

Answers to Key Questions

CHAPTER ONE APPENDIX

1-1 Use the economic perspective to explain why someone who is normally a light eater at a standard restaurant may become somewhat of a glutton at a buffet-style restaurant which charges a single price for all you can eat.

This behavior can be explained in terms of marginal costs and marginal benefits. At a standard restaurant, items are priced individually — they have a positive marginal cost. If you order more, it will cost you more. You order until the marginal benefit from the extra food no longer exceeds the marginal cost. At a buffet you pay a flat fee no matter how much you eat. Once the fee is paid, additional food items have a zero marginal cost. You therefore continue to eat until your marginal benefit becomes zero.

1-5 Explain in detail the interrelationships between economic facts, theory, and policy. Critically evaluate this statement: “The trouble with economic theory is that it is not practical. It is detached from the real world.”

Economic theory consists of factually supported generalizations about economic behavior that can be used to formulate economic policies. Economic theory enables policymakers to formulate economic policies that are relevant to real-world goals and problems that are based upon carefully observed facts.

1-7 Indicate whether each of the following statements applies to microeconomics or macroeconomics:

(a), (d), and (f) are macro; (b), (c), and (e) are micro.

1-8 Identify each of the following as either a positive or a normative statement:

- a. The high temperature today was 89 degrees.
 - b. It was too hot today.
 - c. Other things being equal, higher interest rates reduce the total amount of borrowing.
 - d. Interest rates are too high.
- (a) and (c) are positive; (b) and (d) are normative.

1-9 Explain and give an illustration of (a) the fallacy of composition; and (b) the “after this, therefore because of this” fallacy. Why are cause-and-effect relationships difficult to isolate in the social sciences?

- (a) The fallacy of composition is the mistake of believing that something true for an individual part is necessarily true for the whole. Example: A single auto producer can increase its profits by lowering its price and taking business away from its competitors. But matched price cuts by all auto manufacturers will not necessarily yield higher industry profits.
- (b) The “after this, therefore because of this” fallacy is incorrectly reasoning that when one event precedes another, the first even necessarily caused the second. Example: Interest rates rise, followed by an increase in the rate of inflation, leading to the erroneous conclusion that the rise in interest rates caused the inflation. Actually higher interest rates slow inflation.

Cause-and-effect relationships are difficult to isolate because “other things” are continually changing.

CHAPTER TWO

2-5 Why is the problem of unemployment a part of the subject matter of economics? Distinguish between allocative efficiency and productive efficiency. Give an illustration of achieving productive, but not allocative, efficiency.

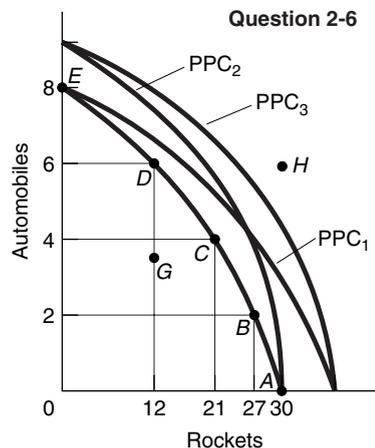
Economics deals with the “limited resources—unlimited wants” problem. Unemployment represents valuable resources that could have been used to produce more goods and services—to meet more wants and ease the economizing problem.

Allocative efficiency means that resources are being used to produce the goods and services most wanted by society. The economy is then located at the optimal point on its production possibilities curve where marginal benefit equals marginal cost for each good. Productive efficiency means the least costly production techniques are being used to produce wanted goods and services. Example: manual typewriters produced using the least-cost techniques but for which there is no demand.

2-6 Here is a production possibilities table for war goods and civilian goods:

Type of Production	Production Alternatives				
	A	B	C	D	E
Automobiles	0	2	4	6	8
Rockets	30	27	21	12	0

- a. Show these data graphically. Upon what specific assumptions is this production possibilities curve based?
- b. If the economy is at point C, what is the cost of one more automobile? One more rocket? Explain how this curve reflects increasing opportunity costs.
- c. What must the economy do to operate at some point on the production possibilities curve?
 - (a) See curve EDCBA. The assumptions are full employment and productive efficiency, fixed supplies of resources, and fixed technology.



(b) 4.5 rockets; .33 automobiles, as determined from the table. Increasing opportunity costs are reflected in the concave-from-the-origin shape of the curve. This means the economy must give up larger and larger amounts of rockets to get constant added amounts of automobiles—and vice versa.

(c) It must obtain full employment and productive efficiency.

2-9 Specify and explain the shapes of the marginal-benefit and marginal-cost curves and use these curves to determine the optimal allocation of resources to a particular product. If current output is such that marginal cost exceeds marginal benefit, should more or less resources be allocated to this product? Explain.

The marginal benefit curve is downward sloping, MB falls as more of a product is consumed because additional units of a good yield less satisfaction than previous units. The marginal cost curve is upward sloping, MC increases as more of a product is produced since additional units require the use of increasingly unsuitable resources. The optimal amount of a particular product occurs where MB equals MC. If MC exceeds MB, fewer resources should be allocated to this use. The resources are more valuable in some alternative use (as reflected in the higher MC) than in this use (as reflected in the lower MB).

2-10 Label point G inside the production possibilities curve you have drawn for question 6. What does it indicate? Label point H outside the curve. What does this point indicate? What must occur before the economy can attain the level of production indicated by point H?

G indicated unemployment, productive inefficiency, or both. H is at present unattainable. Economic growth—through more inputs, better inputs, improved technology—must be achieved to attain H.

2-11 Referring again to question 6, suppose improvement occurs in the technology of producing rockets but not in the production of automobiles. Draw the new production possibilities curve. Now assume that a technological advance occurs in producing automobiles but not in producing rockets. Draw the new production possibilities curve. Now draw a production possibilities curve that reflects technological improvement in the production of both products.

See the graph for question 2-6. PPC_1 shows improved rocket technology. PPC_2 shows improved auto technology. PPC_3 shows improved technology in producing both products.

CHAPTER THREE

3-2 What effect will each of the following have on the demand for product B?

- a. Product B becomes more fashionable.
- b. The price of substitute product C falls.
- c. Income declines and product B is an inferior good.
- d. Consumers anticipate the price of B will be lower in the near future.
- e. The price of complementary product D falls.
- f. Foreign tariff barriers on B are eliminated.

Demand increases in (a), (c), (e), and (f); decreases in (b) and (d).

3-5 What effect will each of the following have on the supply of product B?

- a. A technological advance in the methods of producing B.
- b. A decline in the number of firms in industry B.
- c. An increase in the price of resources required in the production of B.
- d. The expectation that equilibrium price of B will be lower in the future than it is currently.

e. A decline in the price of product A, a good whose production requires substantially the same techniques as does the production of B.

f. The levying of a specific sales tax upon B.

g. The granting of a 50-cent per unit subsidy for each unit of B produced.

Supply increases in (a), (d), (e), and (g); decreases in (b), (c), and (f).

3-7 Suppose the total demand for wheat and the total supply of wheat per month in the Kansas City grain market are as follows:

Thousands of bushels demanded	Price per bushel	Thousand of bushels supplied	Surplus (+) or shortage (-)
85	\$3.40	72	_____
80	3.70	73	_____
75	4.00	75	_____
70	4.30	77	_____
65	4.60	79	_____
60	4.90	81	_____

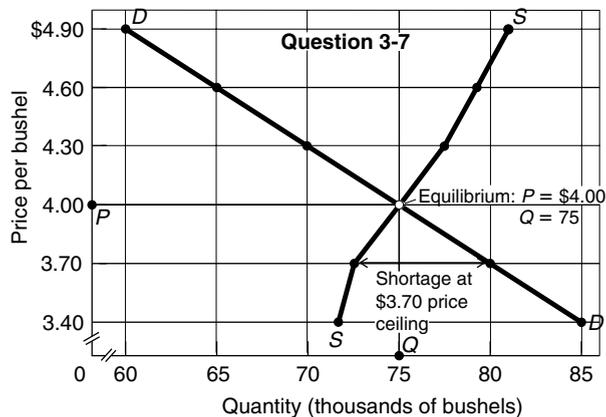
a. What will be the market or equilibrium price? What is the equilibrium quantity? Using the surplus-shortage column, explain why your answers are correct.

b. Graph the demand for wheat and the supply of wheat. Be sure to label the axes of your graph correctly. Label equilibrium price "P" and the equilibrium quantity "Q."

c. Why will \$3.40 not be the equilibrium price in this market? Why not \$4.90? "Surpluses drive prices up; shortages drive them down." Do you agree?

d. Now suppose that the government establishes a ceiling price of, say, \$3.70 for wheat. Explain carefully the effects of this ceiling price. Demonstrate your answer graphically. What might prompt the government to establish a ceiling price?

Data from top to bottom: -13; -7; 0; +7; +14; and +21.



(a) $P_e = \$4.00$; $Q_e = 75,000$. Equilibrium occurs where there is neither a shortage nor surplus of wheat. At the immediately lower price of \$3.70, there is a shortage of 7,000 bushels. At the immediately higher price of \$4.30, there is a surplus of 7,000 bushels. (See graph top of next page.)

(b) Quantity (thousands) of bushels.

(c) Because at \$3.40 there will be a 13,000 bushel shortage which will drive the price up. Because at \$4.90 there will be a 21,000 bushel surplus which will drive the price down. Quotation is incorrect; just the opposite is true.

(d) A \$3.70 ceiling causes a persistent shortage. This product may be a necessity and the government is concerned that some consumers might not be able to afford it.

3-8 How will each of the following changes in demand and/or supply affect equilibrium price and equilibrium quantity in a competitive market; that is, do price and quantity rise, fall, remain unchanged, or are the answers indeterminate, depending on the magnitudes of the shifts in supply and demand? You should rely on a supply and demand diagram to verify answers.

- a. Supply decreases and demand remains constant.
 - b. Demand decreases and supply remains constant.
 - c. Supply increases and demand is constant.
 - d. Demand increases and supply increases.
 - e. Demand increases and supply is constant.
 - f. Supply increases and demand decreases.
 - g. Demand increases and supply decreases.
 - h. Demand decreases and supply decreases.
- (a) Price up; quantity down;
 - (b) Price down; quantity down;
 - (c) Price down; quantity up;
 - (d) Price indeterminate; quantity up;
 - (e) Price up; quantity up;
 - (f) Price down; quantity indeterminate;
 - (g) Price up, quantity indeterminate;
 - (h) Price indeterminate and quantity down.

CHAPTER FOUR

4-7 Assume that a business firm finds that its profits will be at maximum when it produces \$40 worth of product A. Suppose also that each of the three techniques shown in the following table will produce the desired output.

Resource	Price per unit of resource	Resource Units Required		
		Technique No. 1	Technique No. 2	Technique No. 3
Labor	\$3	5	2	3
Land	4	2	4	2
Capital	2	2	4	5
Entrepreneurial ability	2	4	2	4

- a. With the resource prices shown, which technique will the firm choose? Why? Will production entail profits or losses? Will the industry expand or contract? When is a new equilibrium output achieved?
 - b. Assume now that a new technique, technique No. 4, is developed. It entails the use of 2 units of labor, 2 of land, 6 of capital, and 3 of entrepreneurial ability. Given the resource prices in the table, will the firm adopt the new technique? Explain your answers.
 - c. Suppose now that an increase in labor supply causes the price of labor to fall to \$1.50 per unit, all other resource prices being unchanged. Which technique will the producer now choose? Explain.
 - d. "The market system causes the economy to conserve most in the use of those resources which are particularly scarce in supply. Resources that are scarcest relative to the demand for them have the highest prices. As a result, producers use these resources as sparingly as is possible." Evaluate this statement. Does your answer to part c, above, bear out this contention? Explain.
- (a) Technique 2. Because it produces the output with least cost (\$34 compared to \$35 each for the other two). Economic profit will be \$6 (= 40 - \$34), which will cause the industry to expand. Expansion will continue until prices decline to where total revenue is \$34 (equal to total cost).

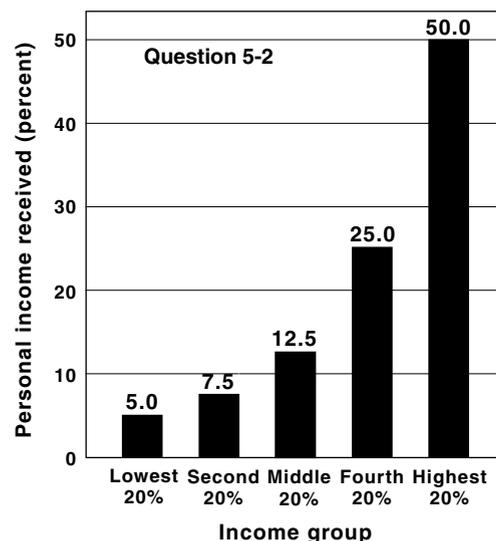
- (b) Adopt technique 4 because its cost is now lowest at \$32.
- (c) Technique 1 because its cost is now lowest at \$27.50
- (d) The statement is logical. Increasing scarcity causes prices to rise. Firms ignoring higher resource prices will become high-cost producers and be competed out of business by firms switching to the less expensive inputs. The market system forces producers to conserve on the use of highly scarce resources. Question 8c confirms this: Technique 1 was adopted because labor had become less expensive.

4-9 Some large hardware stores such as Home Depot boast of carrying as many as 20,000 different products in each store. What motivated the producers of those products—everything from screwdrivers to ladders to water heaters—to make them and offer them for sale? How did producers decide on the best combinations of resources to use? Who made these resources available, and why? Who decides whether these particular hardware products should continue to get produced and offered for sale?

The quest for profit led firms to produce these goods. Producers looked for and found the least-cost combination of resources in producing their output. Resource suppliers, seeking income, made these resources available. Consumers, through their dollar votes, ultimately decide on what will continue to be produced.

CHAPTER FIVE

5-2 Assume that the five residents of Econoville receive incomes of \$50, \$75, \$125, \$250, and \$500. Present the resulting personal distribution of income as a graph similar to Figure 5-2. Compare the incomes of the lowest and highest fifth of the income receivers. The distribution of income is quite unequal. The highest 20 percent of the residents receive 10 times more income than the lowest 20 percent.



5-4 What are the major legal forms of business organization? Briefly state the advantages and disadvantages of each. How do you account for the dominant role of corporations in the U.S. economy?

The legal forms of business organizations are: sole proprietorship, partnership, and corporation.
 Proprietorship advantages: easy to start and provides maximum freedom for the proprietor to do what she/he thinks best.

Proprietorship disadvantages: limited financial resources; the owner must be a Jack-or-Jill-of-all-trades; unlimited liability.

Partnership advantages: easy to organize; greater specialization of management; and greater financial resources. Disadvantages: financial resources are still limited; unlimited liability; possibility of disagreement among the partners; and precarious continuity.

Corporation advantages: can raise large amounts of money by issuing stocks and bonds; limited liability; continuity.

Corporation disadvantages: red tape and expense in incorporating; potential for abuse of stockholder and bondholder funds; double taxation of profits; separation of ownership and control.

The dominant role of corporations stems from the advantages cited, particularly unlimited liability and the ability to raise money.

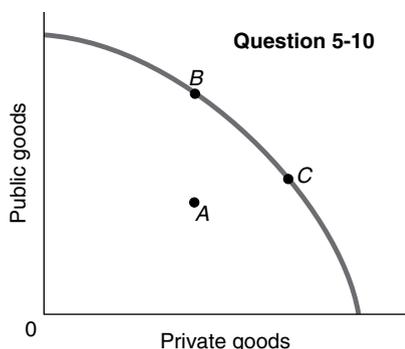
5-9 What are the basic characteristics of public goods? Explain the significance of the exclusion principle. By what means does government provide public goods?

Public goods are indivisible (they are produced in such large units that they cannot be sold to individuals) and the exclusion principle does not apply to them (once the goods are produced nobody—including free riders—can be excluded from the goods' benefits). The free-rider problem explains the significance of the exclusion principle. The exclusion principle separates goods and services which private firms will supply (because those who do not pay for them can be excluded from their benefits) and goods and services which government must supply (because people can obtain the benefits without paying). Government must levy taxes to get revenues to pay for public goods.

5-10 Draw a production possibilities curve with public goods on the vertical axis and private goods on the horizontal axis. Assuming the economy is initially operating on the curve, indicate the means by which the production of public goods might be increased. How might the output of public goods be increased if the economy is initially functioning at a point inside the curve?

On the curve, the only way to obtain more public goods is to reduce the production of private goods (from *C* to *B*).

An economy operating inside the curve can expand the production of public goods without sacrificing private goods (say, from *A* to *B*) by making use of unemployed resources.



5-15 Suppose in Fiscalville there is no tax on the first \$10,000 of income, but earnings between \$10,000 and \$20,000 are taxed at 20 percent and income between \$20,000 and \$30,000 at 30 percent. Any income above \$30,000 is taxed at 40 percent. If your income is \$50,000, how much in taxes will you pay? Determine your marginal and average tax rates. Is this a progressive tax?

Total tax = \$13,000; marginal tax rate = 40% average tax rate = 26%. This is a progressive tax; the average tax rate rises as income goes up.

CHAPTER SIX

6-4 The following are production possibilities tables for South Korea and the United States. Assume that before specialization and trade the optimal product-mix for South Korea is alternative B and for the United States alternative U.F

		<i>South Korea's production possibilities</i>					
<i>Product</i>		A	B	C	D	E	F
Radios (in 1000s)		30	24	18	12	6	0
chemicals (tons)		0	6	12	18	24	30

		<i>U.S. production possibilities</i>					
<i>Product</i>		R	S	T	U	V	W
Radios (in 1000s)		10	8	6	4	2	0
chemicals (tons)		0	4	8	12	16	20

a. Are comparative cost conditions such that the two areas should specialize? If so, what product should each produce?
 b. What is the total gain in radio and chemical output that results from this specialization?

c. What are the limits of the terms of trade? Suppose actual terms of trade are 1 unit of radios for 1-1/2 units of chemicals and that 4 units of radios are exchanged for 6 units of chemicals. What are the gains from specialization and trade for each area?

d. Can you conclude from this illustration that specialization according to comparative advantage results in more efficient use of world resources? Explain.

(a) Yes, because the opportunity cost of radios is less ($1R = 1C$) in South Korea than in the United States ($1R = 2C$). South Korea should produce radios and the United States should produce chemicals.

(b) If they specialize, the United States can produce 20 tons of chemicals and South Korea can produce 30,000 radios. Before specialization South Korea produced alternative B and the United States alternative U for a total of 28,000 radios (24,000 + 4,000) and 18 tons of chemicals (6 tons + 12 tons). The gain is 2,000 radios and 2 tons of chemicals.

(c) The limits of the terms of trade are determined by the comparative cost conditions in each country before trade: $1R = 1C$ in South Korea and $1R = 2C$ in the United States. The terms of trade must be somewhere between these two ratios for trade to occur.

If the terms of trade are $1R = 1-1/2C$, South Korea would end up with 26,000 radios ($= 30,000 - 4,000$) and 6 tons of chemicals. The United States would have 4,000 radios and 14 tons of chemicals ($= 20 - 6$). South Korea has gained 2,000 radios. The United States has gained 2 tons of chemicals.

(d) Yes, the world is obtaining more output from its fixed resources.

6-6 True or false? "U.S. exports create a demand for foreign currencies; foreign imports of U.S. goods generate supplies of foreign currencies." Explain. Would a decline in U.S. consumer income or a weakening of U.S. preferences for foreign products cause the dollar to depreciate or appreciate? Other things equal, what would be the effects of that depreciation or appreciation on U.S. exports and imports?

The first part of this statement is incorrect. U.S. exports create a domestic *supply* of foreign currencies, not a domestic demand for them. The second part of the statement is accurate. The foreign demand for dollars (from U.S. exports) generates a supply of foreign currencies to the United States.

A decline in U.S. incomes or a weakening of U.S. preferences for foreign goods would reduce U.S. imports, reducing U.S.

demand for foreign currencies. These currencies would depreciate (the dollar would appreciate). Dollar appreciation means U.S. exports would decline and U.S. imports would increase.

6-10 Identify and state the significance of each of the following: (a) WTO; (b) EU; (c) euro; and (d) NAFTA. What commonality do they share?

(a) The WTO oversees trade agreements reached by member nations and arbitrates trade disputes among them. (b) The EU is a trading bloc of 15 European countries who have agreed to abolish tariffs and import quotas on most products and have liberalized the movement of labor and capital within the EU. (c) The euro is the common currency that will be used by 11 of the 15 EU countries. (d) NAFTA is a trade bloc made up of the United States, Canada, and Mexico whose purpose is to reduce tariffs and other trade barriers among the three countries.

All of the above have the goals of increasing international trade and leading to a better allocation of the world's resources.

CHAPTER SEVEN

7-3 Why do national income accountants include only final goods in measuring GDP for a particular year? Why don't they include the value of stocks and bonds sold? Why don't they include the value of used furniture bought and sold?

The dollar value of final goods includes the dollar value of intermediate goods. If intermediate goods were counted, then multiple counting would occur. The value of steel (intermediate good) used in autos is included in the price of the auto (the final product).

This value is not included in GDP because such sales and purchases simply transfer the ownership of existing assets; such sales and purchases are not themselves (economic) investment and thus should not be counted as production of final goods and services. Used furniture was produced in some previous year; it was counted as GDP then. Its resale does not measure new production.

7-8 Below is a list of domestic output and national income figures for a given year. All figures are in billions. The questions that follow ask you to determine the major national income measures by both the expenditure and income methods. The results you obtain with the different methods should be the same.

Personal consumption expenditures	\$245
Net foreign factor income earned	4
Transfer payments	12
Rents	14
Consumption of fixed capital (depreciation)	27
Social security contributions	20
Interest	13
Proprietors' income	33
Net exports	11
Dividends	16
Compensation of employees	223
Indirect business taxes	18
Undistributed corporate profits	21
Personal taxes	26
Corporate income taxes	19
Corporate profits	56
Government purchases	72
Net private domestic investment	33
Personal saving	20

a. Using the above data, determine GDP and NDP by both the expenditure and income methods.

b. Now determine NI: first, by making the required additions and subtractions from GDP; and second, by adding up the types of income which comprise NI.

c. Adjust NI from (b) as required to obtain PI.

d. Adjust PI from part c as required to obtain DI.

(a) GDP = \$388, NDP = \$362;

(b) NI = \$399;

(c) PI = \$291;

(d) DI = \$265.

7-11 Suppose that in 1984 the total output in a single-good economy was 7,000 buckets of chicken. Also suppose that in 1984 each bucket of chicken was priced at \$10. Finally, assume that in 1992 the price per bucket of chicken was \$16 and that 22,000 buckets were purchased. Determine the GDP price index for 1984, using 1992 as the base year. By what percentage did the price level, as measured by this index, rise between 1984 and 1992? Use the two methods listed in Table 7-6 to determine real GDP for 1984 and 1992.

$X/100 = \$10/\$16 = .625$ or 62.5 when put in percentage or index form ($.625 \times 100$)

$$\frac{100 - 62.5}{62.5} = .60 \text{ or } 60\% \text{ (Easily calculated)} \quad \frac{16 - 10}{10} = \frac{6}{10} = .6 = 60\%$$

Method 1: 1992 = $(22,000 \times \$16) \div 1.0 = \$352,000$
1984 = $(\$7,000 \times \$10) \div .625 = \$112,000$

Method 2: 1992 = $22,000 \times \$16 = \$352,000$
1984 = $7,000 \times \$16 = \$112,000$

7-12 The following table shows nominal GDP and an appropriate price index for a group of selected years. Compute real GDP. Indicate in each calculation whether you are inflating or deflating the nominal GDP data.

Year	Normal GDP, Billions	Price index (1996–100)	Real GDP billions
1960	\$527.4	22.19	\$ ____
1968	911.5	26.29	\$ ____
1978	2295.9	48.22	\$ ____
1988	4742.5	80.22	\$ ____
1988	8790.2	103.22	\$ ____

Values for real GDP, top to bottom of the column: \$2,376.7 (inflating); \$3,467.1 (inflating); \$4,761.3 (inflating); \$5,911.9 (inflating); \$8,516 (deflating).

CHAPTER EIGHT

8-2 Suppose an economy's real GDP is \$30,000 in year 1 and \$31,200 in year 2. What is the growth rate of its real GDP? Assume that population was 100 in year 1 and 102 in year 2. What is the growth rate of GDP per capita?

Growth rate of real GDP = 4 percent ($= \$31,200 - \$30,000 / \$30,000$). GDP per capita in year 1 = \$300 ($= \$30,000/100$). GDP per capita in year 2 = \$305.88 ($= \$31,200/102$). Growth rate of GDP per capita is 1.96 percent ($= (\$305.88 - \$300)/\$300$).

8-4 What are the four phases of the business cycle? How long do business cycles last? How do seasonal variations and

secular trends complicate measurement of the business cycle? Why does the business cycle affect output and employment in capital goods and consumer durable goods industries more severely than in industries producing nondurables?

The four phases of a typical business cycle, starting at the bottom, are trough, recovery, peak, and recession. As seen in Figure 8-1, the length of a complete cycle varies from about 2 to 3 years to as long as 15 years.

Normally there is a pre-Christmas spurt in production and sales and a January slackening. This normal seasonal variation does not signal boom or recession. From decade to decade, the long-term trend (the secular trend) of the U.S. economy has been upward. A period of no GDP growth thus does not mean that all is normal but that the economy is operating below its trend growth of output.

Because capital goods and durable goods last, purchases can be postponed. This may happen when a recession is forecast. Capital and durable goods industries therefore suffer large output declines during recessions. In contrast, consumers cannot long postpone the buying of nondurables such as food; therefore recessions only slightly reduce nondurable output. Also, capital and durable goods expenditures tend to be "lumpy." Usually, a large expenditure is needed to purchase them and this shrinks to zero after purchase is made.

8-6 Use the following data to calculate (a) the size of the labor force and (b) the official unemployment rate: total population, 500; population under 16 years of age or institutionalized, 120; not in labor force, 150; unemployed, 23; part-time workers looking for full-time jobs, 10.

Labor force = #230 [= 500 - (120 + 150)]; official unemployment rate = 10% [(23/230) × 100].

8-8 Assume that in a particular year the natural rate of unemployment is 5 percent and the actual rate of unemployment is 9 percent. Use Okun's law to determine the size of the GDP gap in percentage-point terms. If the nominal GDP is \$500 billion in that year, how much output is being foregone because of cyclical unemployment?

GDP gap = 8 percent [= (9 - 5) × 2]; forgone output estimated at \$40 billion (=8% of \$500 billion).

8-10 If the price index was 110 last year and is 121 this year, what is this year's rate of inflation? What is the "rule of 70"? How long would it take for the price level to double if inflation persisted at (a) 2, (b) 5, and (c) 10 percent per year?

This year's rate of inflation is 10% or [(121 - 110)/110] × 100.

Dividing 70 by the annual percentage rate of increase of any variable (for instance, the rate of inflation or population growth) will give the approximate number of years for doubling of the variable.

(a) 35 years (= 70/2); (b) 14 years (= 70/5); (c) 7 years (= 70/10).

CHAPTER NINE

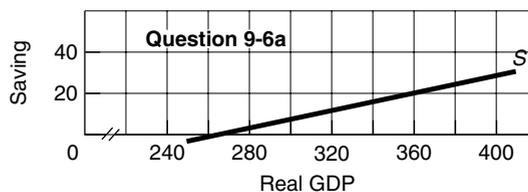
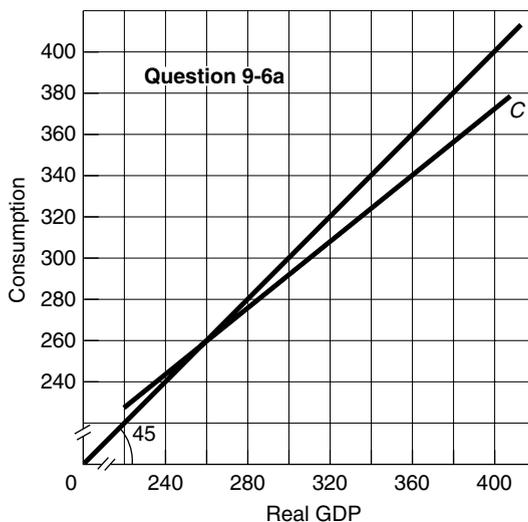
9-5 Complete the accompanying table (top of next column).

- a. Show the consumption and saving schedules graphically.
- b. Locate the break-even level of income. How is it possible for households to dissave at very low income levels?
- c. If the proportion of total income consumed (APC) decreases and the proportion saved (APS) increases as income rises, explain both verbally and graphically how the MPC and MPS can be constant at various levels of income.

Level of output and income (GDP = DI)	Consumption	Saving	APC	APS	MPC	MPS
\$240	\$ _____	\$ -4	_____	_____	_____	_____
260	\$ _____	0	_____	_____	_____	_____
280	\$ _____	4	_____	_____	_____	_____
300	\$ _____	8	_____	_____	_____	_____
320	\$ _____	12	_____	_____	_____	_____
340	\$ _____	16	_____	_____	_____	_____
360	\$ _____	20	_____	_____	_____	_____
380	\$ _____	24	_____	_____	_____	_____
400	\$ _____	28	_____	_____	_____	_____

Data for completing the table (top to bottom). Consumption: \$244; \$260; \$276; \$292; \$308; \$324; \$340; \$356; \$372. APC: 1.02; 1.00; .99; .97; .96; .95; .94; .94; .93. APS: -.02; .00; .01; .03; .04; .05; .06; .06; .07. MPC: .80 throughout. MPS: .20 throughout.

(a) See the graphs.



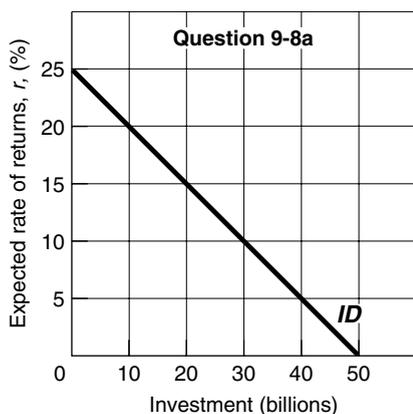
(b) Break-even income = \$260. Households dissave borrowing or using past savings.

(c) Technically, the APC diminishes and the APS increases because the consumption and saving schedules have positive and negative vertical intercepts respectively. (Appendix to Chapter 1). MPC and MPS measure changes in consumption and saving as income changes; they are the slopes of the consumption and saving schedules. For straight-line consumption and saving schedules, these slopes do not change as the level of income changes; the slopes and thus the MPC and MPS remain constant.

9-7 Assume there are no investment projects in the economy which yield an expected rate of return of 25 percent or more. But suppose there are \$10 billion of investment projects yielding expected rate of return of between 20 and 25 percent;

another \$10 billion yielding between 15 and 20 percent; another \$10 billion between 10 and 15 percent; and so forth. Cumulate these data and present them graphically, putting the expected rate of net return on the vertical axis and the amount of investment on the horizontal axis. What will be the equilibrium level of aggregate investment if the real interest rate is (a) 15 percent, (b) 10 percent, and (c) 5 percent? Explain why this curve is the investment-demand curve.

See the graph below. Aggregate investment: (a) \$20 billion; (b) \$30 billion; (c) \$40 billion. This is the investment-demand curve because we have applied the rule of undertaking all investment up to the point where the expected rate of return, r , equals the interest rate, i .



9-9 Assuming the level of investment is \$16 billion and independent of the level of total output, complete the following table and determine the equilibrium levels of output and employment which this private closed economy would provide. What are the sizes of the MPC and MPS?

Possible levels of employment (millions)	Real domestic output (GDP = DI) (billions)	Consumption (billions)	Saving (billions)
40	\$240	\$244	\$ ____
45	260	260	\$ ____
50	280	276	\$ ____
55	300	292	\$ ____
60	320	308	\$ ____
65	340	324	\$ ____
70	360	340	\$ ____
75	380	356	\$ ____
80	400	372	\$ ____

Saving data for completing the table (top to bottom): \$-4; \$0; \$4; \$8; \$12; \$16; \$20; \$24; \$28.

Equilibrium GDP = \$340 billion, determined where (1) aggregate expenditures equal GDP (C of \$324 billion + I of \$16 billion = GDP of \$340 billion); or (2) where planned $I = S$ (I of \$16 billion = S of \$16 billion). Equilibrium level of employment = 65 million; $MPC = .8$; $MPS = .2$.

9-10 Using the consumption and saving data given in question 9 and assuming the level of investment is \$16 billion, what are the levels of saving and planned investment at the \$380 billion level of domestic output? What are the levels of saving and actual investment at that level? What are the levels of saving and planned investment at the \$300 billion level of domestic output? What are the levels of saving and actual investment? Use the concept of

unplanned investment to explain adjustments toward equilibrium from both the \$380 and \$300 billion levels of domestic output.

At the \$380 billion level of GDP, saving = \$24 billion; planned investment = \$16 billion (from the question). This deficiency of \$8 billion of planned investment causes an unplanned \$8 billion increase in inventories. Actual investment is \$24 billion (= \$16 billion of planned investment plus \$8 billion of unplanned inventory investment), matching the \$24 billion of actual saving.

At the \$300 billion level of GDP, saving = \$8 billion; planned investment = \$16 billion (from the question). This excess of \$8 billion of planned investment causes an unplanned \$8 billion decline in inventories. Actual investment is \$8 billion (= \$16 billion of planned investment minus \$8 billion of unplanned inventory disinvestment) matching the actual of \$8 billion.

When unplanned investments in inventories occur, as at the \$380 billion level of GDP, businesses revise their production plans downward and GDP falls. When unplanned disinvestments in inventories occur, as at the \$300 billion level of GDP; businesses revise their production plans upward and GDP rises. Equilibrium GDP—in this case, \$340 billion—occurs where planned investment equals saving.

Say's law states that "supply creates its own demand." People work in order to earn income to and plan to spend the income on output—why else would they work? Basically, the classical economists would say that the economy will operate at full employment or on the production possibilities curve because income earned will be recycled or spent on output. Thus the spending flow is continuously recycled in production and earning income. If consumers don't spend all their income, it would be redirected via saving to investment spending on capital goods.

The Keynesian perspective, on the other hand, suggests that society's savings will not necessarily all be channeled into investment spending. If this occurs, we have a situation in which aggregate demand is less than potential production. Because producers cannot sell all of the output produced at a full employment level, they will reduce output and employment to meet the aggregate demand (consumption plus investment) and the equilibrium output will be at a point inside the production possibilities curve at less than full employment.

CHAPTER TEN

10-2 What is the multiplier effect? What relationship does the MPC bear to the size of the multiplier? The MPS? What will the multiplier be when the MPS is 0, .4, .6, and 1? When the MPC is 1, .90, .67, .50, and 0? How much of a change in GDP will result if businesses increase their level of investment by \$8 billion and the MPC in the economy is .80? If the MPC is .67? Explain the difference between the simple and the complex multiplier.

The multiplier effect is the magnified increase in equilibrium GDP that occurs when any component of aggregate expenditures changes. The greater the MPC (the smaller the MPS), the greater the multiplier.

$MPS = 0$, multiplier = infinity; $MPS = .4$, multiplier = 2.5; $MPS = .6$, multiplier = 1.67; $MPS = 1$, multiplier = 1.

$MPC = 1$; multiplier = infinity; $MPC = .9$, multiplier = 10; $MPC = .67$; multiplier = 3; $MPC = .5$, multiplier = 2; $MPC = 0$, multiplier = 1.

$MPC = .8$: Change in GDP = \$40 billion (= \$8 billion \times multiplier of 5); $MPC = .67$: Change in GDP = \$24 billion (\$8 billion \times multiplier of 3). The simple multiplier takes account of only the leakage of saving. The complex multiplier also takes account of leakages of taxes and imports, making the complex multiplier less than the simple multiplier.

10-5 The data in columns 1 and 2 of the table below are for a private closed economy.

(1) Real domestic output (GDP=DI) billions	(2) Aggregate expenditures private closed economy, billions	(3) Exports, billions	(4) Imports, billions	(5) Net exports, private economy	(6) Aggregate expenditures, open billions
\$200	\$240	\$20	\$30	\$ _____	\$ _____
\$250	\$280	\$20	\$30	\$ _____	\$ _____
\$300	\$320	\$20	\$30	\$ _____	\$ _____
\$350	\$360	\$20	\$30	\$ _____	\$ _____
\$400	\$400	\$20	\$30	\$ _____	\$ _____
\$450	\$440	\$20	\$30	\$ _____	\$ _____
\$500	\$480	\$20	\$30	\$ _____	\$ _____
\$550	\$520	\$20	\$30	\$ _____	\$ _____

a. Use columns 1 and 2 to determine the equilibrium GDP for this hypothetical economy.

b. Now open this economy for international trade by including the export and import figures of columns 3 and 4. Calculate net exports and determine the equilibrium GDP for the open economy. Explain why equilibrium GDP differs from the closed economy.

c. Given the original \$20 billion level of exports, what would be the equilibrium GDP if imports were \$10 billion greater at each level of GDP? Or \$10 billion less at each level of GDP? What generalization concerning the level of imports and the equilibrium GDP do these examples illustrate?

d. What is the size of the multiplier in these examples?

(a) Equilibrium GDP for closed economy = \$400 billion.

(b) Net export data for column 5 (top to bottom); \$-10 billion in each space. Aggregate expenditure data for column 6 (top to bottom): \$230; \$270; \$310; \$350; \$390; \$430; \$470; \$510. Equilibrium GDP for the open economy is \$350 billion, \$50 billion below the \$400 billion equilibrium GDP for the closed economy. The \$-10 billion of net exports is a leakage which reduces equilibrium GDP by \$50 billion.

(c) Imports = \$40 billion: Aggregate expenditures in the private open economy would fall by \$10 billion at each GDP level and the new equilibrium GDP would be \$300 billion. Imports = \$20 billion: Aggregate expenditures would increase by \$10 billion; new equilibrium GDP would be \$400 billion. Exports constant, increases in imports reduce GDP; decreases in imports increase GDP.

(d) Since every rise of \$50 billion in GDP increases aggregate expenditures by \$40 billion, the MPC is .8 and so the multiplier is 5.

10-8 Refer to columns 1 and 6 of the tabular data for question 5. Incorporate government into the table by assuming that it plans to tax and spend \$20 billion at each possible level of GDP. Also assume that all taxes are personal taxes and that government spending does not induce a shift in the private aggregate expenditures schedule. Compute and explain the changes in equilibrium GDP caused by the addition of government.

Before G is added, open private sector equilibrium will be at 350. The addition of government expenditures of G to our analysis raises the aggregate expenditures ($C + I_g + X_n + G$) schedule and increases the equilibrium level of GDP as would an increase in C , I_g , or X_n . Note that changes in government spending are subject to the multiplier effect. Government spending supplements private investment and export spending ($I_g + X + G$), increasing the equilibrium GDP to 450.

The addition of \$20 billion of government expenditures and \$20 billion of personal taxes increases equilibrium GDP from \$350 to \$370 billion. The \$20 billion increase in G raises equilibrium GDP by \$100 billion (= \$20 billion \times the multiplier of 5); the \$20 billion increase in T reduces consumption by \$16 billion at every level. (= \$20 billion \times the MPC of .8). This \$16 billion decline in turn reduces equilibrium GDP by \$80 billion (\$16 billion \times multiplier of 5). The net change from including balanced government spending and taxes is \$20 billion (= \$100 billion - \$80 billion).

10-10 Refer to the accompanying table in answering the questions which follow:

(1) Possible levels of employment, millions	(2) Real domestic output, billions	(3) Real domestic output, billions
90	\$500	\$520
100	550	560
110	600	600
120	650	640
130	700	680

a. If full employment in this economy is 130 million, will there be an inflationary or recessionary gap? What will be the consequence of this gap? By how much would aggregate expenditures in column 3 have to change at each level of GDP to eliminate the inflationary or recessionary gap? Explain.

b. Will there be an inflationary or recessionary gap if the full-employment level of output is \$500 billion? Explain the consequences. By how much would aggregate expenditures in column 3 have to change at each level of GDP to eliminate the inflationary or recessionary gap? Explain.

c. Assuming that investment, net exports, and government expenditures do not change with changes in real GDP, what are the sizes of the MPC, the MPS, and the multiplier?

(a) A recessionary gap. Equilibrium GDP is \$600 billion, while full employment GDP is \$700 billion. Employment will be 20 million less than at full employment. Aggregate expenditures would have to increase by \$20 billion (= \$700 billion - \$680 billion) at each level of GDP to eliminate the recessionary gap.

(b) An inflationary gap. Aggregate expenditures will be excessive, causing demand-pull inflation. Aggregate expenditures would have to fall by \$20 billion (= \$520 billion - \$500 billion) at each level of GDP to eliminate the inflationary gap.

(c) $MPC = .8$ ($= \$40 \text{ billion}/\50 billion); $MPS = .2$ ($= 1 - .8$); multiplier = 5 ($= 1/.2$).

CHAPTER ELEVEN

11-4 Suppose that aggregate demand and supply for a hypothetical economy are as shown:

Amount of real domestic output demanded, billions	Price level (price index)	Amount of real domestic output supplied, billions
\$100	300	\$400
200	250	400
300	200	300
400	150	200
500	150	100

a. Use these sets of data to graph the aggregate demand and supply curves. What will be the equilibrium price level and level of real domestic output in this hypothetical economy? Is the equilibrium real output also the absolute full-capacity real output? Explain.

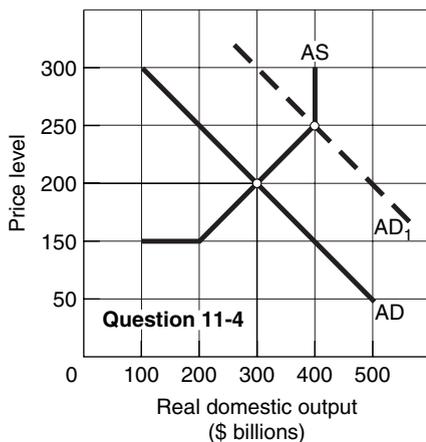
b. Why will a price level of 150 not be an equilibrium price level in this economy? Why not 250?

c. Suppose that buyers desire to purchase \$200 billion of extra real domestic output at each price level. What factors might cause this change in aggregate demand? What is the new equilibrium price level and level of real output? Over which range of the aggregate supply curve—horizontal, intermediate, or vertical—has equilibrium changed?

(a) See the graph. Equilibrium price level = 200. Equilibrium real output = \$300 billion. No, the full-capacity level of GDP is \$400 billion, where the AS curve becomes vertical

(b) At a price level of 150, real GDP supplied is a maximum of \$200 billion, less than the real GDP demanded of \$400 billion. The shortage of real output will drive the price level up. At a price level of 250, real GDP supplied is \$400 billion, which is more than the real GDP demanded of \$200 billion. The surplus of real output will drive down the price level. Equilibrium occurs at the price level at which AS and AD intersect.

See the graph. Increases in consumer, investment, government, or net export spending might shift the AD curve rightward. New equilibrium price level = 250. New equilibrium GDP = \$400 billion. The intermediate range.



11-5 Suppose that the hypothetical economy in question 4 had the following relationship between its real domestic output and the input quantities necessary for producing that level of output:

a. What is productivity in this economy?
b. What is the per unit cost of production if the price of each input is \$2?

c. Assume that the input price increases from \$2 to \$3 with no accompanying change in productivity. What is the new per unit cost of production? In what direction did the \$1 increase in input price push the aggregate supply curve? What effect would this shift in aggregate supply have upon the price level and the level of real output?

d. Suppose that the increase in input price does not occur but instead that productivity increases by 100 percent. What would be the new per unit cost of production? What effect would this change in per unit production cost have on the aggregate supply curve? What effect would this shift in aggregate supply have on the price level and the level of real output?

Input quantity	Real domestic output
150.0	400
112.5	300
75.0	200

(a) Productivity = 2.67 ($= 300/112.5$).

(b) Pre-unit cost of production = \$.75 ($= \$2 \times 112.5/300$).

(c) New per unit production cost = \$1.13. The AS curve would shift leftward. The price level would rise and real output would decrease.

(d) New per unit cost of production = \$0.375 ($= \$2 \times 112.5/600$). AS curve shifts to the right; price level declines and real output increases.

11-7 What effects would each of the following have on aggregate demand or aggregate supply? In each case use a diagram to show the expected effects on the equilibrium price level and level of real output. Assume that all other things remain constant.

- a.** A widespread fear of depression on the part of consumers
- b.** A large purchase of U.S. wheat by Russia
- c.** A \$1 increase in the excise tax on cigarettes
- d.** A reduction in interest rates at each price level
- e.** A major cut in Federal spending for health care
- f.** The expectation of a rapid rise in the price level
- g.** The complete disintegration of OPEC, causing oil prices to fall by one-half
- h.** A 10 percent reduction in personal income tax rates
- i.** An increase in labor productivity
- j.** A 12 percent increase in nominal wages
- k.** Depreciation in the international value of the dollar
- l.** A sharp decline in the national incomes of our western European trading partners
- m.** A sizable increase in U.S. immigration.

- (a) AD curve left
- (b) AD curve right
- (c) AS curve left
- (d) AD curve right
- (e) AD curve left
- (f) AD curve right
- (g) AS curve right
- (h) AD curve right
- (i) AS curve right
- (j) AS curve left
- (k) AD curve right; AS curve left
- (l) AD curve left
- (m) AS curve right.

11-8 Other things being equal, what effect will each of the following have on the equilibrium price level and level of real output:

- a. An increase in aggregate demand in the vertical range of aggregate supply
- b. An increase in aggregate supply with no change in aggregate demand (assume prices and wages are flexible)
- c. Equal increases in aggregate demand and aggregate supply
- d. A reduction in aggregate demand in the horizontal range of aggregate supply
- e. An increase in aggregate demand and a decrease in aggregate supply
- f. A decrease in aggregate demand in the intermediate range of aggregate supply
 - (a) Price level rises and no change in real output
 - (b) Price level drops and real output increases
 - (c) Price level does not change, but real output rises
 - (d) Price level does not change, but real output declines
 - (e) Price level increases, but the change in real output is indeterminate
 - (f) Price level may not change, but real output declines (if prices are flexible downward, then output will decline but not as much as if prices stay high)

CHAPTER TWELVE

12-2 Assume that a hypothetical economy with an MPC of .8 is experiencing severe recession. By how much would government spending have to increase to shift the aggregate demand curve rightward by \$25 billion? How large a tax cut would be needed to achieve this same increase in aggregate demand? Why the difference? Determine one possible combination of government spending increases and tax decreases that would accomplish this same goal. (See Figure 12-1 for illustration.)

In this problem, the multiplier is $1/.2$ or 5 so, the increase in government spending = \$5 billion.

For tax cut question, initial spending of \$5 billion is still required, but only .8 (= MPC) of a tax cut will be spent. So $.8 \times$ tax cut = \$5 billion or tax cut = \$6.25 billion. Part of the tax reduction (\$1.25 billion) is saved, not spent.

One combination: a \$1 billion increase in government spending and a \$5 billion tax cut.

12-3 What are government's fiscal policy options for ending severe demand-pull inflation? Use the aggregate demand-aggregate supply model to show the impact of these policies on the price level. Which of these fiscal policy options do you think a "conservative" economist might favor? A "liberal" economist?

Options are to reduce government spending, increase taxes, or some combination of both. See Figure 12-2. If the price level is flexible downward, it will fall. In the real world, the goal is to reduce inflation—to keep prices from rising so rapidly—not to reduce the price level. A "conservative" economist might favor cuts in government spending since this would reduce the size of government. A "liberal" economist might favor a tax hike, it would preserve government spending programs.

12-7 Define the "full-employment budget" explain its significance, and state why it may differ from the "actual budget." Suppose the full-employment, noninflationary level of real output is GDP_3 (not GDP_2) in the economy depicted in Figure 12-3. If the economy is operating at GDP_2 instead of GDP_3 , what is the status of its full-employment budget? Of its current fiscal policy? What change in fiscal policy would you recommend? How would you accomplish that in terms of the G and T lines in the figure?

The full-employment budget (also call standardized) measures what the Federal deficit or surplus would be if the economy reached full-employment level of GDP with existing tax and

spending policies. If the full-employment budget is balanced, then the government is not engaging in either expansionary nor contractionary policy, even if, for example, a deficit automatically results when GDP declines. The "actual" budget is the deficit or surplus that results when revenues and expenditures occur over a year if the economy is not operating at full-employment.

Looking at Figure 12-3, if full-employment GDP level was GDP_3 , then the full-employment budget is contractionary since a surplus would exist. Even though the "actual" budget has no deficit at GDP_2 , fiscal policy is contractionary. To move the economy to full-employment, government should cut taxes or increase spending. You would raise G line or lower T line or combination of each until they intersect at GDP_3 .

12-10 Briefly state and evaluate the problem of time lags in enacting and applying fiscal policy. Explain the notion of a political business cycle. What is the crowding-out effect and why is it relevant to fiscal policy? In what respect is the net export effect similar to the crowding-out effect?

It takes time to ascertain the direction in which the economy is moving (recognition lag), to get a fiscal policy enacted into law (administrative lag); and for the policy to have its full effect on the economy (operational lag). Meanwhile, other factors may change, rendering inappropriate a particular fiscal policy. Nevertheless, discretionary fiscal policy is a valuable tool in preventing severe recession or severe demand-pull inflation.

A political business cycle is the concept that politicians are more interested in reelection than in stabilizing the economy. Before the election, they enact tax cuts and spending increases to please voters even though this may fuel inflation. After the election, they apply the brakes to restrain inflation; the economy will slow and unemployment will rise. In this view the political process creates economic instability.

The crowding-out effect is the reduction in investment spending caused by the increase in interest rates arising from an increase in government spending, financed by borrowing. The increase in G was designed to increase AD but the resulting increase in interest rates may decrease I . Thus the impact of the expansionary fiscal policy may be reduced.

The next export effect also arises from the higher interest rates accompanying expansionary fiscal policy. The higher interest rates make U.S. bonds more attractive to foreign buyers. The inflow of foreign currency to buy dollars to purchase the bonds drives up the international value of the dollar, making imports less expensive for the United States, and U.S. exports more expensive for people abroad. Net exports in the United States decline, and like the crowding-out effect, diminish the expansionary fiscal policy.

CHAPTER THIRTEEN

13-4 What are the components of the $M1$ money supply? What is the largest component? Which of the components is legal tender? Why is the face value of a coin greater than its intrinsic value? What near-monies are included in $M2$ money supply? What distinguishes the $M2$ and $M3$ money supplies?

$M1$ = currency (in circulation) + checkable deposits. The largest component of $M1$ is checkable deposits. If the face value of a coin were not greater than its intrinsic (metallic) value, people would remove coins from circulation and sell them for their metallic content. $M2 = M1 +$ noncheckable savings deposits + money market deposit accounts + small time deposits money market mutual fund balances. $M3 = M2 +$ large time deposits (those of \$100,000 or more). Near-monies are components of $M2$ not included in $M1$.

13-6 Suppose the price level and value of the dollar in year 1 are 1.0 and \$1.00, respectively. If the price level rises to 1.25 in year 2, what is the new value of the dollar? If instead the price level had fallen to .50, what would have been the value of the dollar? What generalization can you draw from your answer?

In the first case, the value of the dollar (in year 2, relative to year 1) is \$.80 (= 1/1.25); in the second case the value is \$2 (= 1/.50). Generalization: The price level and the value of the dollar are inversely related.

13-7 What is the basic determinant of (a) the transactions demand and (b) the asset demand for money? Explain how these two demands might be combined graphically to determine total money demand. How is the equilibrium interest rate in the money market determined? How might (a) the expanded use of credit cards, (b) a shortening of worker pay periods, and (c) an increase in nominal GDP each independently affect the transactions demand for money and the equilibrium interest rate?

(a) The level of nominal GDP. The higher this level, the greater the amount of money demanded for transactions. (b) The interest rate. The higher the interest rate, the smaller the amount of money demanded as an asset.

On a graph measuring the interest rate vertically and the amount of money demanded horizontally, the two demands for the money curves can be summed horizontally to get the total demand for money. This total demand shows the total amount of money demanded at each interest rate. The equilibrium interest rate is determined at the intersection of the total demand for money curve and the supply of money curve.

(a) Expanded use of credit cards: transaction demand for money declines; total demand for money declines; interest rate falls. (b) Shortening of worker pay periods: transaction demand for money declines; total demand for money declines; interest rate falls. (c) Increase in nominal GDP: transaction demand for money increases; total demand for money increases; interest rate rises.

CHAPTER FOURTEEN

14-2 Why are commercial banks required to have reserves? Explain why reserves are an asset to commercial banks but a liability to the Federal Reserve Banks. What are excess reserves? How do you calculate the amount of excess reserves held by a bank? What is their significance?

Reserves provide the Fed a means of controlling the money supply. It is through increasing and decreasing excess reserves that the Fed is able to achieve a money supply of the size it thinks best for the economy.

Reserves are assets of commercial banks because these funds are cash belonging to them; they are a claim the commercial banks have against the Federal Reserve Bank. Reserves deposited at the Fed are a liability to the Fed because they are funds it owes; they are claims that commercial banks have against it.

Excess reserves are the amount by which actual reserves exceed required reserves: Excess reserves = actual reserves — required reserves. Commercial banks can safely lend excess reserves, thereby increasing the money supply.

14-4 “When a commercial bank makes loans, it creates money; when loans are repaid, money is destroyed.” Explain.

Banks add to checking account balances when they make loans; these checkable deposits are part of the money supply. People pay off loans by writing checks; checkable deposits fall, meaning the money supply drops. Money is “destroyed.”

14-8 Suppose the Continental Bank has the simplified balance sheet that follows. The reserve ratio is 20 percent.

	Assets			Liabilities and net worth	
	(1)	(2)		(1)	(2)
Reserves	\$22,000	_____	Demand deposits	_____	_____
Securities	38,000	_____	\$100,000		
Loans	40,000	_____			

a. What is the maximum amount of new loans which this bank can make? Show in column 1 how the bank’s balance sheet will appear after the bank has loaned this additional amount.

b. By how much has the supply of money changed? Explain.

c. How will the bank’s balance sheet appear after checks drawn for the entire amount of the new loans have been cleared against this bank? Show this new balance sheet in column 2.

d. Answer questions a, b, and c on the assumption that the reserve ratio is 15 percent.

(a) \$2,000. Column 1 of Assets (top to bottom): \$22,000; \$38,000; \$42,000. Column 1 of Liabilities: \$102,000.

(b) \$2,000. The bank has lent out its excess reserves, creating \$2,000 of new demand-deposit money.

(c) Column 2 of Assets (top to bottom): \$20,000; \$38,000; \$42,000. Column 2 of Liabilities; \$100,000.

(d) \$7,000.

14-13 Suppose the simplified consolidated balance sheet shown below is for the commercial banking system. All figures are in billions. The reserve ratio is 25 percent.

	Assets			Liabilities and net worth	
	(1)	(2)		(1)	(2)
Reserves	\$ 52	_____	Demand deposits	\$200	_____
Securities	48	_____			
Loans	100	_____			

a. What amount of excess reserves does the commercial banking system have? What is the maximum amount the banking system might lend? Show in column 1 how the consolidated balance sheet would look after this amount has been lent. What is the monetary multiplier?

b. Answer question 13a assuming that the reserve ratio is 20 percent. Explain the resulting difference in the lending ability of the commercial banking system.

(a) Required reserves = \$50 billion (= 25% of \$200 billion); so excess reserves = \$2 billion (= \$52 billion – \$50 billion). Maximum amount banking system can lend = \$8 billion (= 1/.25 ∞ \$2 billion). Column (1) of Assets data (top to bottom): \$52 billion; \$48 billion; \$108 billion. Column (1) of Liabilities data: \$208 billion. Monetary multiplier = 4 (= 1/.25).

(b) Required reserves = \$40 billion (= 20% of \$200 billion); so excess reserves = \$12 billion (= \$52 billion – \$40 billion). Maximum amount banking system can lend = \$60 billion (= 1/.20 ∞ \$12 billion). Column (1) data for assets after loans (top to bottom); \$52 billion; \$48 billion; \$160 billion. Column (1) data for liabilities after loans: \$260 billion. Monetary multiplier = 5 (= 1/.20). The decrease in the reserve ratio increases the banking system’s excess reserves from \$2 billion to \$12 billion and increases the size of the monetary multiplier from 4 to 5. Lending capacity becomes 5 ∞ \$12 = \$60 billion.

CHAPTER FIFTEEN

15-2 In the table below you will find simplified consolidated balance sheets for the commercial banking system and the twelve Federal Reserve Banks. In columns 1 through 3, indicate how the balance sheets would read after each transaction of a to c is completed. Do not cumulate your answers; that is, analyze each transaction separately, starting in each case from the figures provided. All accounts are in billions of dollars.

<i>Consolidated Balance Sheet: All Commercial Banks</i>				
		(1)	(2)	(3)
Assets:				
Reserves	\$ 33	—	—	—
Securities	60	—	—	—
Loans	60	—	—	—
Liabilities and net worth:				
Checkable deposits	150	—	—	—
Loans from the Federal Reserve Banks	3	—	—	—

<i>Consolidated Balance Sheet: Twelve Federal Reserve Banks</i>				
		(1)	(2)	(3)
Assets:				
Securities	\$60	—	—	—
Loans to commercial banks	3	—	—	—
Liabilities and net worth:				
Reserves of commercial banks	\$33	—	—	—
Treasury deposits	3	—	—	—
Federal Reserve Notes	27	—	—	—

a. Suppose a decline in the discount rate prompts commercial banks to borrow an additional \$1 billion from the Federal Reserve Banks. Show the new balance-sheet figures in column 1.

b. The Federal Reserve Banks sell \$3 billion in securities to the public, who pay for the bonds with checks. Show the new balance-sheet figures in column 2.

c. The Federal Reserve Banks buy \$2 billion of securities from commercial banks. Show the new balance-sheet figures in column 3.

d. Now review each of the above three transactions, asking yourself these three questions: (1) What change, if any, took place in the money supply as a direct and immediate result of each transaction? (2) What increase or decrease in commercial banks' reserves took place in each transaction? (3) Assuming a reserve ratio of 20 percent, what change in the money-creating potential of the commercial banking system occurred as a result of each transaction?

(a) Column (1) data, top to bottom: Bank Assets: \$34, 60, 60; Liabilities: \$150, 4; Fed Assets: \$60, 4; Liabilities: \$34, 3, 27.

(b) Column (2) data: Bank Assets: \$30, 60, 60; Liabilities: \$147, 3; Fed Assets: \$57, 3, 30, 3, 27.

(c) Column (3) data (top to bottom): \$35; \$58; \$60; \$150; \$3; (Fed banks) \$62; \$3; \$35; \$3; \$27.

(d) (d1) Money supply (checkable deposits) directly changes only in (b), where it decreases by \$3 billion; (d2) See balance sheets; (d3) Money-creating potential of the banking system increases by \$5 billion in (a); decreases by \$12 billion in (b) (not by \$15 billion—the writing of \$3 billion of checks by the public to buy bonds reduces demand deposits by \$3 billion, thus freeing \$0.6 billion of reserves. Three billion dollars minus \$0.6 billion equals \$2.4 billion of reduced reserves, and

this multiplied by the monetary multiplier of 5 equals \$12 billion); and increases by \$10 billion in (c).

15-3 Suppose that you are a member of the Board of Governors of the Federal Reserve System. The economy is experiencing a sharp and prolonged inflationary trend. What changes in (a) the reserve ratio, (b) the discount rate, and (c) open-market operations would you recommend? Explain in each case how the change you advocate would affect commercial bank reserves, the money supply, interest rates, and aggregate demand.

(a) Increase the reserve ratio. This would increase the size of required reserves. If the commercial banks were fully loaned up, they would have to call in loans. The money supply would decrease, interest rates would rise, and aggregate demand would decline.

(b) Increase the discount rate. This would decrease commercial bank borrowing from the Fed. Actual reserves of the commercial banks would fall, as would excess reserves and lending. The money supply would drop, interest rates would rise, and aggregate demand would decline.

(c) Sell government securities in the open market. Buyers of the bonds would write checks to the Fed on their demand deposits. When these checks cleared, reserves would flow from the banking system to the Fed. The decline in reserves would reduce the money supply, which would increase interest rates and reduce aggregate demand.

15-4 What is the basic objective of monetary policy? State the cause-effect chain through which monetary policy is made effective. What are the major strengths and weaknesses of monetary policy?

The basic objective of monetary policy is to assist the economy in achieving a full-employment, non-inflationary level of total output. Changes in the money supply affect interest rates, which affect investment spending and therefore aggregate demand.

The major strengths of monetary policy are its speed and flexibility compared to fiscal policy, the Board of Governors is somewhat removed from political pressure, and its successful record in preventing inflation and keeping prices stable. The Fed is given some credit for prosperity in the 1990s.

The major weaknesses are that the Fed's control may weaken with bank reforms and electronic banking that diminish the importance of the traditional money supply, changes in velocity may offset changes in money supply and weaken monetary policy results, and monetary policy has asymmetrical impact—it combats inflation better than it helps recovery from recession.

15-5 Distinguish between the Federal funds rate and the prime interest rate. In what way is the Federal funds rate a measure of the tightness or looseness of monetary policy? In 1999 and 2000 the Fed used open-market operations to increase the Federal funds rate. What was the logic of those actions? What was the effect on the prime interest rate?

The Federal funds interest rate is the interest rate banks charge one another on overnight loans needed to meet the reserve requirement. The prime interest rate is the interest rate banks charge on loans to their most creditworthy customers. The tighter the monetary policy, the less the supply of excess reserves in the banking system and the higher the Federal funds rate. The reserve is true of a loose or easy monetary policy which expands excess reserves and the federal funds rate will fall.

The Fed wanted to reduce the excess reserves, slowing the growth of the money supply. This would slow the expansion of aggregate demand and prevent inflation. The prime interest rate went up.

15-6 Suppose the Federal Reserve decides to engage in a tight money policy as a way to reduce demand-pull inflation. Use the aggregate demand-aggregate supply model to show what this policy is intended to accomplish in a closed economy. Now introduce the open economy and explain how changes in the international value of the dollar might affect the location of your aggregate demand curve.

The intent of a tight money policy would be shown as a leftward shift of the aggregate demand curve and a decline in the price level (or, in the real world, a reduction in the rate of inflation). In an open economy, the interest rate hike resulting from the tight money policy would entice people abroad to buy U.S. securities. Because they would need U.S. dollars to buy these securities, the international demand for dollars would rise, causing the dollar to appreciate. Net exports would fall, pushing the aggregate demand curve farther leftward than in the closed economy.

CHAPTER SIXTEEN

16-3 Suppose the full-employment level of real output (Q) for a hypothetical economy is \$250 and the price level (P) initially is 100. Use the short-run aggregate supply schedules below to answer the questions which follow:

AS($P=100$)		AS($P=125$)		AS($P=75$)	
P	Q	P	Q	P	Q
125	280	125	250	125	310
100	250	100	220	100	280
75	220	75	190	75	250

a. What will be the level of real output in the *short run* if the price level unexpectedly rises from 100 to 125 because of an increase in aggregate demand? What if the price level falls unexpectedly from 100 to 75 because of a decrease in aggregate demand? Explain each situation, using numbers from the table.

b. What will the level of real output be in the long run when the price level rises from 100 to 125? When it falls from 100 to 75? Explain each situation.

c. Show the circumstances described in parts a and b on graph paper, and derive the long-run aggregate supply curve. (a) \$280; \$220. When the price level rises from 100 to 125 [in aggregate supply schedule $AS(P_{100})$], producers experience higher prices for their products. Because nominal wages are constant, profits rise and producers increase output to $Q = \$280$. When the price level decreases from 100 to 75, profits decline and producers adjust their output to $Q = \$75$. These are short-run responses to changes in the price level. (b) \$250; \$250. In the long run, a rise in the price-level to 125 leads to nominal wage increases. The $AS(P_{100})$ schedule changes to $AS(P_{125})$ and Q returns to \$250, now at a price level of 125. In the long run, a decrease in price level to 75 leads to lower nominal wages, yielding aggregate supply schedule $AS(P_{75})$. Equilibrium Q returns to \$250, now at a price level of 75.

(c) Graphically, the explanation is identical to Figure 16-1b. short-run AS: $P_1 = 100$; $P_2 = 125$; $P_3 = 75$; and $Q_1 = \$250$; $Q_2 = \$280$; and $Q_3 = \$220$. Long-run aggregate supply = $Q_1 = \$250$ at each of the three price levels.

16-4 Use graphical analysis to show how each of the following would affect the economy first in the short run and then in the long run. Assume that the United States is initially operating at its full-employment level of output, that prices and wages are

eventually flexible both upward and downward, and that there is no counteracting fiscal or monetary policy.

a. Because of a war abroad, the oil supply to the United States is disrupted, sending oil prices rocketing upward.

b. Construction spending on new homes rises dramatically, greatly increasing total U.S. investment spending.

c. Economic recession occurs abroad, significantly reducing foreign purchases of U.S. exports.

(a) See Figure 16-4 in the chapter. Short run: The aggregate supply curve shifts to the left, the price level rises, and real output declines. Long run: The aggregate supply curve shifts back rightward (due to declining nominal wages), the price level falls, and real output increases.

(b) See Figure 16-3. Short run: The aggregate demand curve shifts to the right, and both the price level and real output increase. Long run: The aggregate supply curve shifts to the left (due to higher nominal wages), the price level rises, and real output declines.

(c) See Figure 16-5. Short run: The aggregate demand curve shifts to the left, both the price level and real output decline. Long run: The aggregate supply curve shifts to the right, the price level falls further, and real output increases.

16-6 Suppose the government misjudges the natural rate of unemployment to be much lower than it actually is, and thus undertakes expansionary fiscal and monetary policy to try to achieve the lower rate. Use the concept of the short-run Phillips Curve to explain why these policies might at first succeed. Use the concept of the long-run Phillips Curve to explain the long-run outcome of these policies.

In the short-run there is probably a tradeoff between unemployment and inflation. The government's expansionary policy should reduce unemployment as aggregate demand increases. However, the government has misjudged the natural rate and will continue its expansionary policy beyond the point of the natural level of unemployment. As aggregate demand continues to rise, prices begin to rise. In the long-run, workers demand higher wages to compensate for these higher prices. Aggregate supply will decrease (shift leftward) toward the natural rate of unemployment.

In other words, any reduction of unemployment below the natural rate is only temporary and involves a short-run rise in inflation. This, in turn, causes long-run costs to rise and a decrease in aggregate supply. The end result should be an equilibrium at the natural rate of unemployment and a higher price level than the beginning level. The long-run Phillips curve is thus a vertical line connecting the price levels possible at the natural rate of unemployment found on the horizontal axis.

CHAPTER SEVENTEEN

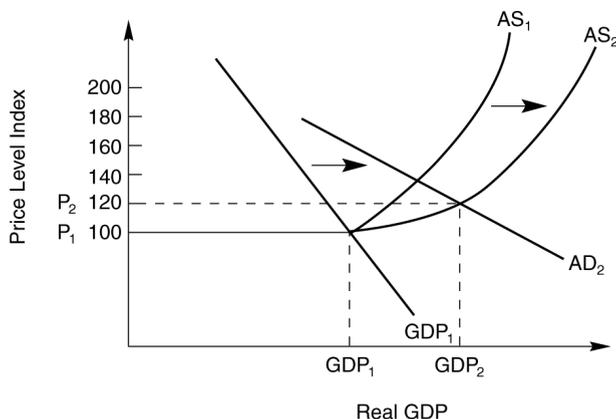
17-1 What are the four supply factors of economic growth? What is the demand factor? What is the efficiency factor? Illustrate these factors in terms of the production possibilities curve.

The four supply factors are the quantity and quality of natural resources; the quantity and quality of human resources; the stock of capital goods; and the level of technology. The demand factor is the level of purchases needed to maintain full employment. The efficiency factor refers to both productive and allocative efficiency. Figure 18-1 illustrates these growth factors by showing movement from curve AB to curve CD.

17-5 Between 1990 and 1999 the U.S. price level rose by about 20 percent while its real output increased by about 33 percent.

Use the aggregate demand-aggregate supply model to illustrate these outcomes graphically.

In the graph shown, both AD and AS expanded over the 1990–1999 period. Because aggregate supply increased as well as aggregate demand, the new equilibrium output rose at a faster pace than did the price level. P_2 is 20% above P_1 and GDP_2 is 33% greater than GDP_1 . Note that it is also possible that in early 1990s when unemployment was above natural rate that some of the expansion of AD took place in the horizontal portion of AS curve, but that is not the situation depicted here.



17-6 To what extent have increases in U.S. real GDP resulted from more labor inputs? Rearrange the following contributors to the growth of real GDP in order of their quantitative importance: economies of scale, quantity of capital, improved resource allocation, education and training, technological advance.

The U.S. labor force grew by about 2 million workers per year for each of the past 25 years and this explains much of the growth in real GDP. Other factors have also been important. Refer to Table 17-1. Factor importance in descending order: (1) Technological advance—the discovery of new knowledge which results in the combining of resources in more productive ways. (2) The quantity of capital. (3) Education and training. (4) Economies of scale and (5) improved resource allocation.

17-8 Relate each of the following to the New Economy:

- the rate of productivity growth
- information technology
- increasing returns
- network effects
- global competition

Each of the above is a characteristic of the New Economy. The rate of productivity growth has grown substantially due to innovations using microchips, computers, new telecommunications devices, and the Internet. All of these innovations describe features of what we call information technology which connects information in all parts of the world with information seekers. New information products are often digital in nature and can be easily replicated once they have been developed. The start-up cost of new firms and new technology is high, but expanding production has a very low marginal cost which leads to economies of scale—firms' output grows faster than their inputs. Network effects refer to a type of economy of scale whereby certain information products become more valuable to each user as the number of buyers grows. For example, a fax machine is more useful to you when lots of other people and firms have one; the same is true for compatible word-processing programs. Global competition is a feature of the New Economy because both transportation and communication can be accomplished at much lower cost and faster speed

than previously which expands market possibilities for both consumers and producers who are not very limited by national boundaries today.

CHAPTER EIGHTEEN

18-1 Assess the potential for using fiscal policy as a stabilization tool under (a) an annually balanced budget, (b) a cyclically balanced budget, and (c) functional finance.

(a) There is practically no potential for using fiscal policy as a stabilization tool under an annually balanced budget. In an economic downturn, tax revenues fall. To keep the budget in balance, fiscal policy would require the government to reduce its spending or increase its tax rates, adding to the deficiency in spending and accelerating the downturn. If the economy were booming and tax revenues were mounting, to keep the budget balanced fiscal policy would have to increase government spending or reduce taxes, thus adding to the already excessive demand and accelerating the inflationary pressures. An annually balanced budget would intensify cyclical ups and downs.

(b) A cyclically balanced budget would be countercyclical, as it should be, since it would bolster demand by lowering taxes and increasing government spending during a recession and restrain demand by raising taxes and reducing government spending during an inflationary boom. However, because boom and bust are not always of equal intensity and duration budget surpluses during the upswing need not automatically match budget deficits during the downswing. Requiring the budget to be balanced over the cycle may necessitate inappropriate changes in tax rates or levels of government expenditures.

(c) Functional finance pays no attention to the balance of deficits and surpluses annually or over the cycle. What counts is the maintenance of a noninflationary full-employment level of spending. Balancing the economy is what counts, not the budget.

18-3 What are the two main ways the size of the public debt is measured. Distinguish between refinancing and retiring the debt. How does an internally held public debt differ from an externally held public debt? Contrast the effects of retiring an internally held debt from an externally held debt.

Two ways of measuring the public debt: (1) measure its absolute dollar size; (2) measure its size as a percentage of GDP.

Refinancing the public debt simply means rolling over outstanding debt—selling “new” bonds to retire maturing bonds. Retiring the debt means purchasing bonds back from those who hold them or paying the bonds off at maturity.

An internally held debt is one in which the bondholders live in the nation having the debt; an externally held debt is one in which the bondholders are citizens of other nations. Paying off an internally held debt would involve buying back government bonds. This could present a problem of income distribution because holders of the government bonds generally have higher incomes than the average taxpayer. But paying off an internally held debt would not burden the economy as a whole—the money used to pay off the debt would stay within the domestic economy. In paying off an externally held debt, people abroad could use the proceeds of the bonds sales to buy products or other assets from the U.S. However, the dollars gained could be simply exchanged for foreign currency and brought back to their home country. This reduces U.S. foreign reserves holdings and may lower dollar exchange rate.

18-7 Trace the cause-and-effect chain through which financing and refinancing of the public debt might affect real interest rates,

private investment, and the stock of capital and economic growth. How might investment in public capital and complementarities between public and private capital alter the outcome of the cause-effect chain?

Cause and effect chain: Government borrowing to finance the debt competes with private borrowing and drives up the interest rate; the higher interest rate causes a decline in private capital and economic growth slows.

However, if public investment complements private investment, private borrowers may be willing to pay higher rates for positive growth opportunities. Productivity and economic growth could rise.

CHAPTER NINETEEN

19-1 Use the aggregate demand-aggregate supply model to compare classical and Keynesian interpretations of (a) the aggregate supply curve, and (b) the stability of the aggregate demand curve. Which of these interpretations seems more consistent with the realities of the Great Depression?

(a) Classical economists envisioned the AS curve as being perfectly vertical. When prices fall, real profits do not decrease because wage rates fall in the same proportion. With constant real profits, firms have no reason to change the quantities of output they supply. Keynesians viewed the AS curve as being horizontal at outputs less than the full-employment output and vertical only at full employment. Declines in aggregate demand do not change the price level because wages and prices are assumed to be inflexible downward.

(b) Classical economists viewed AD as stable so long as the monetary authorities hold the money supply constant. Therefore inflation and deflation are unlikely. Keynesians viewed the AD curve as unstable—even if the money supply is constant—since investment spending is volatile. Decreases in AD can cause a recession; rapid increases in AD can cause demand-pull inflation.

(c) The Keynesian view seems more consistent with the facts of the Great Depression; in that period, real output declined by nearly 40 percent in the United States and remained low for a decade.

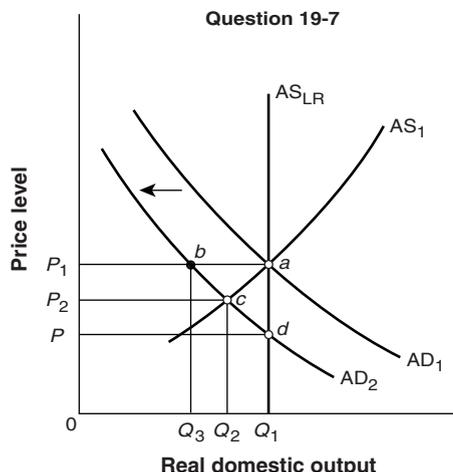
19-4 Suppose that the money supply and the nominal GDP for a hypothetical economy are \$96 billion and \$336 billion, respectively. What is the velocity of money? How will households and businesses react if the central bank reduces the money supply by \$20 billion? By how much will nominal GDP have to fall to restore equilibrium, according to the monetarist perspective?

Velocity = 3.5 or 336/96. They will cut back on their spending to try to restore their desired ratio of money to other items of wealth. Nominal GDP will fall to \$266 billion (= \$76 billion remaining money supply × 3.5) to restore equilibrium.

19-7 Use an AD-AS graph to demonstrate and explain the price-level and real-output outcome of an anticipated decline in aggregate demand, as viewed by RET economists. (Assume that the economy initially is operating at its full-employment level of output.) Then, demonstrate and explain on the same graph the outcome, as viewed by mainstream economists.

See the graph and the decline in aggregate demand from AD₁ to AD₂. RET view: The Economy anticipates the decline in the price level and immediately moves from *a* to *d*.

Mainstream view: The economy first moves from *a* to *b* and then to *c*. In view of historical evidence, the mainstream view seems more plausible to us than the RET view; only when aggregate demand shifts from AD₂ to AD₁ will full-employment output Q₁ be restored in the mainstream view.



19-13 Place MON, RET, or MAIN besides the statements that most closely reflect monetarist, rational expectations, or mainstream views, respectively.

- a. Anticipated changes in aggregate demand affect only the price level; they have no effect on real output.
 - b. Downward wage inflexibility means that declines in aggregate demand can cause long-lasting recession.
 - c. Changes in the money supply *M* increase *PQ*; at first only *Q* rises because nominal wages are fixed, but once workers adapt their expectations to new realities, *P* rises and *Q* returns to its former level.
 - d. Fiscal and monetary policy smooth out the business cycle.
 - e. The Fed should increase the money supply at a fixed annual rate.
- (a) RET;
 (b) MAIN;
 (c) MON;
 (d) MAIN;
 (e) MON.

CHAPTER TWENTY

20-2 Graph the accompanying demand data and then use the midpoints formula for Ed to determine price elasticity of demand for each of the four possible \$1 price changes. What can you conclude about the relationship between the slope of a curve and its elasticity? Explain in a nontechnical way why demand is elastic in the northwest segment of the demand curve and inelastic in the southeast segment.

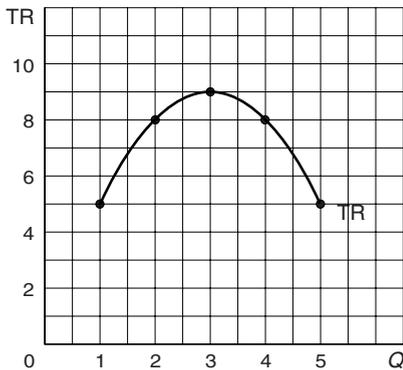
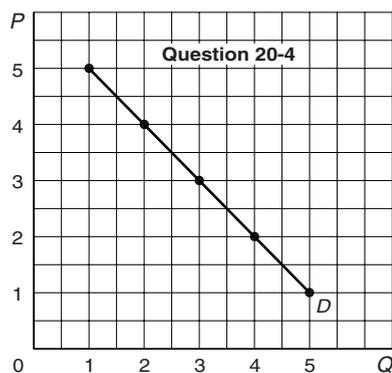
Product price	Quantity demanded
\$5	1
4	2
3	3
2	4
1	5

See the graph accompanying the answer to 20-4. Elasticities, top to bottom: 3; 1.4; 7/14; .333. Slope does not measure elasticity. This demand curve has a constant slope of -1 (= -1/1), but elasticity declines as we move down the curve. When the initial price is high and initial quantity is low, a unit change in price is a *low* percentage while a unit change in quantity is a *high* percentage change. The percentage change in quantity exceeds the

percentage change in price, making demand elastic. When the initial price is low and initial quantity is high, a unit change in price is a *high* percentage change while a unit change in quantity is a *low* percentage change. The percentage change in quantity is less than the percentage change in price, making demand inelastic.

20-4 Calculate total-revenue data from the demand schedule in question 2. Graph total revenue below your demand curve. Generalize on the relationship between price elasticity and total revenue.

See the graph. Total revenue data, top to bottom: \$5; \$8; \$9; \$8; \$5. When demand is elastic, price and total revenue move in the opposite direction. When demand is inelastic, price and total revenue move in the same direction.



20-5 How would the following changes in price affect total revenue. That is, would total revenue increase, decline, or remain unchanged?

- a. Price falls and demand is inelastic.
- b. Price rises and demand is elastic.
- c. Price rises and supply is elastic.
- d. Price rises and supply is inelastic.
- e. Price rises and demand is inelastic.
- f. Price falls and demand is elastic.
- g. Price falls and demand is of unit elasticity.

Total revenue would increase in (c), (d), (e), and (f); decrease in (a) and (b); and remain the same in (g).

20-6 What are the major determinants of price elasticity of demand? Use these determinants and your own reasoning in judging whether demand for each of the following products is elastic or inelastic:

- (a) bottled water, (b) toothpaste; (c) Crest toothpaste; (d) ketchup, (e) diamond bracelets; (f) Microsoft Windows operating system.

Substitutability, proportion of income; luxury versus necessity, and time. Elastic: (a), (c), (e). Inelastic: (b), (d), and (f).

20-10 In November 1998 Vincent van Gogh’s self-portrait sold at auction for \$71.5 million. Portray this sale in a demand and supply diagram and comment on the elasticity of supply. Comedian George Carlin once mused, “If a painting can be forged well enough to fool some experts, why is the original so valuable?” Provide an answer.

The supply is perfectly inelastic—vertical—at a quantity of 1 unit. The \$71.5 million price is determined where the downward sloping demand curve intersected this supply curve.

If more than one picture were available (all but one having to be a copy), the demand would likely decrease enormously.

20-12 Suppose the cross elasticity of demand for products A and B is +3.6 and for products C and D it is -5.4. What can you conclude about how products A and B are related? Products C and D?

A and B are substitutes; C and D are complements.

20-13 The income elasticities of demand for movies, dental services, and clothing have been estimated to be +3.4, +1.0, and +0.5 respectively. Interpret these coefficients. What does it mean if the income elasticity coefficient is negative?

All are normal goods—income and quantity demanded move in the same direction. These coefficients reveal that a 1 percent increase in income will increase the quantity of movies demanded by 3.4 percent, of dental services by 1.0 percent, and of clothing by 0.5 percent. A negative coefficient indicates an inferior good—income and quantity demanded move in the opposite direction.

CHAPTER TWENTY-ONE

21-2 Complete the following table and answer the questions below:

Units consumed	Total utility	Marginal utility
0	0	
1	10	10
2		8
3	25	
4	30	
5		3
6	34	

- a. At which rate is total utility increasing: a constant rate, a decreasing rate, or an increasing rate? How do you know?
- b. “A rational consumer will purchase only 1 unit of the product represented by these data, since that amount maximizes marginal utility.” Do you agree? Explain why or why not.
- c. “It is possible that a rational consumer will not purchase any units of the product represented by these data.” Do you agree? Explain why or why not.

Missing total utility data, top to bottom: 18; 33. Missing marginal utility data, top to bottom: 7; 5; 1.

- (a) A decreasing rate; because marginal utility is declining.
- (b) Disagree. The marginal utility of a unit beyond the first may be sufficiently great (relative to product price) to make it a worthwhile purchase.
- (c) Agree. This product’s price could be so high relative to the first unit’s marginal utility that the consumer would buy none of it.

21-4 Columns 1 through 4 of the accompanying table show the marginal utility, measured in terms of utils, which Ricardo would

get by purchasing various amounts of products A, B, C, and D. Column 5 shows the marginal utility Ricardo gets from saving. Assume that the prices of A, B, C, and D are \$18, \$6, \$4, and \$24, respectively, and that Ricardo has a money income of \$106.

Column 1		Column 2		Column 3		Column 4		Column 5	
Units of A	MU	Units of B	MU	Units of C	MU	Units of D	MU	No. of \$ saved	MU
1	72	1	24	1	15	1	36	1	5
2	54	2	15	2	12	2	30	2	4
3	45	3	12	3	8	3	24	3	3
4	36	4	9	4	7	4	18	4	2
5	27	5	7	5	5	5	13	5	1
6	18	6	5	6	4	6	7	6	1/2
7	15	7	2	7	3.5	7	4	7	1/4
8	12	8	1	8	3	8	2	8	1/8

- What quantities of A, B, C, and D will Ricardo purchase in maximizing his utility?
- How many dollars will Ricardo choose to save?
- Check your answers by substituting them into the algebraic statement of the utility-maximizing rule.
 - 4 units of A; 3 units of B; 3 units of C, and 0 units of D.
 - Save \$4.
 - $36/\$18 = 12/\$6 = 8/\$4 = 2/\1 . The marginal utility per dollar of the last unit of each product purchased is 2.

21-5 You are choosing between two goods, X and Y, and your marginal utility from each is as shown below. If your income is \$9 and the prices of X and Y are \$2 and \$1, respectively, what quantities of each will you purchase in maximizing utility? What total utility you will realize. Assume that, other things remaining unchanged, the price of X falls to \$1. What quantities of X and Y will you now purchase? Using the two prices and quantities for X, derive a demand schedule (price-quantity-demanded table) for X.

Units of X	MU _x	Units of Y	MU _y
1	10	1	8
2	8	2	7
3	6	3	6
4	4	4	5
5	3	5	4
6	2	6	3

Buy 2 units of X and 5 units of Y. Marginal utility of last dollar spent will be equal at 4 ($= 8/\$2$ for X and $4/\$1$ for Y) and the \$9 income will be spent. Total utility = 48 ($= 10 + 8$ for X plus $8 + 7 + 6 + 5 + 4$ for Y). When the price of X falls to \$1, the quantity of X demanded increases from 2 to 4. Total utility is now 58 ($= 10 + 8 + 6 + 4$ for X plus $8 + 7 + 6 + 5 + 4$ for Y).

Demand schedule: $P = \$2$; $Q = 2$. $P = \$1$; $Q = 4$.

CHAPTER TWENTY-ONE APPENDIX

21A-3 Using Figure 4, explain why the point of tangency of the budget line with an indifference curve is the consumer's equilibrium position. Explain why any point where the budget line intersects an indifference curve will not be equilibrium. Explain: "The consumer is in equilibrium where $MRS = P_B/P_A$."

The tangency point places the consumer on the highest attainable indifference curve; it identifies the combination of goods yielding the highest total utility. All intersection points place the consumer on a lower indifference curve. MRS is the slope of the indifference curve; P_B/P_A is the slope of the budget line. Only at the tangency point are these two slopes equal. If $MRS > P_B/P_A$ or $MRS < P_B/P_A$, adjustments in the combination of products can be made to increase total utility (get to a higher indifference curve).

CHAPTER TWENTY-TWO

22-2 Gomez runs a small pottery firm. He hires one helper at \$12,000 per year, pays annual rent of \$5,000 for his shop, and materials cost \$20,000 per year. Gomez has \$40,000 of his own funds invested in equipment (pottery wheels, kilns, and so forth) that could earn him \$4,000 per year if alternatively invested. Gomez has been offered \$15,000 per year to work as a potter for a competitor. He estimates his entrepreneurial talents are worth \$3,000 per year. Total annual revenue from pottery sales is \$72,000. Calculate accounting profits and economic profits for Gomez's pottery.

Explicit costs: \$37,000 ($= \$12,000$ for the helper + \$5,000 of rent + \$20,000 of materials). Implicit costs: \$22,000 ($= \$4,000$ of forgone interest + \$15,000 of forgone salary + \$3,000 of entrepreneurship).

Accounting profit = \$35,000 ($= \$72,000$ of revenue – \$37,000 of explicit costs); Economic profit = \$13,000 ($= \$72,000 - \$37,000$ of explicit costs – \$22,000 of implicit costs).

22-4 Complete the following table by calculating marginal product and average product from the data given. Plot total, marginal, and average product and explain in detail the relationship between each pair of curves. Explain why marginal product first rises, then declines, and ultimately becomes negative. What bearing does the law of diminishing returns have on short-run costs? Be specific. "When marginal product is rising, marginal cost is falling. And when marginal product is diminishing, marginal cost is rising." Illustrate and explain graphically.

Inputs of labor	Total product	Marginal product	Average product
0	0	—	—
1	15	—	—
2	34	—	—
3	51	—	—
4	65	—	—
5	74	—	—
6	80	—	—
7	83	—	—
8	82	—	—

Marginal product data, top to bottom: 15; 19; 17; 14; 9; 6; 3; –1. Average product data, top to bottom: 15; 17; 17; 16.25; 14.8; 13.33; 11.86; 10.25. Your diagram should have the same general characteristics as text Figure 22-2.

MP is the slope—the rate of change—of the TP curve. When TP is rising at an increasing rate, MP is positive and rising. When TP is rising at a diminishing rate, MP is positive but falling. When TP is falling, MP is negative and falling. AP rises when MP is above it; AP falls when MP is below it.

MP first rises because the fixed capital gets used more productively as added workers are employed. Each added worker contributes more to output than the previous worker because the firm is better able to use its fixed plant and equipment. As still more labor is added, the law of diminishing returns takes hold. Labor becomes so abundant relative to the fixed capital that congestion occurs and marginal product falls. At the extreme, the addition of labor so overcrowds the plant that the marginal product of still more labor is negative—total output falls.

Illustrated by Figure 22-6. Because labor is the only variable input and its price (its wage rate) is constant, MC is found by dividing the wage rate by MP. When MP is rising, MC is falling; when MP reaches its maximum, MC is at its minimum; when MP is falling, MC is rising.

Total product	Total fixed cost	Total variable cost	Total cost	Average fixed cost	Average variable cost	Average total cost	Marginal cost
0	\$___	\$ 0	\$___	\$___	\$___	\$___	\$___
1	___	45	___	___	___	___	___
2	___	85	___	___	___	___	___
3	___	120	___	___	___	___	___
4	___	150	___	___	___	___	___
5	___	185	___	___	___	___	___
6	___	225	___	___	___	___	___
7	___	270	___	___	___	___	___
8	___	325	___	___	___	___	___
9	___	390	___	___	___	___	___
10	___	465	___	___	___	___	___

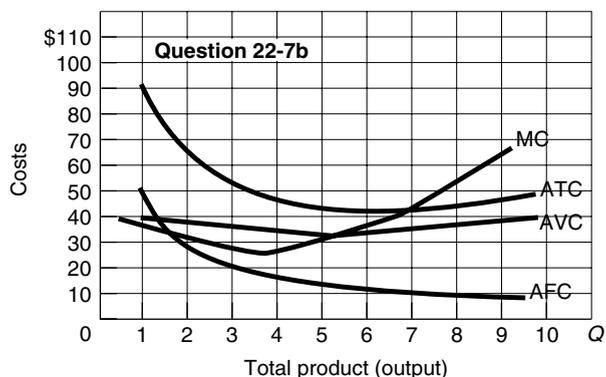
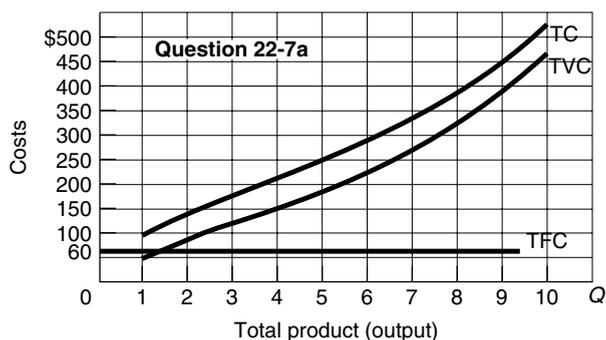
22-7 A firm has fixed costs of \$60 and variable costs as indicated in the table above. Complete the table. When finished, check your calculations by referring to question 4 at the end of Chapter 23.

- Graph total fixed cost, total variable cost, and total cost. Explain how the law of diminishing returns influences the shapes of the total variable-cost and total-cost curves.
- Graph AFC, AVC, ATC, and MC. Explain the derivation and shape of each of these four curves and their relationships to one another. Specifically, explain in nontechnical terms why the MC curve intersects both the AVC and ATC curves at their minimum points.
- Explain how the locations of each of the four curves graphed in question 7b would be altered if (1) total fixed cost had been \$100 rather than \$60, and (2) total variable cost had been \$10 less at each level of output.

The total fixed costs are all \$60. The total costs are all \$60 more than the total variable cost. The other columns are shown in Question 4 in Chapter 23.

(a) See the graph. Over the 0 to 4 range of output, the TVC and TC curves slope upward at a decreasing rate because of increasing marginal returns. The slopes of the curves then increase at an increasing rate as diminishing marginal returns occur.

(b) See the graph. $AFC = TFC/Q$ falls continuously since a fixed amount of capital cost is spread over more units of output. The MC (= change in TC/change in Q), $AVC = TVC/Q$, and $ATC = TC/Q$ curves are U-shaped, reflecting the influence of first increasing and then diminishing returns. The ATC curve sums AFC and AVC vertically. The ATC curve falls when the MC curve is below it; the ATC curve rises when the MC curve is above it. This means the MC curve must intersect the ATC curve at its lowest point. The same logic holds for the minimum point of the AVC curve.



(c1) If TFC has been \$100 instead of \$60, the AFC and ATC curves would be higher—by an amount equal to \$40 divided by the specific output. Example: at 4 units, $AVC = \$25.00 [=(\$60 + \$40)/4]$; and $ATC = \$62.50 [=(\$210 + \$40)/4]$. The AVC and MC curves are not affected by changes in fixed costs.

(c2) If TVC has been \$10 less at each output, MC would be \$10 lower for the first unit of output but remain the same for the remaining output. The AVC and ATC curves would also be lower—by an amount equal to \$10 divided by the specific output. Example: at 4 units of output, $AVC = \$35.00 [=(\$150 - \$10)/4]$, $ATC = \$50 [=(\$210 - \$10)/4]$. The AFC curve would not be affected by the change in variable costs.

22-10 Use the concepts of economies and diseconomies of scale to explain the shape of a firm's long-run ATC curve. What is the concept of minimum efficient scale? What bearing may the exact shape of the long-run ATC curve have on the structure of an industry?

The long-run ATC curve is U-shaped. At first, long-run ATC falls as the firm expands and realizes economies of scale from labor and managerial specialization and the use of more efficient capital. The long-run ATC curve later turns upward when the enlarged firm experiences diseconomies of scale, usually resulting from managerial inefficiencies.

The MES (minimum efficient scale) is the smallest level of output needed to attain all economies of scale and minimum long-run ATC.

If long-run ATC drops quickly to its minimum cost which then extends over a long range of output, the industry will likely be composed of both large and small firms. If long-run ATC descends slowly to its minimum cost over a long range of output, the industry will likely be composed of a few large firms. If long-run

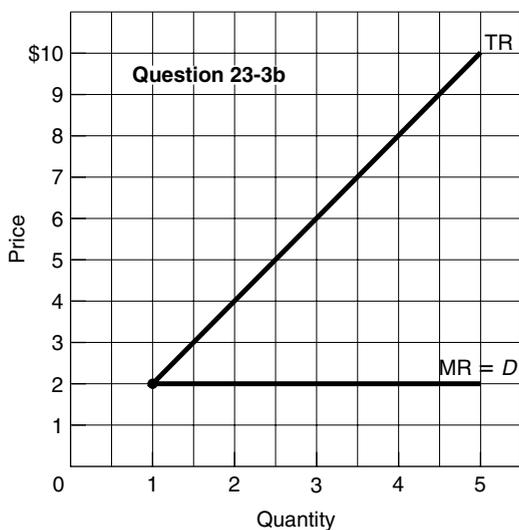
ATC drops quickly to its minimum point and then rises abruptly, the industry likely be composed of many small firms.

CHAPTER TWENTY-THREE

23-3 Use the following demand schedule to determine total and marginal revenues for each possible level of sales:

Product Price: \$	Quantity Demanded	Total Revenue: \$	Marginal Revenue: \$
2	0		
2	1		
2	2		
2	3		
2	4		
2	5		

- a. What can you conclude about the structure of the industry in which this firm is operating? Explain.
 - b. Graph the demand, total-revenue, and marginal-revenue curves for this firm.
 - c. Why do the demand and marginal-revenue curves coincide?
 - d. "Marginal revenue is the change in total revenue." Explain verbally and graphically, using the data in the table. Total revenue, top to bottom: 0; \$2; \$4; \$8; \$10. Marginal revenue, top to bottom: \$2, throughout.
- (a) The industry is purely competitive—this firm is a "price taker." The firm is so small relative to the size of the market that it can change its level of output without affecting the market price.
- (b) See graph.
- (c) The firm's demand curve is perfectly elastic; MR is constant and equal to P .



(d) Yes. Table: When output (quantity demanded) increases by 1 unit, total revenue increase by \$2. This \$2 increase is the marginal revenue. Figure: The change in TR is measured by the slope of the TR line, 2 (= \$2/1 unit).

23-4 Assume the following unit-cost data are for a purely competitive producer:

Total Product	Average fixed cost	Average variable cost	Average total cost	Marginal cost
0	\$60.00	\$45.00	\$105.00	\$45
1	30.00	42.50	72.50	\$40
2	20.00	40.00	60.00	35
3	15.00	37.50	52.50	30
4	12.00	37.00	49.00	35
5	10.00	37.50	47.50	40
6	8.57	38.57	47.14	45
7	7.50	40.63	48.13	55
8	6.67	43.33	50.00	65
9	6.00	46.50	52.50	75
10				

- a. At a product price of \$56, will this firm produce in the short run? Why, or why not? If it does produce, what will be the profit-maximizing or loss-minimizing output? Explain. What economic profit or loss will the firm realize per unit of output.
- b. Answer the questions of 4a assuming that product price is \$41.
- c. Answer the questions of 4a assuming that product price is \$32.
- d. In the table below, complete the short-run supply schedule for the firm (columns 1 to 3) and indicate the profit or loss incurred at each output (column 3).

(1) Price	(2) Quantity supplied, single firm	(3) Profit (+) or loss(l)	(4) Quantity supplied, 1500 firms
\$26			
32	—	\$ —	—
38	—	—	—
41	—	—	—
46	—	—	—
56	—	—	—
66	—	—	—

- e. Explain: "That segment of a competitive firm's marginal-cost curve which lies above its average- variable-cost curve constitutes the short-run supply curve for the firm." Illustrate graphically.
- f. Now assume there are 1500 identical firms in this competitive industry; that is, there are 1500 firms, each of which has the same cost data as shown here. Calculate the industry supply schedule (column 4).
- g. Suppose the market demand data for the product are as follows:

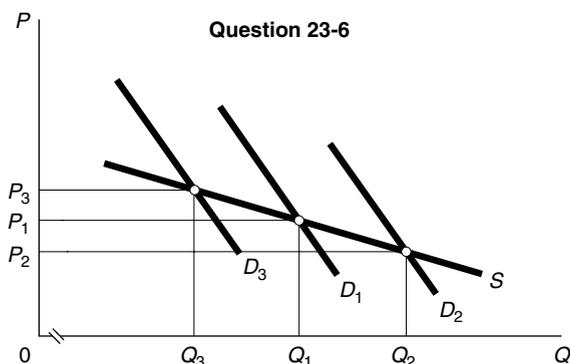
Price	Total quantity demanded
\$26	17,000
32	15,000
38	13,500
41	12,000
41	10,500
56	9,500
66	8,000

What will equilibrium price be? What will equilibrium output be for the industry? For each firm? What will profit or loss be per unit? Per firm? Will this industry expand or contract in the long run?

- (a) Yes, \$56 exceeds AVC (and ATC) at the loss—minimizing output. Using the $MR = MC$ rule it will produce 8 units. Profits per unit = $\$7.87 (= \$56 - \$48.13)$; total profit = \$62.96.
- (b) Yes, \$41 exceeds AVC at the loss—minimizing output. Using the $MR = MC$ rule it will produce 6 units. Loss per unit or output is $\$6.50 (= \$41 - \$47.50)$. Total loss = $\$39 (= 6 \times \$6.50)$, which is less than its total fixed cost of \$60.
- (c) No, because \$32 is always less than AVC. If it did produce, its output would be 4—found by expanding output until MR no longer exceeds MC. By producing 4 units, it would lose $\$82 [= 4 (\$32 - \$52.50)]$. By Not producing, it would lose only its total fixed cost of \$60.
- (d) Column (2) data, top to bottom: 0; 0; 5; 6; 7; 8; 9, Column (3) data, top to bottom in dollars: -60; -60; -55; -39; -8; +63; +144.
- (e) The firm will not produce if $P < AVC$. When $P > AVC$, the firm will produce in the short run at the quantity where $P (=MR)$ is equal to its increasing MC. Therefore, the MC curve above the AVC curve is the firm's short-run supply curve; it shows the quantity of output the firm will supply at each price level. See Figure 23-6 for a graphical illustration.
- (f) Column (4) data, top to bottom: 0; 0; 7,500; 9,000; 10,500; 12,000; 13,500.
- (g) Equilibrium price = \$46; equilibrium output = 10,500. Each firm will produce 7 units. Loss per unit = \$1.14, or \$8 per firm. The industry will contract in the long run.

23-6 Using diagrams for both the industry and representative firm, illustrate competitive long-run equilibrium. Assuming constant costs, employ these diagrams to show how (a) an increase and (b) a decrease in market demand will upset this long-run equilibrium. Trace graphically and describe verbally the adjustment processes by which long-run equilibrium is restored. Now rework your analysis for increasing- and decreasing-cost industries and compare the three long-run supply curves.

See Figures 23.8 and 23.9 and their legends. See Figure 23.11 for the supply curve for an increasing cost industry. The supply curve for a decreasing cost industry is below.



23-7 In long-run equilibrium, $P = \text{minimum ATC} = MC$. Of what significance for economic efficiency is the equality of P and minimum ATC? The equality of P and MC? Distinguish between productive efficiency and allocative efficiency in your answer.

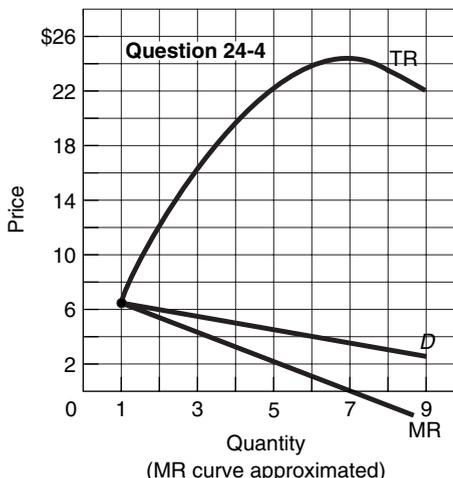
The equality of P and minimum ATC means the firm is achieving *productive efficiency*; it is using the most efficient technology and employing the least costly combination of resources. The equality of P and MC means the firm is achieving *allocative efficiency*, the industry is producing the right product in the right amount based on society's valuation of that product and other products.

CHAPTER TWENTY-FOUR

24-4 Use the demand schedule that follows to calculate total revenue and marginal revenue at each quantity. Plot the demand, total-revenue, and marginal-revenue curves and explain the relationships between them. Explain why the marginal revenue of the fourth unit of output is \$3.50, even though its price is \$5.00. Use Chapter 20's total-revenue test for price elasticity to designate the elastic and inelastic segments of your graphed demand curve. What generalization can you make regarding the relationship between marginal revenue and elasticity of demand? Suppose that somehow the marginal cost of successive units of output were zero. What output would the profit-seeking firm produce? Finally, use your analysis to explain why a monopolist would never produce in the inelastic region of demand.

Price	Quantity demanded	Price	Quantity demanded
\$7.00	0	\$4.50	5
6.50	1	4.00	6
6.00	2	3.50	7
5.50	3	3.00	8
5.00	4	2.50	9

Total revenue, in order from $Q = 0$: 0; \$6.50; \$12.00; \$16.50; \$20.00; \$22.50; \$24.00; \$24.50; \$24.00; \$22.50. Marginal revenue in order from $Q = 1$: \$6.50; \$5.50; \$4.50; \$3.50; \$2.50; \$1.50; \$0.50; -\$1.50. See the accompanying graph. Because TR is increasing at a diminishing rate, MR is declining. When TR turns downward, MR becomes negative. Marginal revenue is below D because to sell an extra unit, the monopolist must lower the price on the marginal unit as well as on each of the preceding units sold. Four units sell for \$5.00 each, but three of these four could have been sold for \$5.50 had the monopolist been satisfied to sell only three. Having decided to sell four, the monopolist has to lower the price of the first three from \$5.50 to \$5.00, sacrificing \$.50 on each for a total of \$1.50. This "loss" of \$1.50 explains the difference between the \$5.00 price obtained on the fourth unit of output and its marginal revenue of \$3.50. Demand is elastic from $P = \$6.50$ to $P = \$3.50$, a range where TR is rising. The curve is of unitary elasticity at $P = \$3.50$, where TR is at its maximum. The curve is inelastic from then on as the price continues to decrease and TR is falling. When MR is positive, demand is elastic. When MR is zero, demand is of unitary elasticity. When MR is negative, demand is inelastic. If MC is zero, the monopolist should produce 7 units where MR is also zero. It would never produce where demand is inelastic because MR is negative there while MC is positive.



24-5 Suppose a pure monopolist is faced with the demand schedule shown below and the same cost data as the competitive producer discussed in question 4 at the end of Chapter 23. Calculate the missing total- and marginal-revenue amounts, and determine the profit-maximizing price and output for this monopolist. What is the monopolist's profit? Verify your answer graphically and by comparing total revenue and total cost.

Price	Quantity demanded	Total revenue	Marginal revenue
\$115	0	\$ _____	\$ _____
100	1	\$ _____	\$ _____
83	2	\$ _____	\$ _____
71	3	\$ _____	\$ _____
63	4	\$ _____	\$ _____
55	5	\$ _____	\$ _____
48	6	\$ _____	\$ _____
42	7	\$ _____	\$ _____
37	8	\$ _____	\$ _____
33	9	\$ _____	\$ _____
29	10	\$ _____	\$ _____

Total revenue data, top to bottom, in dollars: 0; 100; 166; 213; 252; 275; 288; 294; 296; 297; 290. Marginal revenue data, top to bottom, in dollars: 100; 66; 47; 39; 23; 6; 2; 1; -7.

Price = \$63; output = 4; profit = \$42 [= 4(\$63 - 52.50)]. Your graph should have the same general appearance as Figure 24-4. At $Q = 4$, $TR = \$252$ and $TC = \$210$ [= 4(\$52.50)].

24-6 If the firm described in question 5 could engage in perfect price discrimination, what would be the level of output? Of profits? Draw a diagram showing the relevant demand, marginal-revenue, average-total-cost, and marginal-cost curves and the equilibrium price and output for a nondiscriminating monopolist. Use the same diagram to show the equilibrium position of a monopolist that is able to practice perfect price discrimination. Compare equilibrium outputs, total revenues, economic profits, and consumer prices in the two cases. Comment on the economic desirability of price discrimination.

Perfect price discrimination: Output = 6. TR would be \$420 (= \$100 + \$83 + \$71 + \$63 + \$55 + \$48). TC would be \$285 [= 6(47.50)]. Profit would be \$135 (= \$420 - \$285).

Your single diagram should combine Figure 24-8a and 24-b in the chapter. The discriminating monopolist faces a demand curve that is also its MR curve. It will sell the first unit at f in Figure 24-8b and then sell each successive unit at lower prices (as shown on the demand curve) as it moves to Q_2 units, where $D (= MR) = MC$. Discriminating monopolist: Greater output; total revenue, and profits. Some consumers will pay a higher price under discriminating monopoly than with nondiscriminating monopoly; others, a lower price. Good features: greater output and improved allocative efficiency. Bad feature: more income is transferred from consumers to the monopolist.

24-11 It has been proposed that natural monopolists should be allowed to determine their profit-maximizing outputs and prices and then government should tax their profits away and distribute them to consumers in proportion to their purchases from the monopoly. Is this proposal as socially desirable as requiring monopolists to equate price with marginal cost or average total cost?

No, the proposal does not consider that the output of the natural monopolist would still be at the suboptimal level where $P > MC$. Too little would be produced and there would be an underallocation of resources. Theoretically, it would be more desirable to force the natural monopolist to charge a price equal to marginal cost and subsidize any losses. Even setting price equal to ATC would be an improvement over this proposal. This fair-return pricing would allow for a normal profit and ensure greater production than the proposal would.

CHAPTER TWENTY-FIVE

25-2 Compare the elasticity of the monopolistically competitor's demand curve with that of a pure competitor and a pure monopolist. Assuming identical long-run costs, compare graphically the prices and output that would result in the long run under pure competition and under monopolistic competition. Contrast the two market structures in terms of productive and allocative efficiency. Explain: "Monopolistically competitive industries are characterized by too many firms, each of which produces too little."

Less elastic than a pure competitor and more elastic than a pure monopolist. Your graphs should look like Figures 23-12 and 25-1 in the chapters. Price is higher and output lower for the monopolistic competitor. Pure competition: $P = MC$ (allocative efficiency); $P = \text{minimum ATC}$ (productive efficiency). Monopolistic competition: $P > MC$ (allocative efficiency) and $P > \text{minimum ATC}$ (productive inefficiency). Monopolistic competitors have excess capacity; meaning that fewer firms operating at capacity (where $P = \text{minimum ATC}$) could supply the industry output.

25-7 Answer the following questions, which relate to measures of concentration.

- a. What is the meaning of a four-firm concentration ratio of 60 percent? 90 percent? What are the shortcomings of concentration ratios as measures of monopoly power?
- b. Suppose that the five firms in industry A have annual sales of 30, 30, 20, 10, and 10 percent of total industry sales. For the five firms in industry B the figures are 60, 25, 5, 5, and 5 percent. Calculate the Herfindahl index for each industry and compare their likely competitiveness.

A four-firm concentration ratio of 60 percent means the largest four firms in the industry account for 60 percent of sales; a four-firm concentration ratio of 90 percent means the largest four firms account for 90 percent of sales. Shortcomings: (1) they pertain to the nation as a whole, although relevant markets may be localized; (2) they do not account for interindustry competition; (3) the data are for U.S. products—imports are excluded; and (4) they don't reveal the dispersion of size among the top four firms.

Herfindahl index for A: 2,400 (= 900 + 900 + 400 + 100 + 100). For B: 4,300 (= 3,600 + 625 + 25 + 25 + 25). We would expect industry A to be more competitive than industry B, where one firm dominates and two firms control 85 percent of the market.

25-8 Explain the general meaning of the following profit payoff matrix for oligopolists C and D. All profit figures are in thousands.

- a. Use the payoff matrix to explain the mutual interdependence that characterizes oligopolistic industries.
- b. Assuming no collusion between C and D, what is the likely pricing outcome?
- c. In view of your answer to 8b, explain why price collusion is mutually profitable. Why might there be a temptation to chat on the collusive agreement?

		C's possible prices	
		\$40	\$35
D's possible prices	\$40	\$57	\$59
	\$35	\$50	\$55
		\$60	\$55
		\$69	\$58

The matrix shows the four possible profit outcomes for each of two firms, depending on which of the two price strategies each follows. Example: If C sets price at \$35 and D at \$40, C's profit will be \$59,000, and D's \$55,000.

(a) C and D are interdependent because their profits depend not just on their own price, but also on the other firm's price.

(b) Likely outcome: Both firms will set price at \$35. If either charged \$40, it would be concerned the other would undercut the price and its profit by charging \$35. At \$35 for both; C's profit is \$55,000, D's, \$58,000.

(c) Through price collusion—agreeing to charge \$40—each firm would achieve higher profits (C = \$57,000; D = \$60,000). But once both firms agree on \$40, each sees it can increase its profit even more by secretly charging \$35 while its rival charges \$40.

25-9 What assumptions about a rival's response to price changes underlie the kinked-demand curve for oligopolists? Why is there a gap in the oligopolist's marginal-revenue curve? How does the kinked demand curve explain price rigidity in oligopoly? What are the shortcomings of the kinked-demand model?

Assumptions: (1) Rivals will match price cuts; (2) Rivals will ignore price increases. The gap in the MR curve results from the abrupt change in the slope of the demand curve at the going price. Firms will not change their price because they fear that if they do their total revenue and profits will fall. Shortcomings of the model: (1) It does not explain how the going price evolved in the first place; (2) it does not allow for price leadership and other forms of collusion.

25-11 Why is there so much advertising in monopolistic competition and oligopoly? How does such advertising help consumers and promote efficiency? Why might it be excessive at times?

Two ways for monopolistically competitive firms to maintain economic profits are through product development and advertising. Also, advertising will increase the demand for the firm's product. The oligopolist would rather not compete on a basis of price. Oligopolists can increase their market share through advertising that is financed with economic profits from past advertising campaigns. Advertising can operate as a barrier to entry.

Advertising provides information about new products and product improvements to the consumer. Advertising may result in an increase in competition by promoting new products and product improvements.

Advertising may result in manipulation and persuasion rather than information. An increase in brand loyalty through advertising will increase the producer's monopoly power. Excessive advertising may create barriers to entry into the industry.

CHAPTER TWENTY-SIX

26-4 Suppose a firm expects that a \$20 million expenditure on R&D will result in a new product which will increase its revenue by a total of \$30 million 1 year from now. The firm estimates that the production cost of the new product will be \$29 million.

a. What is the expected rate of return on this R&D expenditure?

b. Suppose the firm can get a bank loan at 6 percent interest to finance its \$20 million R&D project. Will the firm undertake the project? Explain why or why not.

c. Now suppose the interest-rate cost of borrowing, in effect, falls to 4 percent because the firm decides to use its own retained earnings to finance the R&D. Will this lower interest rate change the firm's R&D decision? Explain.

(a) 5 percent;

(b) No, because the 5 percent rate of return is less than the 6 percent interest rate;

(c) Yes, because the 5 percent the rate of return is now greater than the 4 percent interest rate.

26-5 Answer the lettered questions below on the basis of the information in this table:

Amount of R&D, millions	Expected rate of return on R&D, %
\$10	16
20	14
30	12
40	10
50	8
60	6

a. If the interest-rate cost of funds is 8 percent, what will be the optimal amount of R&D spending for this firm?

b. Explain why \$20 million of R&D spending will not be optimal.

c. Why won't \$60 million be optimal either?

(a) \$50 million, where the interest-rate cost of funds (i) equals the expected rate of return (r);

(b) at \$20 million in R&D, r of 14 percent exceeds i of 8 percent, thus there would be an underallocation of R&D funds;

(c) at \$60 million, r of 6 percent is less than i of 8 percent, thus there would be an overallocation of R&D funds.

26-6 Refer to Table 26-1 and suppose the price of new product C is \$2 instead of \$4. How does this affect the optimal combination of products A, B, and C for the person represented by the data? Explain: "The success of a new product depends not only on its marginal utility but also on its price."

(a) The person would now buy 5 units of product C and zero units of A and B;

(b) The MU/price ratio is what counts; a new product can be successful by having a high MU, a low price, or both relative to existing products.

26-8 Answer the following questions on the basis of this information for a single firm: total cost of capital = \$1,000; price paid for labor = \$12 per labor unit; price paid for raw materials = \$4 per raw-material unit.

a. Suppose the firm can produce 5,000 units of output by combining its fixed capital with 100 units of labor and 450 units of raw materials. What are the total cost and average total cost of producing the 5,000 units of output?

b. Now assume the firm improves its production process so that it can produce 6,000 units of output by combining its fixed capital with 100 units of labor and 45 units of raw materials. What are the total cost and average cost of producing the 6,000 units of output?

c. In view of your answers to 8a and 8b, explain how process innovation can improve economic efficiency.

(a) Total cost = \$4,000; average total cost = \$.80 (= \$4,000/5,000 units);

(b) Total cost = \$4,000, average total cost = \$.667 (= \$4,000/6,000 units);

(c) Process innovation can lower the average total cost of producing a particular output, meaning that society uses fewer resources in producing that output. Resources are freed from this production to produce more of other desirable goods. Society realizes extra output through a gain in efficiency.

CHAPTER TWENTY-SEVEN

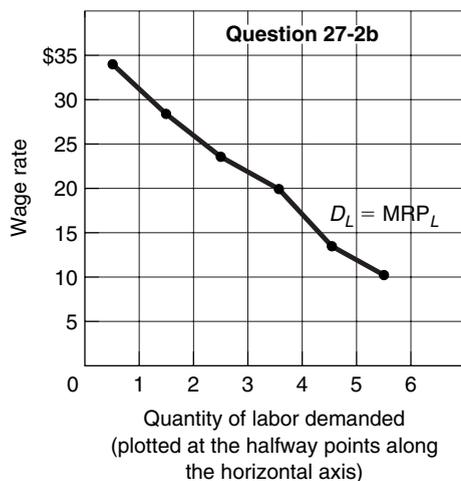
27-2 Complete the following labor demand table for a firm that is hiring labor competitively and selling its product in a competitive market.

Units of labor	Total product	Marginal product	Product price	Total revenue	Marginal revenue product
0	0	_____	\$2	\$_____	\$_____
1	17	_____	2	_____	_____
2	31	_____	2	_____	_____
3	43	_____	2	_____	_____
4	53	_____	2	_____	_____
5	60	_____	2	_____	_____
6	65	_____	2	_____	_____

- a. How many workers will the firm hire if the going wage rate is \$27.95? \$19.95? Explain why the firm will not hire a larger or smaller number of workers at each of these wage rates.
- b. Show in schedule form and graphically the labor demand curve of this firm.
- c. Now again determine the firm's demand curve for labor, assuming that it is selling in an imperfectly competitive market and that, although it can sell 17 units at \$2.20 per unit, it must lower product price by 5 cents in order to sell the marginal product of each successive worker. Compare this demand curve with that derived in question 2b. Which curve is more elastic? Explain.

Marginal product data, top to bottom: 17; 14; 12; 10; 7; 5. Total revenue data, top to bottom: \$0, \$34; \$62; \$86; \$106; \$120; \$130. Marginal revenue product data, top to bottom: \$34; \$28; \$24; \$20; \$14; \$10.

- (a) Two workers at \$27.95 because the MRP of the first worker is \$34 and the MRP of the second worker is \$28, both exceeding the \$27.985 wage. Four workers at \$19.95 because workers 1 through 4 have MRPs exceeding the \$19.95 wage. The fifth worker's MRP is only \$14 so he or she will not be hired.
- (b) The demand schedule consists of the first and last columns of the table:



- (c) Reconstruct the table. New product price data, top to bottom: \$2.20; \$2.15; \$2.10; \$2.05; \$2.00; \$1.95. New total revenue data, top to bottom: \$0; \$37.40; \$66.65; \$90.30; \$108.65; \$120.00; \$126.75. New marginal revenue product data, top to bottom: \$37.40; \$29.25; \$23.65; \$18.35; \$11.35;

\$6.75. The new labor demand is less elastic. Here, MRP falls because of diminishing returns *and* because product price declines as output increases. A decrease in the wage rate will produce less of an increase in the quantity of labor demanded, because the output from the added labor will reduce product price and thus MRP.

27-3 What factors determine the elasticity of resource demand? What effect will each of the following have on the elasticity or location of the demand for resource C, which is being used to produce product X? Where there is any uncertainty as to the outcome, specify the causes of the uncertainty.

- a. An increase in the demand for product X.
- b. An increase in the price of substitute resource D.
- c. An increase in the number of resources substitutable for C in producing X.
- d. A technological improvement in the capital equipment with which resource C is combined.
- e. A decrease in the price of complementary resource E.
- f. A decline in the elasticity of demand for product X due to a decline in the competitiveness of the product market.

Elasticity of demand for a resource is determined by:

- (1) the rate of decline of MP; (2) ease of resource substitutability; (3) elasticity of product demand; and (4) ratio of resource costs to total costs.
- (a) Increase in the demand for resource C.
- (b) Uncertainty relative to the change in demand for resource C; answer depends upon which is larger—the substitution effect or the output effect.
- (c) Increase in the elasticity of resource C.
- (d) Increase in the demand for resource C.
- (e) Increase in the demand for resource C.
- (f) Decrease in the elasticity of resource C.

27-4 Suppose the productivity of labor and capital are as shown in the accompanying table. The output of these resources sells in a purely competitive market for \$1 per unit. Both labor and capital are hired under purely competitive conditions at \$1 and \$3, respectively.

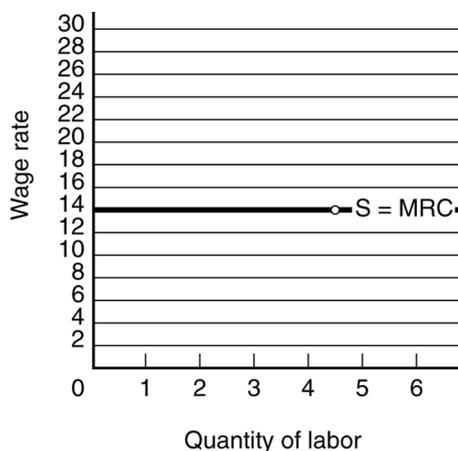
Units of capital	MP of capital	Units of labor	MP of labor
1	24	1	11
2	21	2	9
3	18	3	8
4	15	4	7
5	9	5	6
6	6	6	4
7	3	7	1
8	1	8	1/2

- a. What is the least-cost combination of labor and capital to employ in producing 80 units of output? Explain.
- b. What is the profit-maximizing combination of labor and capital the firm should use? Explain. What is the resulting level of output? What is the economic profit? Is this the least costly way of producing the profit-maximizing output?
 - (a) 2 capital; 4 labor $MP_L/P_L = 7/1$; $MP_C/P_C = 21/3 = 7/1$.
 - (b) 7 capital and 7 labor. $MRP_L/P_L = 1 (= 1/1) = MRP_C/P_C = 1 (= 3/3)$. Output is 142 (= 96 from capital + 46 from labor). Economic profit is \$114 (= \$142 - \$38). Yes, least-cost production is part of maximizing profits. The profit-maximizing rule includes the least-cost rule.

27-5 In each of the following four cases MRP_L and MRP_C refer to the marginal revenue products of labor and capital, respectively, and P_L and P_C refer to their prices. Indicate in each

case whether the conditions are consistent with maximum profits for the firm. If not, state which resource(s) should be used in larger amounts and which resource(s) should be used in smaller amounts.

- a. $MRP_L = \$8$; $P_L = \$4$; $MRP_C = \$8$; $P_C = \$4$.
 - b. $MRP_L = \$10$; $P_L = \$12$; $MRP_C = \$14$; $P_C = \$9$.
 - c. $MRP_L = \$6$; $P_L = \$6$; $MRP_C = \$12$; $P_C = \$12$.
 - d. $MRP_L = \$22$; $P_L = \$26$; $MRP_C = \$16$; $P_C = \$19$.
- (a) Use more of both;
 (b) Use less labor and more capital;
 (c) Maximum profits obtained;
 (d) Use less of both.



CHAPTER TWENTY-EIGHT

28-3 Describe wage determination in a labor market in which workers are unorganized and many firms actively compete for the services of labor. Show this situation graphically, using W_1 to indicate the equilibrium wage rate and Q_1 to show the number of workers hired by the firms as a group. Show the labor supply curve of the individual firm, and compare it with that of the total market. Why the difference? In the diagram representing the firm, identify total revenue, total wage cost, and revenue available for the payment of nonlabor resources.

The labor market is made up of many firms desiring to purchase a particular labor service and of many workers with that labor service. The market demand curve is downward sloping because of diminishing returns and the market supply curve is upward sloping because a higher wage will be necessary to attract additional workers into the market. Whereas the individual firm's supply curve in perfectly elastic because it can hire any number of workers at the going wage, the market supply curve is upward sloping.

For the graphs, see Figure 28.3 and its legend.

28-4 Complete the accompanying labor supply table for a firm hiring labor competitively.

Units of labor	Wage rate	Total labor cost (wage bill)	Marginal resource (labor) cost
0	\$14	\$ _____	\$ _____
1	14	_____	_____
2	14	_____	_____
3	14	_____	_____
4	14	_____	_____
5	14	_____	_____
6	14	_____	_____

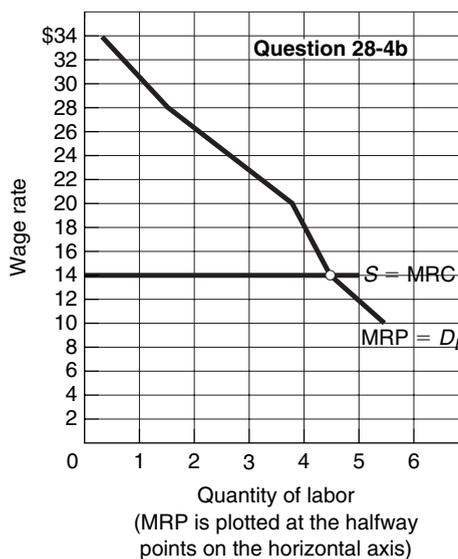
- a. Show graphically the labor supply and marginal resource (labor) cost curves for this firm. Explain the relationships of these curves to one another.
- b. Plot the labor demand data of question 2 in Chapter 27 on the graph in part a above. What are the equilibrium wage rate and level of employment? Explain.

Total labor cost data, top to bottom: \$0; \$14; \$28; \$42; \$56; \$70; \$84. Marginal resource cost data: \$14, throughout.

- (a) The labor supply curve and MRC curve coincide as a single horizontal line at the market wage rate of \$14. The firm can employ as much labor as it wants, each unit

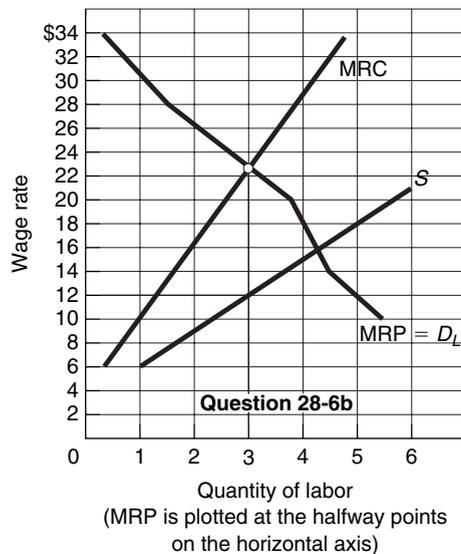
costing \$14; wage rate = MRC because the wage rate is constant to the firm.

(b) Graph: equilibrium is at the intersection of the MRP and MRC curves. Equilibrium wage rate = \$14; equilibrium level of employment = 4 units of labor. Explanation: From the tables: MRP exceeds MRC for each of the first four units of labor, but MRP is less than MRC for the fifth unit.



28-6 Assume a firm is a monopsonist that can hire the first worker for \$6 but must increase the wage rate by \$3 to attract each successive worker. Draw the firm's labor supply and marginal resource cost curves and explain their relationships to one another. On the same graph, plot the labor demand data of question 2 in Chapter 27. What are the equilibrium wage rate and level of employment? What will be the equilibrium wage rate and the level of employment? Why do these differ from your answer to question 4?

The monopsonist faces the market labor supply curve S —it is the only firm hiring this labor. MRC lies above S and rises more rapidly than S because all workers get the higher wage rate that is needed to attract each added worker. Equilibrium wage/rate = \$12; equilibrium employment = 3 (where $MRP = MRC$). The monopsonist can pay a below-competitive wage rate by restricting its employment.



28-7 Assume a monopsonistic employer is paying a wage rate of W_m and hiring Q_m workers, as indicated in Figure 28-8. Now suppose that an industrial union is formed and that it forces the employer to accept a wage rate of W_c . Explain verbally and graphically why in this instance the higher wage rate will be accompanied by an increase in the number of workers hired.

The union wage rate W_c becomes the firm's MRC, which would be shown as a horizontal line to the left of the labor supply curve. Each unit of labor now adds only its own wage rate to the firm's costs. The firm will employ Q_c workers, the quantity of labor where $MRP = MRC (= W_c)$; Q_c is greater than the Q_m workers it would employ if there were no union and if the employer did not have any monopsonistic power, i.e. more workers are willing to offer their labor services when the wage is W_c than W_m .

CHAPTER TWENTY-NINE

29-2 Explain why economic rent is a surplus to the economy as a whole but a cost of production from the standpoint of individual firms and industries. Explain: "Rent performs no incentive function in the economy."

Land is completely fixed in total supply. As population expands and the demand for land increases, rent first appears and then grows. From society's perspective this rent is a surplus payment unnecessary for ensuring that the land is available to the economy as a whole. If rent declined or disappeared, the same amount of land would be available. If it increased, no more land would be forthcoming. Thus, rent does not function as an incentive for adding land to the economy.

But land does have alternative uses. To get it to its most productive use, individuals and firms compete and the winners are those who pay the highest rent. To the high bidders, rent is a cost of production that must be covered by the revenue gained through the sale of the commodities produced on that land.

29-4 Why is the supply of loanable funds upsloping? Why is the demand for loanable funds downsloping? Explain the equilibrium interest rate. List some factors that might cause it to change.

(a) The supply of loanable funds is upsloping because savers will make more funds available at higher interest rates than lower interest.

(b) The demand of loanable funds is downsloping because there are few investment and R&D projects that will yield a very high rate of return and many more that will yield a lower rate of return.

(c) The equilibrium interest rate is determined where the interest rate (cost of borrowing the funds) is equal to the expected rate of return (the expected benefit from borrowing the funds and engaging in the investment or R&D project). The supply of loanable fund may change because of a change in households' attitudes about saving (tax policies, macroeconomic conditions) or changes in Federal Reserve policies relative to the money supply. The demand for loanable funds could change as a result a change in technology or a change in the demand for the final product. If there is either a change in supply of or demand for loanable, the interest rate will change.

29-6 Distinguish between nominal and real interest rates. Which is more relevant in making investment and R&D decisions? If the nominal interest rate is 12 percent and the inflation rate is 8 percent, what is the real rate of interest?

The nominal interest rate is the interest rate stated in dollars of current value (unadjusted for inflation). The real interest rate is the nominal interest rate adjusted for inflation (or deflation). The real interest rate is more relevant for making investment decisions—it reflects the true cost of borrowing money. It is compared to the expected return on the investment in the decision process. Real interest rate = 4 percent (= 12 percent – 8 percent).

29-8 How do the concepts of accounting profits and economic profits differ? Why are economic profits smaller than accounting profits? What are the three basic sources of economic profits? Classify each of the following in accordance with these sources:

- A firm's profits from developing and patenting a new medication that greatly reduces cholesterol and thus diminishes the likelihood of heart disease and stroke.
- A restaurant's profit that results from construction of a new highway past its door.
- The profit received by a firm benefiting from an unanticipated change in consumer tastes.

Accounting profit is what remains of a firm's total revenues after it has paid for all the factors of production employed by the firm (its explicit costs) but not for the use of the resources owned by the business itself. Economists also take into consideration implicit costs—the payment the owners could have received by using the resources they own in some other way. The economist adds these implicit costs to the accountant's explicit costs to arrive at total cost. Subtracting the total cost from total revenue results in a smaller profit (the economic profit) than the accountant's profit.

Sources of economic profit: (1) uninsurable risks; (2) innovations; and (3) monopoly.

- Profit from assuming the uncertainties of innovation, as well as monopoly profit from the patent.
- Monopoly profit arising from its locational advantage.
- Profit from bearing the uninsurable risk of a change in demand (the change could have been unfavorable).

CHAPTER THIRTY

30-1 On the basis of the three individual demand schedules below, and assuming these three people are the only ones in the society, determine (a) the market demand schedule on the assumption that the good is a private good, and (b) the collective demand schedule on the assumption that the good is a public good. Explain the differences, if any, in your schedules.

Individual #1		Individual #2		Individual #3	
Price	Q _d	Price	Q _d	Price	Q _d
\$8	0	\$8	1	\$8	0
7	0	7	2	7	0
6	0	6	3	6	1
5	1	5	4	5	2
4	2	4	5	4	3
3	3	3	6	3	4
2	4	2	7	2	5
1	5	1	8	1	6

(a) Private good, top to bottom: P = \$8, Q = 1; P = \$7, Q = 2; P = \$6, Q = 4; P = \$5, Q = 7; P = \$4, Q = 10; P = \$3, Q = 13; P = \$2, Q = 16; P = \$1, Q = 19. (b) Public good, top to bottom; P = \$19, Q = 1; P = \$16, Q = 2; P = \$13, Q = 3; P = \$10, Q = 4; P = \$7, Q = 5; P = \$4, Q = 6; P = \$2, Q = 7; P = \$1, Q = 8. The first schedule represents a horizontal summation of the individual demand curves; the second schedule represents a vertical summation of these curves. The market demand curve for the private good will determine—in combination with market supply—an actual price-quantity outcome in the marketplace. Because potential buyers of public goods do not reveal their individual preferences in the market, the collective demand curve for the public good is hypothetical or needs to be determined through “willingness to pay” studies.

30-2 Use your demand schedule for a public good determined in question 1 and the following supply schedule to ascertain the optimal quantity of this public good. Why is this the optimal quantity?

Optimal quantity = 4. It is optimal because at 4 units the collective willingness to pay for the final unit of the good (= \$10) matches the marginal cost of production (= \$10).

P	Q _s
\$19	10
16	8
13	6
10	4
7	2
4	0

30-3 The following table shows the total costs and total benefits in billions for four different antipollution programs of increasing scope. Which program should be undertaken? Why?

Program	Total Cost	Total Benefit
A	\$ 3	\$ 7
B	7	12
C	12	16
D	18	19

Program B since the marginal benefit no longer exceeds marginal cost for programs that are larger in scope. Plan B is where net benefits—the excess of total benefits over total costs—are maximized.

30-4 Why are spillover costs and spillover benefits also called negative and positive externalities? Show graphically how a tax can correct for a spillover cost and a subsidy to producers can correct for a spillover benefit. How does a subsidy to consumers differ from a subsidy to producers in correcting for a spillover benefit?

Spillover costs are called negative externalities because they are *external* to the participants in the transaction and *reduce* the utility of affected third parties (thus “negative”). Spillover benefits are called positive externalities because they are *external* to the participants in the transaction and *increase* the utility of affected third parties (thus “positive”). See Figures 30-3 and 30-4. Compare (b) and (c) in Figure 30-4.

30-7 Explain the following statement, using the MB curve in Figure 30-6 to illustrate: “The optimal amount of pollution abatement for some substances, say, water from storm drains, is very low; the optimal amount of abatement for other substances, say, cyanide poison, is close to 100 percent.”

Reducing water flow from storm drains has a low marginal benefit, meaning the MB curve would be located far to the left of where it is in the text diagram. It will intersect the MC curve at a low amount of pollution abatement, indicating the optimal amount of pollution abatement (where MB = MC) is low. Any cyanide in public water sources could be deadly. Therefore, the marginal benefit of reducing cyanide is extremely high and the MB curve in the figure would be located to the extreme right where it would intersect the MC curve at or near 100 percent.

30-13 Place an M beside items in the following list which describe a moral hazard problem; place an A beside those that describe an adverse selection problem.

- a. A person with a terminal illness buys several life insurance policies through the mail.
- b. A person drives carelessly because he or she has insurance.
- c. A person who intends to “torch” his warehouse takes out a large fire insurance policy.
- d. A professional athlete who has a guaranteed contract fails to stay in shape during the off-season.
- e. A woman anticipating having a large family takes a job with a firm that offers exceptional child-care benefits.

Moral hazard problem: (b) and (d). Adverse selection problem: (a), (c), and (e).

CHAPTER THIRTY-ONE

31-2 Explain the paradox of voting through reference to the accompanying table which shows the ranking of three public goods by voters Larry, Curley, and Moe.

Public Good	Larry	Curley	Moe
Courthouse	2d choice	1st choice	3d choice
School	3d choice	2d choice	1st choice
Park	1st choice	3d choice	2d choice

The paradox is that majority voting does not always provide a clear and consistent picture of the public’s preferences. Here the courthouse is preferred to the school and the park is preferred to the courthouse, so we would surmise that the park is preferred to the school. But paired-choice voting would show that the school is preferred to the park.

31-3 Suppose that there are only five people in a society and that each favors one of the five flood-control options shown in Table 30-2 (include no protection as one of the options). Explain which of these flood control options will be selected using a majority rule. Will this option be the optimal size of the project from an economic perspective?

Project B (small reservoir wins) using a paired-choice vote. There is no “paradox of voting” problem here and B is the

preference of the median voter. The two voters favoring No reservoir and Levees, respectively, will prefer Small reservoir—project B—to Medium or Large reservoir. The two voters preferring Large reservoir or Medium reservoir will prefer Small reservoir to Levees or No reservoir. The median voter's preference for B will prevail. However, the optimal size of the project from an economic perspective is C—it would provide a greater net benefit to society than B.

31-4 How does the problem of limited and bundled choice in the public sector relate to economic efficiency? Why are public bureaucracies alleged to be less efficient than private enterprises?

The electorate is faced with a small number of candidates, each of whom offers a broad range or “bundle” of proposed policies. Voters are then forced to choose the individual candidate whose bundle of policies most resembles their own. The chances of a perfect identity between a particular candidate's preferences and those of any voter are quite slim. As a result, the voter must purchase some unwanted public goods and services. This represents an inefficient allocation of resources.

Government bureaucracies do not function on the basis of profit, so the incentive for holding down costs is less than in the private sector. Also, because there is no profit-and-loss test of efficiency, it is difficult to determine whether public agencies are operating efficiently. Nor is there entry of competing entities to stimulate efficiency and develop improved public goods and services. Furthermore, wasteful expenditures can be maintained through the self-seeking lobbying of bureaucrats themselves, and the public budgetary process can reward rather than penalize inefficiency.

31-7 Suppose a tax is such that an individual with an income of \$10,000 pays \$2,000 of tax, a person with an income of \$20,000 pays \$3,000 of tax, a person with an income of \$30,000 pays \$4,000 of tax, and so forth. What is each person's average tax rate? Is this tax regressive, proportional, or progressive?

Average tax rates: 20; 15; and 13.3 percent. Regressive.

31-9 What is the incidence of an excise tax when demand is highly inelastic? Elastic? What effect does the elasticity of supply have on the incidence of an excise tax? What is the efficiency loss of a tax, and how does it relate to elasticity of demand and supply?

The incidence of an excise tax is likely to be primarily on consumers when demand is highly inelastic and primarily on producers when demand is elastic. The more elastic the supply, the greater the incidence of an excise tax on consumers and the less on producers.

The efficiency loss of a sales or excise tax is the net benefit society sacrifices because consumption and production of the taxed product are reduced below the level of allocative efficiency which would occur without the tax. Other things equal, the greater the elasticities of demand and supply, the greater the efficiency loss of a particular tax.

CHAPTER THIRTY-TWO

32-2 Describe the major provisions of the Sherman and Clayton acts. What government entities are responsible for enforcing those laws? Are firms permitted to initiate antitrust suits on their own against other firms?

Sherman Act: Section 1 prohibits conspiracies to restrain trade; Section 2 outlaws monopolization. Clayton Act (as amended by Celler-Kefauver Act of 1950): Section 2 outlaws price discrimination; Section 3 forbids tying contracts; Section 7 prohibits mergers which substantially lessen competition; Section 8 prohibits interlocking directorates. The acts are enforced by the

Department of Justice, Federal Trade Commission, and state attorney generals. Private firms can bring suit against other firms under these laws.

32-5 How would you expect antitrust authorities to react to (a) a proposed merger of Ford and General Motors; (b) evidence of secret meetings by contractors to rig bids for highway construction projects; (c) a proposed merger of a large shoe manufacturer and a chain of retail shoe stores; and (d) a proposed merger of a small life insurance company and a regional candy manufacturer.

(a) They would block this horizontal merger (violation of Section 7 of the Clayton Act). (b) They would charge these firms with price fixing (violation of Section 1 of the Sherman Act). (c) They would allow this vertical merger, unless both firms had very large market shares and the resultant merger substantially lessens competition. (d) They would allow this conglomerate merger.

32-10 What types of industries, if any, should be subjected to industrial regulation? What specific problems does industrial regulation entail?

Industries composed of firms with natural monopolies conditions are most likely to be subjected to industrial regulation. Regulation based on “fair-return” prices creates disincentives for firms to minimize costs since cost reductions lead regulators to force firms to change a lower price. Regulated firms may also use “creative” accounting to boost costs and hide profits. Because regulatory commissions depend on information provided by the firms themselves and commission members are often recruited from the industry, the agencies may in effect be controlled by the firms they are supposed to oversee. Also, industrial regulation sometimes is applied to industries that are not, or no longer are, natural monopolies. Regulation may lead to the conditions of a cartel, conditions that are illegal in an unregulated industry.

32-12 How does social regulation differ from industrial regulation? What types of costs and benefits are associated with social regulation?

Industrial regulation is concerned with prices, output, and profits specific industries whereas social regulation deals with the broader impact of business on consumers, workers, and third parties. Benefits: increased worker and product safety, less environmental damage, reduced economic discrimination. Two types of costs: administrative costs, because regulations must be administered by costly government agencies, compliance costs, because firms must increase spending to comply with regulations.

CHAPTER THIRTY-THREE

33-1 Carefully evaluate: “The supply and demand for agricultural products are such that small changes in agricultural supply will result in drastic changes in prices. However, large changes in farm prices have modest effects on agricultural output.” (*Hint*: A brief review of the distinction between supply and quantity supplied may be of assistance.) Do exports increase or reduce the instability of demand for farm products? Explain.

First sentence: Shifts in the supply curve of agricultural goods (*changes in supply*) relative to fixed inelastic demand curves produce large changes in equilibrium prices. Second sentence: But these drastic changes in prices produce only small changes in equilibrium outputs (where *quantities demanded* equals *quantities supplied*) because demands are inelastic.

Because exports are volatile from one year to the next, they increase the instability of demand for farm products.

33-3 Explain how each of the following contributes to the farm problem: (a) the inelasticity of the demand for farm products, (b)

rapid technological progress in farming, (c) the modest long-run growth in the demand for farm commodities, and (d) the volatility of export demand.

(a) Because the demand for most farm products is inelastic, the frequent fluctuations in supply brought about by weather and other factors have relatively small effects on quantity demanded, but large effects on equilibrium prices of farm products. Farmers' sales revenues and incomes therefore are unstable. (b) Technological innovations have decreased production costs, increased long-run supply for most agricultural goods, and reduced the prices of farm output. These declines in prices have put a downward pressure on farm income. (c) The modest long-run growth in the demand for farm products has not been sufficient to offset the expansion of supply, resulting in stagnant farm income. (d) Foreign demand has been unpredictable. Any change in demand will affect farm prices but farmers cannot easily adjust production.

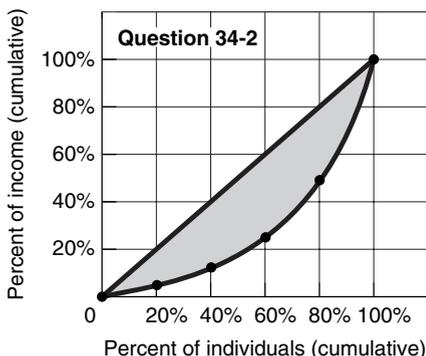
33-8 Explain the economic effects of price supports. Explicitly include environmental and global impacts in your answer. On what grounds do economists contend that price supports cause a misallocation of resources?

Price supports benefit farmers, harm consumers, impose costs on society, and contribute to problems in world agriculture. Farmers benefit because the prices they receive and the output they produce both increase, expanding their gross incomes. Consumers lose because the prices they pay for farm products rise and quantities purchased decline. Society as a whole bears several costs. Surpluses of farm products will have to be bought and stored, leading to a greater burden on taxpayers. Domestic economic efficiency is lessened as the artificially high prices of farm products lead to an overallocation of resources to agriculture. The environment suffers: the greater use of pesticides and fertilizers contributes to water pollution; farm policies discourage crop rotation; and price supports encourage farming of environmentally sensitive land. The efficient use of world resources is also distorted because of the import tariffs or quotas which such programs often require. Finally, domestic overproduction leads to supply increases in international markets, decreasing prices and causing a decline in the gross incomes of foreign producers.

CHAPTER THIRTY-FOUR

34-2 Assume Al, Beth, Carol, David, and Ed receive incomes of \$500, \$250, \$125, \$75, and \$50 respectively. Construct and interpret a Lorenz curve for this five-person economy. What percentage of total income is received by the richest and by the poorest quintiles?

See the Figure in the next Key Question. In this simple economy each person represents a complete income quintile—20 percent of the total population. The richest quintile (Al) receives 50 percent of total income; the poorest quintile (Ed) receives 5 percent.



34-4 Briefly discuss the major causes of income inequality. With respect to income inequality, is there any difference between inheriting property and inheriting a high IQ? Explain.

The reasons for income inequality are: differences in abilities and talents among individuals, differences in the amount of education and training an individual obtains, labor market discrimination, differences in tastes and preferences toward work and job attributes, inequality in the distribution of wealth, the ability to use market power to transfer income to oneself, luck, connections, and misfortune.

A high IQ normally does not lead to high income unless it is combined with personal initiative and favorable social circumstances. Inherited property—as long as it is competently managed—provides income irrespective of one's character and personal attributes. Both factors are largely a matter of the luck of being born into a family with good ability genes and/or wealth. What one does with the genes or wealth, is up to the recipient.

CHAPTER THIRTY-FIVE

35-4 What is the estimated size of the union wage advantage? How might this advantage diminish the efficiency with which labor resources are allocated?

Fifteen percent. The higher wages that unions achieve reduce employment, displace workers, and increase the marginal revenue product in the union sector. Labor supply increases in the nonunionized sector, reducing wages and decreasing marginal revenue production there. Because of the lower nonunion marginal revenue product, the workers added in the nonunion sector contribute less to GDP than they would have in the unionized sector. The gain of GDP in the nonunionized sector does not offset the loss of GDP in the unionized sector so there is an overall efficiency loss.

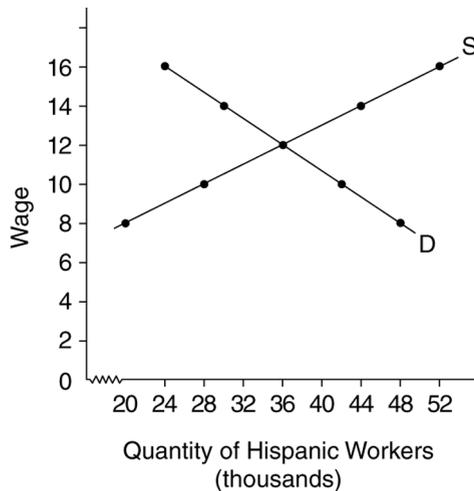
35-7 The labor demand and supply data in the following table relate to a single occupation. Use them to answer the questions that follow. Base your answers on the taste-for-discrimination model.

Quantity of Hispanic labor demanded, thousands	Hispanic wage rate	Quantity of Hispanic labor supplied, thousands
24	\$16	52
30	14	44
36	12	36
42	10	28
48	8	20

- Plot the labor demand and supply curves for Hispanic workers in this occupation.
- What are the equilibrium Hispanic wage rate and quantity of Hispanic employment?
- Suppose the white wage rate in this occupation is \$16. What is the Hispanic-to-white wage ratio?
- Suppose a particular employer has a discrimination coefficient d of \$5 per hour. Will that employer hire Hispanic or white workers at the Hispanic-white wage ratio indicated by part c? Explain.
- Suppose employers as a group become less prejudiced against Hispanics and demand 14 more units of Hispanic labor at each Hispanic wage rate in the table. What are the new equilibrium Hispanic wage rate and level of Hispanic employment? Does the Hispanic-white wage ratio rise or fall? Explain.

f. Suppose Hispanics as a group increase their labor services in this occupation, collectively offering 14 more units of labor at each Hispanic wage rate. Disregarding the changes indicated in part e, what are the new equilibrium Hispanic wage rate and level of Hispanic employment? Does the Hispanic-white wage ratio rise, or does it fall?

(a)



(b) The equilibrium Hispanic wage rate is \$12; the equilibrium quantity of Hispanic employment is 36,000 workers.

(c) The Hispanic-to-white wage ratio is $.75 (= \$12/\$16)$.

(d) The employer will hire only white workers because the \$5 discrimination coefficient exceeds the \$4 difference between the wage rates of whites and Hispanics.

(e) The new equilibrium Hispanic wage rate is \$14 and the new equilibrium quantity of Hispanic employment is 44,000 workers. The Hispanic-white wage ratio rises to $.875 (= \$16/\$14)$ because of the increased demand for Hispanic labor in relation to the unchanging supply of Hispanic labor.

(f) The new equilibrium Hispanic wage rate is \$10 and the new equilibrium quantity of Hispanic employment is 20,000. This Hispanic-white wage ratio falls to $.625 (= \$10/\$16)$.

35-9 Use a demand and supply model to explain the impact of occupational segregation or “crowding” on the relative wage rates and earnings of men and women. Who gains and who loses from the elimination of occupational segregation? Is there a net gain or net loss to society? Explain.

See Figure 35-5. Discrimination against women in two of the three occupations will crowd women into the third occupation. Labor supply in the “men’s occupations” (X and Y) decreases, making them high-wage occupations. Labor supply in the “women’s occupation” (Z) increases creating a low-wage occupation.

Eliminating occupational segregation would entice women into the high-wage occupations, increasing labor supply there and reducing it in the low-wage occupation. The wage rates in the three occupations would converge to B . Women would gain, men would lose. Society would gain because the increase in output in the expanding occupations would exceed the loss of output in the contracting occupation.

35-12 Use graphical analysis to show the gains and losses resulting from the migration of population from a low-income country to a high-income country. Explain how your conclusions are affected by (a) unemployment, (b) remittances to the home country, (c) backflows of migrants to their home country, and (d) the personal characteristics of the migrants. If the migrants are highly skilled workers, is there any justification for the sending country to levy a “brain drain” tax on emigrants?

See Figure 35-6. Migration of labor from the low- to high-income country increases labor supply in the high-income country and decreases it in the low-income country. Wages are equalized at W_e . Output and business income increase in the receiving country; decline in the sending country. World output increases: the output gain in the receiving country exceeds the output loss in the sending country.

(a) The gains to the receiving country will not materialize if the migrants are unemployed after they arrive; there may be gains in the low-income country if the immigrant had been unemployed prior to moving. (b) Remittances to the home country will decrease the income gain in the receiving country and reduce the income loss in the sending country. (c) If migrants who return to their home country have enhanced their skills, their temporary departure might be to the long-run advantage of the home country. (d) Young, skilled migrants will increase output and likely be the net taxpayers in the receiving country, but the sending country will experience a “brain drain.” Older or less skilled workers who are not so easily assimilated could be net recipients of government services.

In view of the sometimes large investments which sending countries have made in providing education and skills, there is a justification for levying a departure tax on such migrants. But if this tax were too high, it would infringe on a basic human right: the right to emigrate.

CHAPTER THIRTY-SIX

36-2 What are the “twin problems” of the health care industry? How are they related?

The “twin problems” are rising prices for all and limited access (lack of insurance) for about 16 percent of the population. The problems are related since rising costs make insurance unaffordable for many individuals and families and make it difficult for some businesses to insure their workers.

36-7 What are the estimates of the income and price elasticities of demand for health care? How does each relate to rising health care costs?

Income elasticity is 1.0 suggesting that health care spending will rise proportionately with income. Some studies indicate it might be 1.5 in the U.S. Price elasticity is only 0.2, meaning higher prices for health care services will increase total health care spending.

36-10 Using the concepts in Chapter 21’s discussion of consumer behavior, explain how health care insurance results in an overallocation of resources to the health care industry. Use a demand and supply diagram to specify the resulting efficiency loss.

Health care insurance removes or greatly lessens a person’s budget restraint at the time health care is purchased, raising health care utility per dollar spent and causing an overconsumption of health care. In Figure 35-3b, insurance reduces the price of health care at the time of purchase from P_u to P_i , increasing the quantity consumed from Q_u to Q_i . At Q_i the marginal cost of health care is represented by point b and exceeds the marginal benefit represented by c , indicating an overallocation of resources. The efficiency loss is area cab .

CHAPTER THIRTY-SEVEN

37-4 To follow are the hypothetical production possibilities tables for New Zealand and Spain.

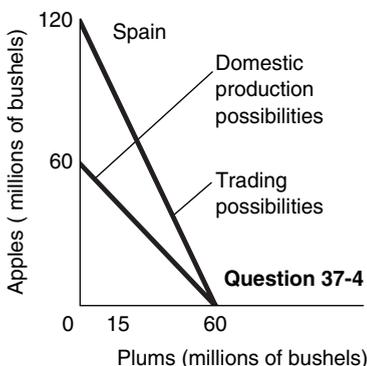
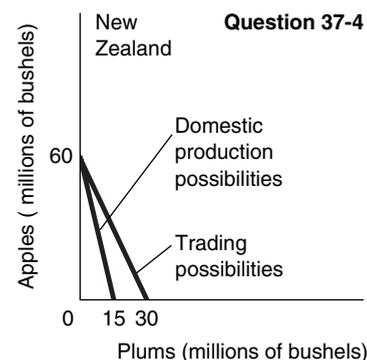
New Zealand's production possibilities table (millions of bushels)

Product	Production alternatives			
	A	B	C	D
Apples	0	20	40	60
Plums	15	10	5	0

Spain's production possibilities table (millions of bushels)

Product	Production alternatives			
	R	S	T	U
Apples	0	20	40	60
Plums	60	40	20	0

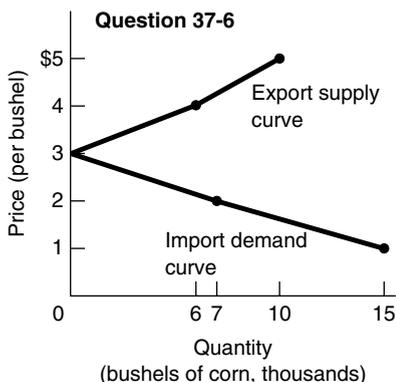
Plot the production possibilities data for each of the two countries separately. Referring to your graphs, answer the following: (a) What is each country's cost ratio of producing plums and apples. (b) Which nation should specialize in which product? (c) Show the trading possibilities lines for each nation if the actual terms of trade are 1 plum for 2 apples. (d) Suppose the optimum product mixes before specialization and trade were alternative B in New Zealand and S in Spain. What would be gains from specialization and trade?



- (a) New Zealand's cost ratio is 1 plum = 4 apples (or 1 apple = 1/4 plum). Spain's cost ratio is 1 plum = 1 apple (or 1 apple = 1 plum). See the graphs.
- (b) New Zealand should specialize in apples, Spain in plums.
- (c) See the graphs.
- (d) Total production before specialization and trade: 40 apples (20 + 20) and 50 plums (10 + 40). After specialization and trade: 60 apples and 60 plums. Gain = 20 apples and 10 plums.

37-6 Refer to Figure 3-5 (Chapter 3). Assume the graph depicts the U.S. domestic market for corn. How many bushels of corn,

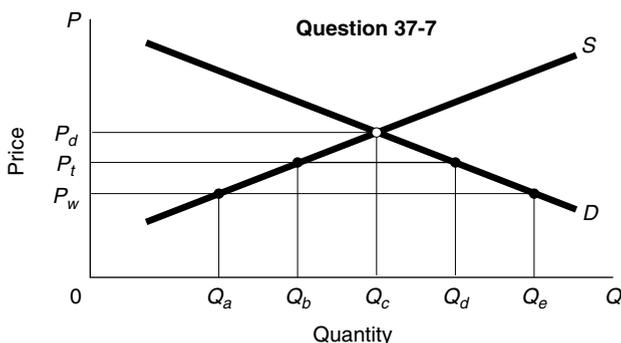
if any, will the United States export or import at a world price of \$1, \$2, \$3, \$4, and \$5? Use this information to construct the U.S. export supply curve and import demand curve for corn. Suppose the only other corn-producing nation is France, where the domestic price is \$4. Which country will export corn; which will import it?



At \$1: import 15,000. At \$2: import 7,000. At \$3: no imports or exports. At \$4: export 6,000. At \$5: export 10,000.

The United States will export corn, France will import it.

37-7 Draw a domestic supply and demand diagram for a product in which the United States does not have a comparative advantage. What impact do foreign imports have on domestic price and quantity? On your diagram show a protective tariff which eliminates approximately one-fourth the assumed imports. What are the price-quantity effects of this tariff to (a) domestic consumers, (b) domestic producers, and (c) foreign exporters? How would the effects of a quota which creates the same amount of imports differ?



See the graph. The United States does not have a comparative advantage in this product so the world price P_w is below the U.S. domestic price of P_d . Imports will reduce the domestic price, increasing consumption from nontrade Q_c to Q_e and decreasing domestic production from Q_c to Q_a . See the graph. A tariff of $P_w P_t$ (a) harms domestic consumers by increasing price from P_w to P_t and decreasing consumption from Q_e to Q_d ; (b) aids domestic producers through the increase in price from P_w to P_t and the expansion of domestic production from Q_a to Q_b ; (c) harms foreign exporters by decreasing exports from $Q_a Q_e$ to $Q_b Q_d$.

An import quota of $Q_b Q_d$ would have the same effects as the tariff, but there would be no tariff revenues to government from these imports; this revenue would effectively go to foreign producers.

37-11 What is the WTO, and how does it relate to international trade? What problems, if any, arise when too many extraneous efforts are tied to efforts to liberalize trade?

The WTO is the World Trade Organization with 138 member nations in 2000. It was established in 1994 by some 120 nations who had been supporters of GATT (General Agreement on Trade and Tariffs) which preceded WTO. The organization promotes reduction in trade barriers and helps to enforce the agreement signed by its nation members.

If too many extraneous issues are tied to efforts to liberalize trade, the liberalization process is slowed down. For example, tying human rights protection to free trade policies might be a very difficult political process which could take much longer to change than trade policy.

CHAPTER THIRTY-EIGHT

38-2 Indicate whether each of the following creates a demand for, or a supply of, European euros in foreign exchange markets:

- a. A U.S. airline firm purchases several Airbus planes assembled in France.
- b. A German automobile firm decides to build an assembly plant in South Carolina.
- c. A U.S. college student decides to spend a year studying at the Sorbonne.
- d. An Italian manufacturer ships machinery from one Italian port to another on a Liberian freighter.
- e. The United States economy grows faster than the French economy.
- f. A United States government bond held by a Spanish citizen matures, and the loan is paid back to that person.
- g. It is widely believed that the Swiss franc will fall in the near future.

A demand for euros is created in (a),(c),(e),(f), and (g) but see note below for e and g. A supply of francs is created in (b) and (d).

Note: Answer for (e) assumes U.S. demand for French goods will grow faster than French imports of U.S. goods, (g) assumes some holders of francs will buy euros instead (Switzerland is not in the EU).

38-3 Alpha's balance of payments data for 2001 are shown below. All figures are in billions of dollars. What are (a) the balance of trade, (b) the balance on goods and services, (c) the balance on current account, and (d) the balance on capital account? Does Alpha have a balance of payments deficit or surplus? Explain.

Merchandise exports	+\$40
Merchandise imports	- 30
Service exports	+ 15
Service imports	- 10
Net investment income	- 5
Net Transfers	+\$10
Foreign purchases of U.S. assets	+ 10
U.S. purchases of foreign assets	- 40
Official reserves	+ 10

Balance of trade = \$10 billion surplus (= exports of goods of \$40 billion minus imports of goods of \$30 billion). Note: This is goods balance only-uses narrow definition of trade balance. Balance on goods and services = \$15 billion surplus (= \$55 billion of exports of goods and services minus \$40 billion of imports of goods and services). Balance on current account = \$20 billion surplus (= credits of \$65 billion minus debits of \$45 billion). Balance on capital account = \$30 billion deficit (= Foreign purchases of assets in the United States of \$10 billion minus U.S. purchases of assets abroad of \$40 billion). Balance of

payments = \$10 billion deficit. Therefore, U.S. must export official reserves = \$10 billion.

38-6 Explain why the U.S. demand for Mexican pesos is downsloping and the supply of pesos to Americans is upsloping. Assuming a system of floating exchange rates between Mexico and the United States, indicate whether each of the following would cause the Mexican peso to appreciate or depreciate:

- a. The United States unilaterally reduces tariffs on Mexican products.
- b. Mexico encounters severe inflation.
- c. Deteriorating political relations reduce American tourism in Mexico.
- d. The United States' economy moves into a severe recession.
- e. The U.S. engages in a high interest rate monetary policy.
- f. Mexican products become more fashionable to U.S. consumers.
- g. The Mexican government encourages U.S. firms to invest in Mexican oil fields.
- h. The rate of productivity growth in the United States diminishes sharply.

The U.S. demand for pesos is downsloping: When the peso depreciates in value (relative to the dollar) the United States finds that Mexican goods and services are less expensive in dollar terms and purchases more of them, demanding a greater quantity of pesos in the process. The supply of pesos to the United States is upsloping: As the peso appreciates in value (relative to the dollar), U.S. goods and services become cheaper to Mexicans in peso terms. Mexicans buy more dollars to obtain more U.S. goods, supplying a larger quantity of pesos.

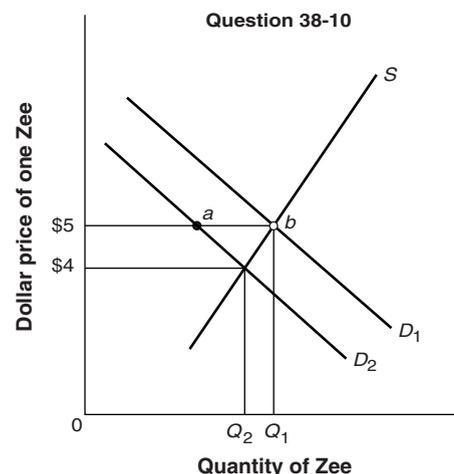
The peso appreciates in (a), (f), (g), and (h) and depreciates in (b), (c), (d), and (e).

38-9 Diagram a market in which the equilibrium dollar price of one unit of fictitious currency Zee is \$5 (the exchange rate is \$5 = Z1). Then show on your diagram a decline in the demand for Zee.

a. Referring to your diagram, discuss the adjustment options the United States would have in maintaining the exchange rate at \$5 = Z1 under a fixed exchange-rate system.

b. How would the U.S. balance of payments surplus that is created (by the decline in demand) get resolved under a system of flexible exchange rates?

See the graph illustrating the market for Zees.



(a) The decrease in demand for Zees from D_1 to D_2 will create a surplus (ab) of Zees at the \$5 price. To maintain the \$5 to Z1 exchange rate, the United States must undertake policies to shift the demand-for-Zee curve rightward or shift the supply-of Zee curve leftward. To increase the demand for Zees, the United States could use dollars or gold to buy Zees in the foreign exchange market; employ trade policies to increase imports to U.S. from Zeeonia; or enact expansionary fiscal and monetary policies to increase U.S. domestic output and income, thus increasing imports from Zeeonia and elsewhere. Expansionary monetary policy could also reduce the *supply* of Zees: Zeeons could respond to the lower U.S. interest rates by reducing their investing in the United States. Therefore, they would not supply as many Zees to the foreign exchange market.

(b) Under a system of flexible exchange rates, the ab surplus of Zees (the U.S. balance of payments surplus) will cause the Zee to depreciate and the dollar to appreciate until the surplus is eliminated (at the \$4 = Z1 exchange rate shown in the figure) because U.S. would import more from Zeeonia and they would buy less from U.S. since Zee's lost value.

CHAPTER THIRTY-NINE

39-3 Assume a DVC and an IAC presently have real per capita outputs of \$500 and \$5,000 respectively. If both nations have a 3 percent increase in their real per capita outputs, by how much will the per capita output gap change?

Rise in per capita output gap = \$135 ($= 3\% \times \$5,000 - 3\% \times \500).

39-6 Contrast the “demographic transition” view of population growth with the traditional view that slower population growth is a prerequisite for rising living standards in the DVCs.

Demographic transition view: Expanded output and income in developing countries will result in lower birthrates and slower growth of population. As incomes of primary family members expand, they begin to see the marginal cost of a larger family exceeding the marginal benefit. The policy emphasis should therefore be on economic growth; population growth will realize. Traditional view: Developing nations should reduce population growth as a first priority. Slow population growth enables the growth of per capita income.

39-7 Because real capital is supposed to earn a higher return where it is scarce, how do you explain the fact that most international investment flows to the IACs (where capital is relatively abundant) rather than to the DVCs (where capital is very scarce)?

Capital earns a higher return where it is scarce, *other things equal*. But, when comparing investment opportunities between IACs and DVCs, other things equal. Advanced factors filled with specialized equipment require a productive work force. IACs have no abundance of educated, experienced workers; these workers are scarce in DVCs. Also, IACs have extensive public infrastructures which increase the returns on private capital. Example: a network of highways makes it more profitable to produce goods which need to be widely transported. Finally, investment returns must be adjusted for risk. IACs have stable governments and “law and order,” reducing the risk of capital being “nationalized” or pilfered by organized crime.

39-13 Use Figure 39-2 (changing box labels as necessary) to explain rapid economic growth in a country such as Chile or South Korea. What factors other than those contained in the figure might contribute to growth?

To describe countries such as Chile and South Korea, we would need to change labels on three boxes, leading to a change in the “results” boxes. “Rapid” population growth would change

to “low” rate of population growth; “low” level of saving would change to “high” level of saving; “low” levels of investment in physical and human capital would change to “high” levels of investment in physical and human capital. These three changes would result in higher productivity and higher per capita income, which would produce a rising level of demand. Other factors: stable national government; homogeneous population; extensive investment in infrastructure; “will to develop”; strong private incentives.

BONUS WEB CHAPTER

Note: Find this chapter at <http://www.mhhe.com/economics/mcconnell15>.

Web-5 Use a supply and demand diagram to explain why persistent shortages of many consumer goods occurred under central planning in the Soviet Union and in prereform China. Why were black markets common in each country?

See Figure Web-1. Because Russia and China set prices and did not allow them to change as supply or demand shifted, prices were below the equilibrium price for most goods and services. When the fixed price, P_f , is below the equilibrium price, P_e , there will be a shortage since the quantity demanded will exceed the quantity supplied.

Black markets are common where prices are fixed below equilibrium levels. People can buy goods at the fixed government prices (or pay off clerks to save such goods to sell to them), and because of the shortages at the low fixed price, resell these goods at a much higher price to those unable to find the goods in government stores at the controlled prices. This reselling is said to occur on the black market.

Web-6 What have been the major components of economic reform in Russia? What is meant when these reforms are described as “shock therapy”? How successful has Russia been thus far in its reforms?

Privatization of state-owned businesses; market-determined prices; promotion of competition; integration with the world economy; and price-level stabilization. These reforms are referred to as shock therapy because they were dramatic and quick rather than phased in over many years or decades. Russia’s reform has nominally privatized much of the economy (but property rights are still not clearly defined), establishing market-determined prices, and setting the stage for future prosperity. But the transition has resulted in declining living standards for many and increasing income inequality. Also, the government still does not have a successful program for collecting taxes.

Web-8 Relate each of the following items to the success of market reform in China: (a) leasing farm land, (b) price reform, (c) private rural and urban enterprises, (d) special economic zones, and (e) corporatization of state-owned enterprises.

(a) Leasing of land resulted in individually operated rather than collectivized farms; this greatly increased production incentives and boosted farm output.

(b) Price reform established market-based prices. These higher-than-government prices provided incentives for enterprises to expand output; they also enabled market-determined allocation of resources to replace inefficient central planning.

(c) Private rural and urban enterprises absorbed workers released by greater productivity in China’s agricultural sector and established competition for China’s state-owned enterprises.

(d) The special economic zones—with their private corporations, free trade, and foreign investment—established the workability and benefits of “near-capitalism.”

(e) Corporatization focused the goals of state-owned enterprises on providing high-quality, minimum per-unit cost goods desired by consumers.