic units, while macroeconomics examines the operation of the entire economy.

CHAPTER OUTLINE

1. Economics is the study of how society makes choices about what, how, and for whom output is to be produced and thus decides how its scarce resources are to be allocated among competing alternatives. Three specific issues illustrate how society answers these three economic questions.
 - a. The first issue is the impact of OPEC’s oil price increase on both the domestic and the world economy. When the oil price shocks occurred during the middle and late 1970s, the price of petroleum products increased relative to the prices of other goods. Producers of goods using petroleum began to reduce their consumption of oil products as firms tried to find more fuel-efficient ways of producing output. The “how” question is answered in this case by having the firms produce in a more petroleum-efficient manner. The “what” question is answered as higher oil prices induce both households and firms to conserve on the use of petroleum so that goods that use less (or no) oil products are produced and consumed. The answer to the “for whom” question stems from OPEC’s vastly increased wealth after the oil price increases. As this increased wealth flowed into the OPEC countries, they demanded more

goods and services. OPEC's share of world output increased, and less was left for everyone else.

- b. The second issue is the way income is divided among different groups both within the United States and among nations. More than half the world's population lives in low-income countries, and so we find low standards of living in much of the world. The industrialized countries have less than one-fifth of the world's population but receive 60 percent of the world's income. The "for whom" question is answered simply. The world economy produces primarily for people in the upper-income countries because they can afford to buy the output. The "what" question is also answered simply because output is produced primarily to satisfy the wants of people in the rich countries. The answer to the "how" question helps explain the differences in the distribution of output and income. In the rich countries, production takes place using a larger amount of machines and skilled labor, while in the poor countries, the production process involves a larger quantity of unskilled labor and fewer machines. The number of goods produced per worker per hour is higher in the industrialized countries than in the low-income countries, and so labor in the industrialized nations receives a much higher income. Within a particular country, the distribution of income is determined by the type of work performed by labor and the ownership of wealth. The distribution of income within a country influences the type of goods produced, who receives the goods, and how production takes place.
 - c. The third issue is the way in which governments affect the allocation of resources and influence society's decisions on the "what," "how," and "for whom" questions. Governments provide services to society and make transfer payments (no services are provided by the recipient) to some citizens. In order to pay for these services and transfer payments, governments levy taxes. Governments affect the "what" question when they purchase particular goods and services; the "for whom" question is affected by taxing some citizens while making transfer payments to others; and the "how" question is affected when governments impose regulations on production. The role of government in economic activity is controversial. Some economists argue that government intervention into the economy causes disincentives to work and lowers overall production efficiency, while others argue that government participation improves society's overall well-being.
2. The production possibilities frontier illustrates both the concept of scarcity in an economic system and the problem of making choices about what is to be produced and how production is to take place. Given society's limited resources and a definite number of goods which can be produced, more of one good is produced only at the expense of other goods. This happens because of the law of diminishing returns. As resources are transferred from the production of all other goods into the production of only one good, the additional output of these extra resources falls. If society wants more of one good, it must transfer more and more resources out of the production of all other goods. If an economy produces only two goods, the production possibilities frontier shows for each level of the output of one good the maximum amount of the other good which can be produced. Each point on the curve is efficient because it's the best society can do. Points below the frontier are attainable but inefficient, while points outside the curve are not attainable. Where society chooses to be on its production possibilities frontier determines the types of goods produced and how (in terms of resource use) production takes place. In many economies, market activities primarily determine where society is on its frontier and answer the "what," "how," and "for whom" questions.
 3. Buyers and sellers of goods and services come together in the market. The market is where households express decisions about their consumption of goods, firms decide what and how to produce, and workers decide how much and for whom to work. Because markets respond to the prices of both goods and resources, they allocate resources into the production of goods which society wants. Some economic systems, however, do not use markets to answer the three fundamental questions.
 - a. In a command economy, the government makes the decisions about what will be produced, how, and for whom and then instructs firms and workers about its decisions. Even in a command economy, though, some markets exist to a small degree.
 - b. When the government does not intervene in market activities, free markets exist. The invisible hand concept argues that as individuals in free markets pursue their own self-interest, the interests of others and of society as a whole are promoted. There is no need for any central direction by government, since the free market answers the basic economic questions.
 - c. Completely free markets with individuals and

firms free to pursue their own self-interest and absolute command economies with their suppression of personal and economic freedoms are two opposite approaches society can take in answering the basic economic questions. These extremes, however, do not exist. Most countries have, to varying degrees, a mixed economic system. In a mixed economy, both the government and the private sector interact in solving the “what,” “how,” and “for whom” questions. The degree of government intervention in the economies of the industrialized countries differs. In the United States, most economists favor a free market, yet many still see areas in which government intervention might benefit society.

4. Economists are called upon to explain how the economy works and to make recommendations about how economic performance can be improved. When an economist objectively states a fact about the operation of the economy, positive economics is being practiced; the economist serves as a detached scientist. When statements are made about or prescriptions are made for an economic system on the basis of personal value judgments, normative economics is being practiced. Although positive and normative economics ideally should be kept separate, most economists find this difficult to do.
5. The fundamental principles on which all of economic analysis is based are classified as either microeconomics or macroeconomics. Microeconomics studies the behavior of individual economic agents and of particular markets or industries. In microeconomic analysis, emphasis is placed on the relative prices of goods, not the overall level of prices in the economy. Macroeconomics examines the activities and behavior of the economy as a whole. Three of the more frequently used macroeconomic concepts are gross national product, the aggregate price level, and the unemployment rate.

IMPORTANT TERMS AND THEIR MEANING

Match the following terms with the correct definition or phrase.

- | | |
|--|-------------------|
| 1. _____ A society in which government makes all of the decisions about production and consumption | a. Macroeconomics |
| 2. _____ The value of all goods and services produced in the economy in a given time period | b. Trade-off |

- | | |
|---|------------------------|
| 3. _____ Offers prescriptions for an economy on the basis of personal value judgments | c. Inflation |
| 4. _____ Term used to describe a falling aggregate price level | d. Invisible hand |
| 5. _____ Examines the activities and behavior of the economy as a whole | e. Normative economics |
| 6. _____ Shows for each level of output of one good the maximum amount of the other good that can be produced | f. Scarcity |
| 7. _____ Shows how income is divided among different groups | g. Efficiency |
| 8. _____ Describes a market in which there is no government intervention and individuals are not restricted in the pursuit of their own self-interest | h. Adam Smith |
| 9. _____ There is only a limited amount of land, labor, and machines which can be used to satisfy society's virtually unlimited needs | i. Command economy |
| 10. _____ Examines the activities and behavior of individual economic agents | j. Unemployment |
| 11. _____ The most output possible is being produced with the resources available to society; any point on the production possibilities frontier | k. Diminishing returns |
| 12. _____ Term used to describe an increasing aggregate price level | l. Income distribution |
| 13. _____ Adding more and more workers to a given industry causes the number of goods produced by the extra workers to fall because each has less of the other resources with which to work | m. Mixed economy |
| 14. _____ Deals with objective or scientific explanations of the working of an economy | n. Microeconomics |
| 15. _____ Payments made to individuals without their providing a service in return | o. Deflation |

- 16.** ____ Author of the *Wealth of Nations* (1776), who argued that society would benefit if individuals pursued their own self-interest
- 17.** ____ The government and private sector interact in solving the basic economic questions
- 18.** ____ The situation in which individuals are in the labor force, want to work, but cannot find a job
- 19.** ____ Argues that individuals pursuing their own self-interest are led to do things that are in the interest of others and of society as a whole
- 20.** ____ Because all resources have alternative uses, in order to get one good, another good which could have been produced has to be given up
- p.** Positive economics
- q.** Gross national product
- r.** The free market
- s.** Production possibilities frontier
- t.** Transfers

EXERCISES

1. Presented in the table below is the production possibilities schedule for a hypothetical economy. It is assumed that the economy produces only two goods: movies and steaks. It is also assumed that all resources are employed in the production of either movies or steaks. The table shows six alternative output possibilities.

GOOD	POSSIBILITY					
	A	B	C	D	E	F
Steaks	15	14	12	9	5	0
Movies	0	1	2	3	4	5

- a.** This table shows what the economy (can/should) ____ produce and would be described as (positive/normative) ____ economics.
- b.** In order to produce the first movie, society must give up ____ unit(s) of steak.
- c.** As society chooses to produce more movies, people must give up (more/fewer) ____ steaks for each extra movie produced. This happens because as resources continue to transfer out of the production of ____ into the production of ____, the law of ____ applies.

d. It (is/is not) ____ possible for society to produce 14 steaks and 3 movies.

e. Every time an additional movie is produced, it costs society something in terms of steaks. In the table below, complete the column labeled “cost of movies in terms of steaks” by entering the number of steaks which must be given up in order to produce one more movie.

MOVIES	COST OF MOVIES IN TERMS OF STEAKS
First movie	_____
Second movie	_____
Third movie	_____
Fourth movie	_____
Fifth movie	_____

f. This table shows that as society produces more of one good, its costs (increase/decrease) ____ in terms of the other good so that the trade-off (is/is not) ____ constant.

2. Figure 1-1 shows the six production possibilities for movies and steaks presented in Exercise 1.

a. Connect the six possibilities and label your curve PPF.

b. If society is (on/below/beyond) ____ the PPF, the economy is producing efficiently, but any point (on/below/beyond) ____ the PPF shows that resources are being wasted.

c. Suppose that the economy was producing 3 movies but only 5 steaks. Find the point which represents this combination of goods and label it point G. At point G, society is producing (efficiently/inefficiently) ____ because it could produce ____ units

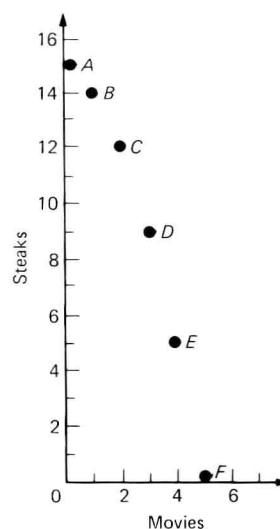


FIGURE 1-1

of steaks and 3 movies or 5 units of steak and _____ movies.

d. Suppose now that the law of diminishing returns does not hold and that steaks can be traded for movies at the rate of 3 steaks for each movie. The maximum number of steaks which can be produced (assuming no movies) is 15. The maximum number of movies which can be produced (assuming no steaks) is 5. Draw a new PPF to reflect this constant trade-off and label it PPF'.

The PPF' is now a _____ line because the cost of movies in terms of steak (does/does not) _____ increase as more movies and fewer steaks are produced.

3. Below are six statements which the economist might find interesting. In the blank beside each statement, indicate whether it is a positive (P) or normative (N) statement.

a. _____ Sanitation workers in San Francisco have an average salary of \$20,000 per year.

b. _____ Craftsmen from the Appalachian region of the United States are the best in the country.

c. _____ The average salary of sanitation workers in San Francisco is too high.

d. _____ In August 1982, the price of gold again topped the \$400 per ounce mark.

e. _____ In 1924, the value of GNP in the United States was \$85 billion.

f. _____ Because the market system promotes an unfair distribution of income, it should be done away with, and economic planning should take its place.

4. In the spaces below, list and give one-sentence definitions of three frequently used macroeconomic concepts.

a. _____

b. _____

c. _____

FILL-IN QUESTIONS

1. The _____ is the percentage of individuals in the labor force who would like to find work but cannot.

2. The price of a gallon of gasoline, the number of workers hired by a firm, and the satisfaction received by a consumer from eating a hamburger are examples

of topics studied in (micro/macro) _____ economics.

3. Economics is the study of how society decides _____ is to be produced, _____ it is to be produced, and _____.

4. The dramatic price increases of petroleum products during the 1970s were called _____ shocks, and as a result the OPEC countries had (more/less) _____ money to spend.

5. In a command economy, the _____ plans the production and distribution activities of the entire economy, but in a market economy, these decisions are made by _____ as they each pursue their own _____.

6. By levying taxes and making transfer payments, governments directly influence how society answers the (how/for whom) _____ question.

7. With its given level of resources, there (is/is not) _____ a definite amount of goods and services a society can produce during a certain period of time; if society wants more of one good, it must give up increasingly (more/less) _____ of other goods.

8. The _____ states that as we add additional workers to an industry, the amount each extra worker adds to output declines.

9. Adam Smith argued that it (was/was not) _____ possible for society's well-being to be promoted when each individual pursued his own _____.

10. In a _____ economy, both the government and the private sector interact in solving the fundamental economic questions. This (is/is not) _____ the most frequently encountered type of economic system.

11. Normative economics reflects _____ judgments which are based on an individual's feelings about an issue.

TRUE-FALSE QUESTIONS

1. _____ To say that the rate of inflation is 6.2 percent per year is a positive statement about a macroeconomic concept.

2. _____ The distribution of income tells how much a country produced during a particular period of time

and serves as an indicator of the citizens' standard of living.

3. ____ A frequently heard argument against government transfer payments and income taxes is that they create disincentives to work and affect the way society allocates its scarce resources.

4. ____ Any point along a production possibilities frontier is efficient because it shows the most that society can produce with its given resources.

5. ____ Once society determines its production possibilities in a market system, it is up to economists to decide where production should take place and what goods should be produced.

6. ____ In an absolute command economy, the government determines what is to be produced and who receives the output, but it leaves the decisions about how to produce up to private citizens.

7. ____ The United States, the Soviet Union, and Hong Kong all have mixed economies, but they all have different degrees of market orientation.

8. ____ When economists make normative statements about market performance, they are simply stating facts about prices, output, income, and employment.

9. ____ All of the specialized areas of economics have as their basis either microeconomics or macroeconomics.

10. ____ The OPEC price increases during the 1970s had little or no effect on either how or what the U.S. economy produced.

MULTIPLE CHOICE QUESTIONS

Circle the correct answer.

1. The production possibilities frontier is concave to the origin because

- a. if society wants an extra unit of one good, it has to give up increasing amounts of the other good
- b. the extra output produced by resources declines as more and more are added to a given industry
- c. the law of diminishing returns applies
- d. it shows that as more of one good is produced, its cost in terms of other goods increases
- e. all of the above

2. Economics can be defined as

- a. the study of the stock market
- b. the study of how society answers the "what," "how," and "for whom" questions
- c. the study of how government influences market behavior

d. the study of how to increase personal financial well-being

3. All of the following are classified as low-income countries except

- a. Brazil c. China
- b. India d. Uganda

4. In a country where assets are privately owned and highly concentrated in the hands of a few, we would expect

- a. income to be equally distributed across the population
- b. a larger percentage of the population living in poverty and a small percentage being very wealthy
- c. a large percentage of the population being very wealthy and a small percentage living in poverty
- d. none of the above

5. When governments tax and make transfer payments to households, they are most directly affecting

- a. what is to be produced
- b. how production is to take place
- c. the location of the production possibilities frontier
- d. for whom output is produced

6. When society chooses a point on its production possibilities frontier, it answers all of the following except

- a. how to produce
- b. what to produce
- c. for whom to produce
- d. where production takes place efficiently

7. The term "free markets" describes

- a. markets in which there is an absence of government intervention and the invisible hand is operating
- b. markets in which the government establishes the prices producers must charge for their output
- c. markets in which employers must pay labor a minimum wage and produce according to government regulations
- d. markets in which government prohibits the price of certain goods from rising above a certain level

8. The United States, Canada, and Great Britain are said to have mixed economies because

- a. firms produce only with the approval of the government
- b. government exercises no influence over the market
- c. both government and the private sector interact to solve the basic economic questions
- d. there are no trade barriers between the three nations

9. All of the following are positive economic statements except

- a. in August 1982, the Fed lowered its discount rate to 10 percent
- b. the unemployment rate during 1981 exceeded 9 percent
- c. the Federal income tax is unfair to middle-income households
- d. the Social Security tax base is now greater than \$30,000

10. Microeconomics examines all of the following except

- a. the level of output produced by a firm
- b. increases or decreases in the level of unemployment
- c. the impact on sales of a higher federal excise tax on a bottle of whiskey
- d. the number of workers hired in a particular industry

11. Which of the following statements is incorrect?

- a. in a mixed economy, the organization of all markets is the same
- b. markets can answer the basic economic questions
- c. a market can exist only if there are buyers and sellers
- d. markets are one way society can determine the allocation of its scarce resources

12. All of the following are characteristics of an absolute command economy except

- a. government decides what, how, and for whom to produce
- b. there is a strong central government
- c. there is an absence of markets
- d. there is private ownership and allocation of resources

AT THIS POINT YOU SHOULD BE ABLE TO . . .

1. Write a definition of economics and explain the problem of scarcity.

2. Using one of the issues presented in this chapter, explain how society deals with the allocation of scarce resources among competing demands.

3. Construct a production possibilities frontier and explain the principles behind the curve.

4. State the effect of the law of diminishing returns on the shape of the production possibilities frontier.

5. Explain the concept of a free market and a command economy and state how each answers the basic economic questions.

6. Describe how the invisible hand can produce a coherent society.

7. Explain why most countries have a mixed economy rather than either of the two absolute extremes.

8. Give an example of positive and normative economic statements.

9. State the difference between microeconomics and macroeconomics and list two topics covered in each.

QUESTIONS FOR THOUGHT

1. What are some of the arguments both for and against active government participation in market activities? In your opinion, is the role of government in our economy good or bad? Explain.

2. The production possibilities frontier emphasizes the notion of scarcity and the problem of choosing what is to be produced. Why is the term "frontier" used? Under what conditions would the frontier shift outward? Explain.

3. If you had to define economics to a friend, what would you say? Why do you think people study economics?

4. Explain the difference between microeconomics and macroeconomics. Professors Fischer and Dornbusch state that nearly all economic issues fall into either microeconomics or macroeconomics. Explain what they mean by this statement.

5. Explain the difference between a free market and a command economy. How does each answer the basic economic questions?

2

The Tools Economists Use

Chapter 2 introduces some basic concepts and techniques employed by economists in their attempt to understand economic events. Economists, like physicists or chemists, use a scientific approach to problem solving but, unlike pure scientists, do not have the luxury of a controlled laboratory environment. Using the scientific method, economists formulate theories, specify models, collect data, advance hypotheses, and then test the hypotheses to either substantiate or refute the theory.

Chapter 2 is organized into nine main parts, and the emphasis is on correctly formulating, building, and testing economic models. When you have mastered Chapter 2, you will have learned the basic foundation for a new way of thinking.

Chapter 2 begins by locating some of the more frequently used data sources and emphasizes the importance of using tables and charts in economic analysis. The main discussion of economic data centers on the meanings and descriptions of time series and cross section data. Time series data are measurements of economic variables over a period of time (weeks, months, or years). Cross section data, on the other hand, are measurements of a given variable taken at a particular time for different economic units. All data used in your textbook belong to one of these two types and are frequently presented in tabular or graphic form. Weighted averages are commonly used in the analysis of time series data.

Index numbers, which are numbers expressing time series data in terms of a common base value, permit economists to compare different economic data over time. The best known index number is the consumer price index (CPI).

Economic data can be either real or nominal. A variable's nominal value is expressed in current dollars; it is the variable's money value. The real value of a variable equals its purchasing power. An index of prices allows an economist to convert nominal values into real values. Economists are interested in how variables change. When analyzing time series data, they want to know how much a variable changes over time. When studying cross section data, they want to know how much a variable changes among different groups. Two ratios commonly used to measure changes in variables are the percentage change and the growth rate.

Economists build models to help organize their thinking processes and to express relationships among economic variables. Models may be very formal mathematical expressions or very informal arguments about the perceived relationships among variables. Diagrams are used in model building to help us visualize how variables interact with one another. By plotting data in a scatter diagram and then fitting a line to the data, it is possible to determine quickly whether variables are related. Economic theory alone may not tell this.

Economic models often incorporate simplifying assumptions in order to reach a conclusion. One simplifying assumption is "other things equal." This assumption is needed because there are many economic factors in an actual situation, and this makes analysis difficult. The economist attempts to make the situation less complex by eliminating some factors. The economist must be aware that although other things may be assumed equal, they often are not.

Although economists follow the scientific method when observing economic phenomena by advancing a theory to explain the phenomena and then testing hypotheses with data in an attempt to accept or refute the theory, the absence of a controlled experimental environment makes economics an inexact science.

CHAPTER OUTLINE

1. Economists use data to describe economic events which occur in society. Data also serve as inputs into theoretical and descriptive models. A first step to any serious study of economics is the development of an understanding of data collection, organization, and tabulation techniques.
 - a. Some common sources of economic data are government and trade publications as well as private data banks. Among the most frequently

used government publications are the *Statistical Abstract of the U.S.* and *The Economic Report of the President*.

- b. Once data are collected, they can be presented in the form of tables and charts. A table has a title, specifics of data measurement, a legend, and any other description specific to the data being presented.
 - c. Data collected at different points in time (weeks, months, or years) are called time series data and show how variables change over time. Time series data are often presented diagrammatically in charts. In a chart, both the vertical and horizontal axes are labeled in the appropriate units (the horizontal axis may measure time), and the data points are plotted in the space between the axes. Although charts are a convenient way of presenting data, caution must be taken not to mislead or be misled by the graphical presentations. In both charts and tables, time series data are often presented as averages.
 - d. In contrast to time series data, cross section data measure a given variable for different economic units at the same moment of time. Cross section data can also be presented in tables or charts.
 - (1) The median of any set of data is the middle point when the data are arranged by size. The mean is the average of the data. The mean may be influenced or distorted by extreme values in the data, but the median is not affected by such values.
2. When economic data are measured in different units, an index number allows the comparison of the different data sets. An index number expresses data relative to a given base value and is calculated by the formula

$$\text{Index number} = \frac{\text{value of observed data}}{\text{value of base}} \times 100$$

Index numbers provide a quick and convenient method of comparing data over different time periods or different data series.

- a. An important use of index numbers is to describe the behavior of several different economic variables and express this behavior in a single number. To develop a single index number for a group of variables, an index for each variable to be included is first calculated and then weighted. The weighted average of the index for the group of variables (the single index number) is calculated by adding all of the individually weighted indices. The

weighted average provides an index number which allows an analysis of the overall behavior of the group of variables.

- b. One of the most frequently cited indices is the consumer price index (CPI). The CPI measures the price behavior of a broad group of commodities often consumed by households, and so it is a weighted average. The index is a measure of inflation and tells how prices, on average, change.
 - c. Indices can be developed to measure such diverse data as wages, production, manufacturing, and stock prices. To create an index for a set of time series data, a base year must be established and assigned a value of 100. All other data are then expressed in relation to the base year.
3. Economic data are at times measured in real terms and at other times measured in nominal terms. Real data are adjusted for changes in the price level. Nominal data are expressed in terms of current prices. The nominal value of economic data is simply its money value, but the data's real value shows what the data will buy. Economists are often interested in how real values change over time or within a specific time period because such information is important in understanding the effects of inflation on the economy.
- a. The real (relative) price of a good is its price measured relative to the prices of other goods. The real price of a good is adjusted for changes in the general level of prices. The nominal price of a good is simply the price measured in dollars. Consumers are often more concerned with the relative prices of goods than with nominal prices.
 - b. The purchasing power of money is an index of the amount of goods that can be bought with a dollar. Real income is a measure of the purchasing power of income because prices are held constant. All real variables are measured in constant dollars because the effect of changes in the price level is removed so that the purchasing power of money remains the same. Nominal variables are measured in current dollars because no adjustment is made for changes in the purchasing power of these dollars.
4. Economists usually want to know how much a variable changes, and so two widely used measures are the percentage change and the growth rate.
- a. The percentage change in either time series or cross section data provides a unit-free statistic. A percentage change in an index number (or other economic data such as price, quantity,

or income) from one period to the next is calculated by the formula

$$\text{Percentage change} = \frac{\left(\begin{array}{cc} \text{ending} & \text{beginning} \\ \text{observation} & - \text{observation} \end{array} \right)}{\text{beginning observation}} \times 100$$

The percentage change can be either positive or negative, depending on the direction of the change.

- b. When time series data are being examined, it is useful to measure the growth rate of the variable over time. The growth rate is the percentage rate per period by which a variable is changing. For any two time periods, the growth rate can be calculated as a percentage change, using the formula in 4a.
5. As economists establish relationships between variables and use these relationships to make predictions, building an economic model helps organize the thinking and reasoning process. An economic model is a simplified picture of reality and provides a logical framework for examining an issue. The construction of an economic model begins with the observation of economic events in the real world. Although some elements of the model may be given, others, through a process of theoretical abstraction, may be assumed constant (other things equal). Through either statistics or logical means, the model is specified.
 - a. The main purpose of model building is to provide a systematic way of thinking about a problem. Models may be very simple or very elaborate, but they should all simplify reality. There is no easy answer to the question of how far models should go in simplifying the real world.
6. During the specification and definition of the basic framework of a model, the actual relationship between variables is unknown. The model tells what the relevant facts (data) are.
 - a. Examining historical or cross sectional data on the variables in either tabular or graphic form may help establish their relationship.
 - b. The scatter diagram is a quick and convenient method of determining how two variables are related. If a relationship exists between two variables, the scatter diagram also provides a general idea about its strength.
7. Besides showing the combined observations on two variables, the scatter diagram shows that if a relationship exists, it may be either positive or negative.
 - a. When a scatter diagram contains many observations, we can fit a line through the points on the diagram. Fitting a line through the data is a statistical technique usually performed by an econometrician. The significance of the fitted line is that it establishes an approximate quantitative relationship between the two variables.
- b. The quantitative relationship established by the econometrician between two variables takes the form of an equation, or an algebraic statement of the fitted line. The equation shows the exact relationship between two variables.
- c. Economic relationships are often presented in diagrams. An equation showing the relationship between two variables is easily plotted and states the slope and intercept of the line. The slope of a line indicates its steepness, while the intercept is the point at which the line crosses the vertical axis. The slope of a line may be positive or negative. When the slope is negative, the relationship between the variables is negative. A negative relationship between two variables means that higher values of one imply lower values of the other; the variables move in opposite directions. A positive relationship means that higher values of one imply higher values of the other; the variables move in the same direction. Not all economic relationships plot as straight lines.
8. Economists often make the simplifying assumption of "all other things equal" as they build models. This assumption is made in order to remove all the market interactions which might affect the variables under analysis. When a model specifies a relationship between two variables and all other things are assumed equal, you must be aware that some of the things that are assumed away may affect the model's results. It is not uncommon for variables to be omitted from a model when they should have been included.
9. Economists do not have the luxury of controlled laboratory experiments. However, by observing economic phenomena, presenting a theory or model to explain the phenomena, and then testing the theory, economists are learning how a complex economic system works. As theories are tested, retested, and substantiated, they are accepted as facts.

IMPORTANT TERMS AND THEIR MEANING

Match the following terms with the correct definition or phrase.

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| 1. ____ In a graphic presentation of an equation, this number tells how much Y changes when X changes | a. Consumer price index |
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