

SUMMARY

1. Microeconomics examines the functioning of individual industries and the behavior of individual decision-making units. Macroeconomics is concerned with the sum, or aggregate, of these individual decisions—the consumption of all households in the economy, the amount of labor supplied and demanded by all individuals and firms, and the total amount of all goods and services produced.

20.1 MACROECONOMIC CONCERNS p. 445

2. The three topics of primary concern to macroeconomists are the growth rate of aggregate output, the level of unemployment, and increases in the overall price level, or inflation.

20.2 THE COMPONENTS OF THE MACROECONOMY p. 448

3. The circular flow diagram shows the flow of income received and payments made by the four groups in the economy—households, firms, the government, and the rest of the world. Everybody's expenditure is someone else's receipt—every transaction must have two sides.
4. Another way of looking at how households, firms, the government, and the rest of the world relate is to consider

the markets in which they interact: the goods-and-services market, labor market, and money (financial) market.

5. Among the tools that the government has available for influencing the macroeconomy are *fiscal policy* (decisions on taxes and government spending) and *monetary policy* (control of short term interest rates).

20.3 A BRIEF HISTORY OF MACROECONOMICS p. 451

6. Macroeconomics was born out of the effort to explain the Great Depression of the 1930s. Since that time, the discipline has evolved, concerning itself with new issues as the problems facing the economy have changed. Through the late 1960s, it was believed that the government could fine-tune the economy to keep it running on an even keel at all times. The poor economic performance of the 1970s, however, showed that *fine-tuning* does not always work.

20.4 THE U.S. ECONOMY SINCE 1970 p. 453

7. Since 1970, the U.S. economy has seen five recessions and two periods of high inflation.

REVIEW TERMS AND CONCEPTS

aggregate behavior, p. 444
 aggregate output, p. 445
 business cycle, p. 445
 circular flow, p. 448
 contraction, recession, or slump, p. 446
 corporate bonds, p. 450
 deflation, p. 447
 depression, p. 445
 dividends, p. 450

expansion or boom, p. 446
 fine-tuning, p. 451
 fiscal policy, p. 450
 Great Depression, p. 451
 hyperinflation, p. 447
 inflation, p. 447
 macroeconomics, p. 444
 microeconomics, p. 444
 monetary policy, p. 450

recession, p. 445
 shares of stock, p. 450
 stagflation, p. 452
 sticky prices, p. 444
 transfer payments, p. 448
 Treasury bonds, notes, or bills, p. 450
 unemployment rate, p. 447

PROBLEMS

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20.1 MACROECONOMIC CONCERNS

LEARNING OBJECTIVE: Describe the three primary concerns of macroeconomics.

- 1.1 Define inflation. Assume that you live in a simple economy in which only three goods are produced and traded: cashews, pecans, and almonds. Suppose that on January 1, 2015, cashews sold for \$12.50 per pound, pecans were \$4.00 per pound, and almonds were \$5.50 per pound. At the end of the year, you discover that the cashew crop was

lower than expected and that cashew prices had increased to \$17.00 per pound, but pecan prices stayed at \$4.00 and almond prices had actually fallen to \$3.00. Can you say what happened to the overall “price level”? How might you construct a measure of the “change in the price level”? What additional information might you need to construct your measure?

- 1.2 Define unemployment. Should everyone who does not hold a job be considered “unemployed”? To help with your answer, draw a supply and demand diagram depicting the

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labor market. What is measured along the demand curve? What factors determine the quantity of labor demanded during a given period? What is measured along the labor supply curve? What factors determine the quantity of labor supplied by households during a given period? What is the opportunity cost of holding a job?

- 1.3 According to Eurostat, the European Union (EU) statistical office, the unemployment rate in the EU (composed of 28 countries) has steadily increased in the years following the 2007–08 global financial crisis, from a low of 7 percent in 2007 to a peak of 10.9 percent in 2013, with a small reversal in 2014. Yet the average growth rate in the EU 28 countries has followed a much less regular path, decreasing from a peak of 3.1 percent in 2007 to a low of –4.4 percent in 2009 (a recessionary year), returning positive in 2010 and 2011 (respectively, 2.1 percent and 1.7 percent), but turning negative again in 2012 (–0.5 percent), then slightly positive in 2013 (0.2 percent) and slightly accelerating in 2014 (1.4 percent). How can you explain these contrasting trends?
- 1.4 Describe the state of the economy in the country where you live, both in dynamic terms—comparing this year with the last few years—and in comparative terms, with other countries of a similar income category. Is economic growth strong or weak? Is unemployment high or low? Is inflation excessive or not? How have economic growth, unemployment and inflation evolved over the past few years?
- 1.5 Explain briefly how macroeconomics is different from microeconomics. How can macroeconomists use microeconomic theory to guide them in their work, and why might they want to do so?
- 1.6 A 2001 study by Berndt and Rappaport found that between 1976 and 1999, the average price of desktop computers in the United States had declined such that the 1999 price was only 0.069 percent of the 1976 price—a 1,445-fold decrease over a twenty-three year period. Does this imply that U.S. consumers' purchasing power has increased 1,445 times during the same period? What do increases or decreases in individual goods' price levels tell us about inflation? About consumers' purchasing power?

20.2 THE COMPONENTS OF THE MACROECONOMY

LEARNING OBJECTIVE: Discuss the interaction between the four components of the macroeconomy.

- 2.1 Several member states of the European Union have adopted, since 2009–10, contractionary fiscal policy measures consisting of cuts in government spending and increases in taxation. These policies, often dubbed “austerity” policies by their opponents, have led the

latter to question their opportunity in a context of slow economic growth and high unemployment. Why?

- 2.2 In which market arenas can each of the following goods and services be traded?
 - a. A government bond.
 - b. A haircut at your local hairdresser.
 - c. Your skills as an economist.
 - d. A pair of second-hand shoes at the local market.
 - e. The average goals scored by a famous soccer player.
 - f. An insurance contract for your car.

20.3 A BRIEF HISTORY OF MACROECONOMICS

LEARNING OBJECTIVE: Summarize the macroeconomic history of the United States between 1929 and 1970.

- 3.1 Many of the expansionary periods during the twentieth century occurred during wars. Why do you think this is true?
- 3.2 John Maynard Keynes was the first to show that government policy could be used to change aggregate output and prevent recession by stabilizing the economy. Describe the economy of the world at the time Keynes was writing. Describe the economy of the United States today. What measures are being proposed by potential presidential candidates for the election of 2016 to stimulate growth in the economy? Do any of these proposed policies follow the policies proposed by John Maynard Keynes? If so, which policies and from which candidates?
- 3.3 Assume that the demand for flight attendants increases significantly as a result of an increase in demand for air travel. Explain what will happen to unemployment using both classical and Keynesian reasoning.
- 3.4 Explain why the length and severity of the Great Depression necessitated a fundamental rethinking of the operations of the macroeconomy.

20.4 THE U.S. ECONOMY SINCE 1970

LEARNING OBJECTIVE: Describe the U.S. Economy Since 1970.

- 4.1 The *Economics in Practice* describes prosperity and recession as they are depicted in literature. Looking at data on GDP growth released by the Organization for Economic Cooperation and Development in its Interim Economic Outlook (available at <http://www.oecd.org/eco/outlook/economicoutlook.htm>), how would you compare the economic performance of “emerging markets” such as Brazil, China and Russia with respect to advanced industrial economies such as Germany, the United Kingdom and the United States over the past year or two? Are these economies expanding or shrinking?

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PROBLEMS

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23.1 THE KEYNESIAN THEORY OF CONSUMPTION

LEARNING OBJECTIVE: Explain the principles of the Keynesian theory of consumption.

- 1.1 Briefly define the following terms and explain the relationship between MPC and MPS and the relationship between aggregate output and aggregate income.
 - a. MPC
 - b. MPS
 - c. Aggregate output
 - d. Aggregate income
- 1.2 Fill in the aggregate saving column in the following table. Use the data in the table to calculate the consumption function and the saving function, and plot these functions as well as the 45-degree line on a graph. What are the values for the MPC and the MPS?

Aggregate Income, Y	Aggregate Consumption, C	Aggregate Saving, S
\$ 0	\$200	
100	250	
200	300	
300	350	
400	400	
500	450	
600	500	

- 1.3 [Related to the Economics in Practice on p. 500] The *Economics in Practice* describes some of the difficulties that households have with regard to decisions involving trade-offs between the present and the future. Explain briefly how the problem of global warming and the problem of adequate household saving are similar. Describe ways in which the concept of opportunity cost can be used to frame these two problems. What barriers might prevent households or societies from achieving satisfactory outcomes?

- 1.4 Assume in country Y, the average marginal propensity to save is 0.2. When the aggregate income is zero, consumers spend 50 to consume. Derive the saving function and consumption function for this country. What happens to consumption when the propensity to save decreases to 0.1? Explain your answer and show this on the graph.

23.2 PLANNED INVESTMENT (I) VERSUS ACTUAL INVESTMENT

LEARNING OBJECTIVE: Explain the difference between planned investment and actual investment.

- 2.1 Explain the difference between actual investment and planned investment. When are actual investment and planned investment equal? When is actual investment greater than planned investment? When is actual investment less than planned investment?
- 2.2 A large multinational shipping company, AhoySales, Inc. has just decided to spend €10 million on new storage space in Munich, €45 million on new aircraft, and €5 million on additional acquisition of kerosene. In addition to these expenses, the company is producing 5 million parcels at a price of €5 per parcel.
Now suppose that AhoySales plans to have a tenth of that production in inventory. Over time, the company's parcels have met with increasing demand, but the inventory has only increased by €1 million.
 - a. What is this firm's total planned investment?
 - b. How much did the firm actually invest?
 - c. What is the difference between actual and planned investment? Should AhoySales produce more or fewer parcels? Why?

23.3 PLANNED INVESTMENT AND THE INTEREST RATE (r)

LEARNING OBJECTIVE: Understand how planned investment is affected by the interest rate.

- 3.1 Explain whether you agree or disagree with the following statement: "All else equal, businesses will generally plan more investment projects when interest rates rise, because higher interest rates mean businesses will earn more on those investments."

23.4 THE DETERMINATION OF EQUILIBRIUM OUTPUT (INCOME)

LEARNING OBJECTIVE: Explain how equilibrium output is determined.

- 4.1 The following data are estimates for the small island nation of Kaboom

Real GNP (Y.....)	800 million Kaboomian dollars
Planned investment spending)	200 million Kaboomian dollars

Kaboom is a simple economy with no government, no taxes, and no imports or exports. Kaboomers (citizens

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of Kaboom) are creatures of habit. They have a rule that everyone saves exactly 40 percent of income. Assume that planned investment is fixed and remains at 200 million Kaboomian dollars.

You are asked by the business editor of the *Explosive Times*, the local newspaper, to predict the economic events of the next few months. By using the data given, can you make a forecast? What is likely to happen to inventories? What is likely to happen to the level of real GDP? Is the economy at an equilibrium? When will things stop changing?

4.2 Go to the OECD website (www.oecd.org) and check their database. What are the main components of Australia's GDP for the last quarter where data is available? How does it compare to New Zealand?

4.3 The following questions refer to this table:

Aggregate Output/Income	Consumption	Planned Investment
1,000	1,500	250
1,500	1,875	250
2,000	2,250	250
2,500	2,625	250
3,000	3,000	250
3,500	3,375	250
4,000	3,750	250
4,500	4,125	250

- At each level of output, calculate saving. At each level of output, calculate unplanned investment (inventory change). What is likely to happen to aggregate output if the economy produces at each of the levels indicated? What is the equilibrium level of output?
 - Over each range of income (1,000 to 1,500, 1,500 to 2,000, and so on), calculate the marginal propensity to consume. Calculate the marginal propensity to save. What is the multiplier?
 - By assuming there is no change in the level of the MPC and the MPS and planned investment jumps by 125 and is sustained at that higher level, recompute the table. What is the new equilibrium level of Y ? Is this consistent with what you compute using the multiplier?
- 4.4** This chapter argues that saving and spending behavior depend in part on wealth (accumulated savings and inheritance), but our simple model does not incorporate this effect. Consider the following model of a simple economy: $C = 50 + 0.8Y + 0.1W$

$$\begin{aligned} I &= 200 \\ W &= 500 \\ Y &= C + I \\ S &= Y - C \end{aligned}$$

If you assume that wealth (W) and investment (I) remain constant (we are ignoring the fact that saving adds to the stock of wealth), what are the equilibrium levels of GDP (Y), consumption (C), and saving (S)? Now suppose that wealth increases by 100 percent to 1,000. Recalculate the equilibrium levels of Y , C , and S . What impact does

wealth accumulation have on GDP? Many were concerned with the large increase in stock values in the late 1990s. Does this present a problem for the economy? Explain.

4.5 You are given the following data concerning Freedonia, a legendary country:

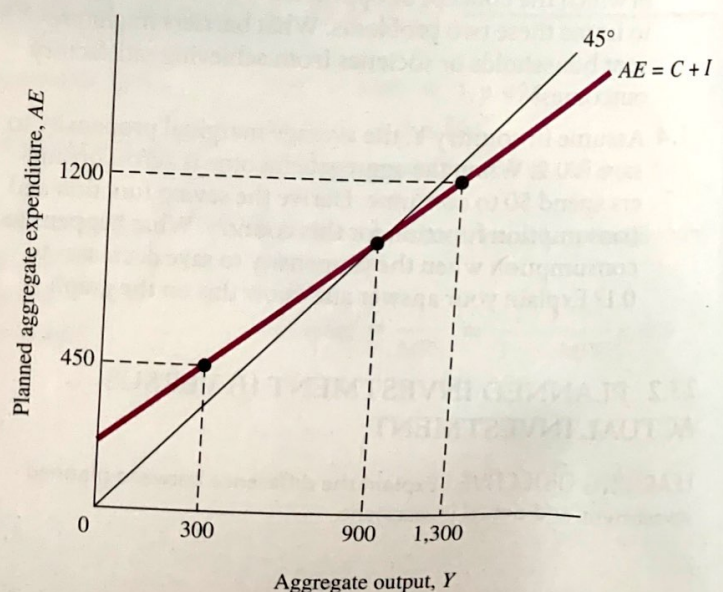
- Consumption function: $C = 200 + 0.8Y$
- Investment function: $I = 100$
- $AE \equiv C + I$
- $AE = Y$

- What is the marginal propensity to consume in Freedonia, and what is the marginal propensity to save?
- Graph equations (3) and (4) and solve for equilibrium income.
- Suppose equation (2) is changed to (2') $I = 110$. What is the new equilibrium level of income? By how much does the \$10 increase in planned investment change equilibrium income? What is the value of the multiplier?
- Calculate the saving function for Freedonia. Plot this saving function on a graph with equation (2). Explain why the equilibrium income in this graph must be the same as in part b.

23.5 THE MULTIPLIER

LEARNING OBJECTIVE: Describe the multiplier process and use the multiplier equation to calculate changes in equilibrium.

- Explain the multiplier intuitively. Why is it that an increase in planned investment of \$100 raises equilibrium output by more than \$100? Why is the effect on equilibrium output finite? How do we know that the multiplier is $1/\text{MPS}$?
- [Related to the Economics in Practice on p. 510]** If households decide to save more, saving in the aggregate may fall. Explain this in words.
- Use the graph to answer the questions that follow.



- a. What is the value of the MPC?
 - b. What is the value of the MPS?
 - c. What is the value of the multiplier?
 - d. What is the amount of unplanned investment at aggregate output of 300, 900, and 1,300?
- 5.4 According to OECD data, Japan's savings rate was 0.6 percent of GDP in 2014, against 15 percent for South

Korea. All else equal, what would this difference in saving tell you about the respective MPC and MPS of the two countries? What does it tell you about the multiplier in the two countries? How would the same increase in investment affect aggregate output in the two countries?

CHAPTER 23 APPENDIX

Deriving the Multiplier Algebraically

In addition to deriving the multiplier using the simple substitution we used in the chapter, we can also derive the formula for the multiplier by using simple algebra. Recall that our consumption function is:

$$C = a + bY$$

where b is the marginal propensity to consume. In equilibrium:

$$Y = C + I$$

Now we solve these two equations for Y in terms of I . By substituting the first equation into the second, we get:

$$Y = \underbrace{a + bY}_C + I$$

This equation can be rearranged to yield:

$$\begin{aligned} Y - bY &= a + I \\ Y(1 - b) &= a + I \end{aligned}$$

We can then solve for Y in terms of I by dividing through by $(1 - b)$:

$$Y = (a + I) \left(\frac{1}{1 - b} \right)$$

Now look carefully at this expression and think about increasing I by some amount, ΔI , with a held constant. If I increases by ΔI , income will increase by

$$\Delta Y = \Delta I \times \frac{1}{1 - b}$$

Because $b \equiv \text{MPC}$, the expression becomes

$$\Delta Y = \Delta I \times \frac{1}{1 - \text{MPC}}$$

The multiplier is

$$\frac{1}{1 - \text{MPC}}$$

Finally, because $\text{MPS} + \text{MPC} \equiv 1$, MPS is equal to $1 - \text{MPC}$, making the alternative expression for the multiplier $1/\text{MPS}$, just as we saw in this chapter.

LEARNING OBJECTIVE

Show that the multiplier is 1 divided by 1 minus the MPC.

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24.4 THE ECONOMY'S INFLUENCE ON THE GOVERNMENT BUDGET p. 531

9. Automatic stabilizers are revenue and expenditure items in the federal budget that automatically change with the state of the economy and that tend to stabilize GDP. For example, during expansions, the government automatically takes in more revenue because people are making more money that is taxed.

10. The full-employment budget is an economist's construction of what the federal budget would be if the economy were producing at a full-employment level of output. The structural deficit is the federal deficit that remains even at full employment. The cyclical deficit is that part of the total deficit caused by the economy operating at less than full employment.

REVIEW TERMS AND CONCEPTS

automatic destabilizer, p. 532
 automatic stabilizers, p. 532
 balanced-budget multiplier, p. 525
 budget deficit, p. 518
 cyclical deficit, p. 533
 discretionary fiscal policy, p. 517
 disposable, or after-tax, income (Y_d), p. 517
 federal budget, p. 527
 federal debt, p. 530
 federal surplus (+) or deficit (-), p. 527
 fiscal drag, p. 532
 fiscal policy, p. 516

full-employment budget, p. 532
 government spending multiplier, p. 522
 monetary policy, p. 516
 net taxes (T), p. 517
 privately held federal debt, p. 531
 structural deficit, p. 533
 tax multiplier, p. 524
 Equations:
 Disposable income: $Y_d = Y - T$, p. 517
 $AE = C + I + G$, p. 518
 Government budget deficit $= G - T$, p. 518

Equilibrium in an economy with a government: $Y = C + I + G$, p. 519

Saving/investment approach to equilibrium in an economy with a government: $S + T = I + G$, p. 520

Government spending multiplier

$$= \frac{1}{MPS} = \frac{1}{1 - MPC}, p. 522$$

$$\text{Tax multiplier} = -\left(\frac{MPC}{MPS}\right), p. 525$$

$$\text{Balanced-budget multiplier} = 1, p. 525$$

PROBLEMS

Similar problems are available on MyEconLab.

24.1 GOVERNMENT IN THE ECONOMY

LEARNING OBJECTIVE: Discuss the influence of fiscal policies on the economy.

- 1.1 Define saving and investment. Data for the simple economy of Newt show that in 2015, saving exceeded investment and the government is running a balanced budget. What is likely to happen? What would happen if the government were running a deficit and saving were equal to investment?

- 1.2 Expert economists in the economy of Bongo estimate the following:

	Billion Bongos
Real output/income	1,200
Government purchases	300
Total net taxes	300
Investment spending (planned)	200

Assume that Bongoliers consume 80 percent of their disposable incomes and save 20 percent.

- a. You are asked by the business editor of the *Bongo Tribune* to predict the events of the next few months. By using the data given, make a forecast. (Assume that investment is constant.)
 b. If no changes were made, at what level of GDP (Y) would the economy of Bongo settle?

- c. Some local conservatives blame Bongo's problems on the size of the government sector. They suggest cutting government purchases by 25 billion Bongos. What effect would such cuts have on the economy? (Be specific.)

- 1.3 Assume that in 2015, the following prevails in the Republic of Nurd:

$$\begin{aligned} Y &= \$200 & G &= \$0 \\ C &= \$160 & T &= \$0 \\ S &= \$40 \\ I(\text{planned}) &= \$30 \end{aligned}$$

Assume that households consume 80 percent of their income, they save 20 percent of their income, $MPC = 0.8$, and $MPS = 0.2$. That is, $C = 0.8Y_d$ and $S = 0.2Y_d$.

- a. Is the economy of Nurd in equilibrium? What is Nurd's equilibrium level of income? What is likely to happen in the coming months if the government takes no action?
 b. If \$200 is the "full-employment" level of Y , what fiscal policy might the government follow if its goal is full employment?
 c. If the full-employment level of Y is \$250, what fiscal policy might the government follow?
 d. Suppose $Y = \$200$, $C = \$160$, $S = \$40$, and $I = \$40$. Is Nurd's economy in equilibrium?
 e. Starting with the situation in part d, suppose the government starts spending \$30 each year with no taxation and continues to spend \$30 every period. If I remains

constant, what will happen to the equilibrium level of Nurd's domestic product (Y)? What will the new levels of C and S be?

f. Starting with the situation in part d, suppose the government starts taxing the population \$30 each year without spending anything and continues to tax at that rate every period. If I remains constant, what will happen to the equilibrium level of Nurd's domestic product (Y)? What will be the new levels of C and S ? How does your answer to part f differ from your answer to part e? Why?

1.4 Some economists debate about the impact of high public debt on economic growth. Carmen Reinhart and Ken Rogoff, two economists and the authors of *This Time is*

Different, claim there exists a "debt overhang"—a level of public debt beyond which economic growth is negatively affected by excessive government borrowing, though others disagree. Using the OECD database, find the latest data on GDP growth and the level of public debt for Japan, the United States, and Germany. What do these numbers tell you about the "debt overhang" argument?

1.5 Evaluate the following statement: For an economy to be in equilibrium, planned investment spending plus government purchases must equal saving plus net taxes.

1.6 For the data in the following table, the consumption function is $C = 800 + 0.6(Y - T)$. Fill in the columns in the table and identify the equilibrium output.

Output	Net Taxes	Disposable Income	Consumption Spending	Saving	Planned Investment Spending	Government Purchases	Planned Aggregate Expenditure	Unplanned Inventory Change
2,100	100				300	400		
2,600	100				300	400		
3,100	100				300	400		
3,600	100				300	400		
4,100	100				300	400		
4,600	100				300	400		
5,100	100				300	400		

1.7 For each of the following sets of data, determine if output will need to increase, decrease, or remain the same to move the economy to equilibrium:

- $Y = 1,000$; $C = 100 + 0.75(Y - T)$; $I = 200$; $G = 150$; $T = 100$
- $Y = 5,000$; $C = 200 + 0.9(Y - T)$; $I = 500$; $G = 400$; $T = 300$
- $Y = 2,000$; $C = 150 + 0.5(Y - T)$; $I = 150$; $G = 150$; $T = 50$
- $Y = 1,600$; $C = 300 + 0.6(Y - T)$; $I = 250$; $G = 150$; $T = 100$

24.2 FISCAL POLICY AT WORK: MULTIPLIER EFFECTS

LEARNING OBJECTIVE: Describe the effects of three fiscal policy multipliers.

2.1 Use your answer to Problem 1.6 to calculate the MPC, MPS, government spending multiplier, and tax multiplier. Draw a graph showing the data for consumption spending, planned aggregate expenditures, and aggregate output. Be sure to identify the equilibrium point on your graph.

2.2 Suppose that in your country, the marginal propensity to save equals 15 percent of disposable income, when income is null, consumption of $C = 150$, government expenditure of $G = 100$ and fixed taxes = 80, and that investment of $I = 50$. Calculate the equilibrium level of GDP. Solve for a change in GDP following an increase in expenditure of 20 percent, financed by an increase of taxation of the same amount. What does it tell you about the impact of expenditure that is fully financed by taxation?

2.3 A \$1 increase in government spending will raise equilibrium income more than a \$1 tax cut will, yet both have the same impact on the budget deficit. So if we care about the budget deficit, the best way to stimulate the economy is through increases in spending, not cuts in taxes. Comment.

2.4 Complete the following:

- If the tax multiplier is -1 , then the marginal propensity to save is _____ the marginal propensity to consume.
- If the government spending multiplier is 8, then the marginal propensity to save equals _____.
- If the marginal propensity to consume is two times the marginal propensity to save, then the government spending multiplier equals _____.
- If the marginal propensity to save is 0.5, then the tax multiplier equals _____.
- If the marginal propensity to save increases by 10 percent, then the government spending multiplier _____.
- If the marginal propensity to consume goes from 0.8 to 0.85, then the tax multiplier _____.
- If the tax multiplier increases (in absolute value) from -1 to -2 , this means that the marginal propensity to consume has _____ relative to the marginal propensity to save.
- If the government spending multiplier decreases from 5 to 4, this means that the marginal propensity to save has _____.

2.5 What is the balanced-budget multiplier? Explain why the balanced-budget multiplier is equal to 1.

24.3 THE FEDERAL BUDGET

LEARNING OBJECTIVE: Compare and contrast the federal budgets of three U.S. government administrations.

3.1 You are appointed secretary of the treasury of a recently independent country called Rugaria. The currency of Rugaria is the lav. The new nation began fiscal operations this year, and the budget situation is that the government

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will spend 10 million lavs and taxes will be 9 million lavs. The 1-million-lav difference will be borrowed from the public by selling 10-year government bonds paying 5 percent interest. The interest on the outstanding bonds must be added to spending each year, and we assume that additional taxes are raised to cover that interest. Assuming that the budget stays the same except for the interest on the debt for 10 years, what will be the accumulated debt? What will the size of the budget be after 10 years?

- 3.2** [Related to the *Economics in Practice* on p. 530] Excessive and cumulative public deficits might lead to an increase in the debt-to-GDP ratio, often used to measure the “weight” of public debt on the economy. The average debt-to-GDP ratio for OECD countries was, in 2014, 94 percent. Apart from the argument, put forward by some economists (see problem 1.4 above), that excessive public debt levels are detrimental to economic growth, many governments have an interest in reducing government debt – starting from the fact that governments pay interest on their debt, and that interest payments are often an important item in government budgets. Assume that country A has a GDP of \$500 billion, a total government debt of \$450 billion, a marginal

propensity to save of 0.2, and that for this year government expenditure equals \$200 while tax receipts amount to \$180. The government has just announced spending cuts of \$20 billion next year with no change in taxation. Would that suffice to reach the government’s twin objectives – a balanced budget and a debt-to-GDP ratio below the OECD average? Why?

24.4 THE ECONOMY’S INFLUENCE ON THE GOVERNMENT BUDGET

LEARNING OBJECTIVE: Explain the influence of the economy on the federal government budget.

- 4.1** Suppose all tax collections are fixed (instead of dependent on income) and all spending and transfer programs are fixed (in the sense that they do not depend on the state of the economy, as, for example, unemployment benefits now do). In this case, would there be any automatic stabilizers in the government budget? Would there be any distinction between the full-employment deficit and the actual budget deficit? Explain.

CHAPTER 24 APPENDIX A

LEARNING OBJECTIVE

Show that the government spending multiplier is 1 divided by 1 minus the *MPC*.

Deriving the Fiscal Policy Multipliers

The Government Spending and Tax Multipliers

In the chapter, we noted that the government spending multiplier is $1/MPS$. (This is the same as the investment multiplier.) We can also derive the multiplier algebraically using our hypothetical consumption function:

$$C = a + b(Y - T)$$

where b is the marginal propensity to consume. As you know, the equilibrium condition is

$$Y = C + I + G$$

By substituting for C , we get

$$Y = a + b(Y - T) + I + G$$

$$Y = a + bY - bT + I + G$$

This equation can be rearranged to yield

$$Y - bY = a + I + G - bT$$

$$Y(1 - b) = a + I + G - bT$$

9. The demand for money depends positively on nominal income. Aggregate nominal income is $P \cdot Y$, where P is the aggregate price level and Y is aggregate real income. An increase in either P or Y increases the demand for money.

25.5 INTEREST RATES AND SECURITY PRICES p. 555

10. Interest rates and security prices are inversely related. If market interest rates rise, prices of existing bonds fall.

25.6 HOW THE FEDERAL RESERVE CONTROLS THE INTEREST RATE p. 557

11. Prior to 2008 the Fed had three tools to control the money supply: (1) changing the required reserve ratio, (2) changing the *discount rate* (the interest rate member banks pay when

they borrow from the Fed), and (3) engaging in *open market operations* (the buying and selling of already-existing government securities). To increase the money supply, the Fed could create additional reserves by lowering the discount rate or by buying government securities, or the Fed could increase the number of deposits that can be created from a given quantity of reserves by lowering the required reserve ratio. To decrease the money supply, the Fed could reduce reserves by raising the discount rate or by selling government securities or it could raise the required reserve ratio.

12. In the post-2008 period large quantities of excess reserves have been held by banks. The Fed is now paying interest on these reserves. When the Fed wants to raise interest rates in the future it will likely do so by increasing the interest rate it pays on bank reserves.

REVIEW TERMS AND CONCEPTS

barter, p. 542

commodity monies, p. 544

currency debasement, p. 544

discount rate, p. 557

excess reserves, p. 549

Federal Open Market Committee (FOMC), p. 552

Federal Reserve Bank (the Fed), p. 548

fiat, or token, money, p. 544

Equations:

$M1 = \text{currency held outside banks} + \text{demand deposits} + \text{traveler's checks} + \text{other checkable deposits}$, p. 545

$M2 = M1 + \text{savings accounts} + \text{money market accounts} + \text{other near monies}$, p. 545

$\text{Assets} = \text{Liabilities} + \text{Net Worth}$, p. 548

$\text{Excess reserves} = \text{actual reserves} - \text{required reserves}$, p. 549

$\text{Money multiplier} = \frac{1}{\text{required reserve ratio}}$, p. 552

legal tender, p. 544

lender of last resort, p. 554

liquidity property of money, p. 543

$M1$, or transactions money, p. 545

$M2$, or broad money, p. 545

medium of exchange, or means of payment, p. 542

money multiplier, p. 551

near monies, p. 545

Open Market Desk, p. 552

open market operations, p. 557

required reserve ratio, p. 549

reserves, p. 548

run on a bank, p. 548

store of value, p. 542

unit of account, p. 543

PROBLEMS

Similar problems are available on MyEconLab.

25.1 AN OVERVIEW OF MONEY

LEARNING OBJECTIVE: Define money and discuss its functions.

- 1.1 [Related to the *Economics in Practice* on p. 543] It is well known that cigarettes served as money for prisoners of war in World War II. Do an Internet search using the key word cigarettes and write a description of how this came to be and how it worked.

- 1.2 As king of Medivalia, you are constantly strapped for funds to pay your army. Your chief economic wizard suggests the following plan: "When you collect your tax payments from your subjects, insist on being paid in gold coins. Take those gold coins, melt them down, and remint them with an extra 10 percent of brass thrown in. You

will then have 10 percent more money than you started with." What do you think of the plan? Will it work?

- 1.3 Why aren't money market accounts included in $M1$ alongside demand deposits? Explain in your own words using the definitions of $M1$ and $M2$.
- 1.4 After suffering two years of staggering hyperinflation, the African nation of Zimbabwe officially abandoned its currency, the Zimbabwean dollar, in April 2009 and made the U.S. dollar its official currency. Why would anyone in Zimbabwe be willing to accept U.S. dollars in exchange for goods and services?
- 1.5 Bitcoin, a peer-to-peer network launched in 2009, used a virtual currency, named bitcoin, to pay for virtual acquisitions online. While many of its users and

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supporters call bitcoin "money", several US regulatory agencies have recently denied bitcoin the currency status, the Commodities and Futures Trading Commission calling it, in a September 2015 decision, a "commodity". What do you think? Why wouldn't bitcoin qualify as money?

- 1.6 Since you're studying abroad for a year, your parents have just sent you a lump sum payment of \$12,000 on try of residence, advising you to transfer equal sums each month to your new checking account, which you just started doing. How have M1 and M2 been affected by the end of your stay abroad? How are they affected

being hidden in personal safes rather than being transferred to savings or checking accounts. How would that change the money supply in that country?

- 2.5 You are given this account for a bank:

Assets		Liabilities	
Reserves	\$1,200	\$8,000	Deposits
Loans	6,800		

The required reserve ratio is 10 percent.

- How much is the bank required to hold as reserves given its deposits of \$8,000?
- How much are its excess reserves?
- By how much can the bank increase its loans?
- Suppose a depositor comes to the bank and withdraws \$500 in cash. Show the bank's new balance sheet, assuming the bank obtains the cash by drawing down its reserves. Does the bank now hold excess reserves? Is it meeting the required reserve ratio? If not, what can it do?

- 2.6 Suppose Ginger deposits \$12,000 in cash into her checking account at the Bank of Skidoo. The Bank of Skidoo has no excess reserves and is subject to a 4 percent required reserve ratio.
- Show this transaction in a T-account for the Bank of Skidoo.
 - Assume the Bank of Skidoo makes the maximum loan possible from Ginger's deposit to Thurston and show this transaction in a new T-account.
 - Thurston decides to use the money he borrowed to purchase a sail boat. He writes a check for the entire loan amount to Gilligan's Seagoing Vessels, which deposits the check in its bank, the Paradise Bank of Kona, Hawaii. When the check clears, the Skidoo Bank transfers the funds to the Paradise Bank. Show these transactions in a new T-account for the Skidoo Bank and in a T-account for the Paradise Bank.
 - What is the maximum amount of deposits that can be created from Ginger's initial deposit?
 - What is the maximum amount of loans that can be created from Ginger's initial deposit?

25.2 HOW BANKS CREATE MONEY

LEARNING OBJECTIVE: Explain how banks create money.

- For each of the following, determine whether it is an asset or a liability on the accounting books of a bank. Explain why in each case.
 - Cash in the vault
 - Demand deposits
 - Savings deposits
 - Reserves
 - Loans
 - Deposits at the Federal Reserve
- In early 2015, the People's Bank of China (PBOC), China's central bank, decided to lower the reserve requirement ratio to 18.5 percent, down from 19.5 percent. Assuming that Chinese banks held an overall loan portfolio of 30,000 billion renminbi at the beginning of the year, how much increase in bank-created money would occur as a result of this change in the reserve ratio?
- Do you agree or disagree with each of the following statements? Explain your answers.
 - When the Treasury of the United States issues bonds and sells them to the public to finance the deficit, the money supply remains unchanged because every dollar of money taken in by the Treasury goes right back into circulation through government spending. This is not true when the Fed sells bonds to the public.
 - The money multiplier depends on the marginal propensity to save.
- *Imagine that as a result of a grave economic crisis, a country's citizens' trust in the financial system in general and the central bank in particular rapidly deteriorates. As a consequence, more and more cash payments end up

25.3 THE FEDERAL RESERVE SYSTEM

LEARNING OBJECTIVE: Define the functions and structure of the Federal Reserve System.

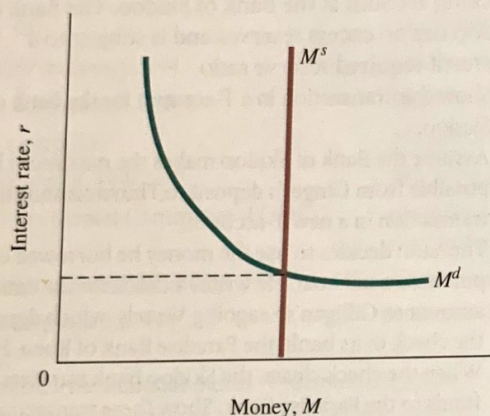
- The United States is divided into 12 Federal Reserve districts, each with a District Bank. These Districts and the locations for the District Bank in each region are shown in Figure 25.4. Do some research to find out why the

districts are divided as they are, why the District Banks are located in the 12 cities shown in Figure 25.4, and why so many districts are located in the Eastern portion of the United States.

25.4 THE DEMAND FOR MONEY

LEARNING OBJECTIVE: Describe the determinants of money demand.

- 4.1** Paul Krugman, a former recipient of the Bank of Sweden Nobel Memorial Prize in Economics, famously depicted the economic situation in Japan in the 1990s as a “liquidity trap”, whereby interest rates were already so low that Japanese consumers would hold additional liquidity without changing their interest rates expectations. What happens to the money demand curve in such case? Why does monetary policy fail to lower interest rates? Explain with the help of a graph.



- 4.2** Explain why there is a negative relationship between the amount of money you should hold and the interest rate.

25.5 INTEREST RATES AND SECURITY PRICES

LEARNING OBJECTIVE: Define interest and discuss the relationship between interest rates and security prices.

5.1 [Related to the Economics in Practice on p. 556]

The *Economics in Practice* states that the capital value of Professor Serebryakov's estate is not the value for which he could sell the estate if the interest rate on “suitable” securities is higher than the average yield from the estate. What would happen to:

- a. the value of the estate if the interest rate on “suitable” securities rose?

- b. the value of the estate if investment in the estate was suddenly viewed as being less risky than investment in the securities?
- c. the yield on the securities if the securities were suddenly viewed as being more risky than was previously thought?

- 5.2** Banco Central do Brasil (BCB), Brazil's central bank, uses a special clearance and escrow rate system for performing open market operations in execution of monetary policy. This interest rate target is known as the Selic rate. In October 2015, it set its interest rate target at 14.25 percent, pursuing a monetary restriction initiated in 2013, when its target rate was 7.25 percent. What impact do you think such changes in central bank interest rates would have on the prices of Brazilian bonds? What may be the objectives of the BCB?

- 5.3** The crisis that has hit the government bond market in the Eurozone in 2010–2011 led, in particular, to a skyrocketing of interest rates and a fall in the prices of government bonds in Greece, Spain and Portugal. Suppose you bought a 10-year Greek government bond in January 2010 for €10,000, at a 5 percent interest rate. Suppose that five-year bonds issued in January 2015 paid 20 percent interest rates. How does that change the value of your bond holding?

25.6 HOW THE FEDERAL RESERVE CONTROLS THE INTEREST RATE

LEARNING OBJECTIVE: Understand how the Fed can change the interest rate.

- 6.1** In the Republic of Doppelganger, the currency is the ditto. During 2015, the Treasury of Doppelganger sold bonds to finance the Doppelganger budget deficit. In all, the Treasury sold 80,000 ten-year bonds with a face value of 1,000 dittos each. The total deficit was 80 million dittos. The Doppelganger Central Bank reserve requirement was 16 percent and in the same year, the bank bought 10 million dittos' worth of outstanding bonds on the open market. All of the Doppelganger debt is held by either the private sector (the public) or the central bank.

- a. What is the combined effect of the Treasury sale and the central bank purchase on the total Doppelganger debt outstanding? On the debt held by the private sector?
- b. What is the effect of the Treasury sale on the money supply in Doppelganger?

SUMMARY**26.1 THE AGGREGATE SUPPLY (AS) CURVE** p. 569

1. Aggregate supply is the total supply of goods and services in an economy. The aggregate supply (AS) curve shows the relationship between the aggregate quantity of output supplied by all the firms in the economy and the overall price level. The AS curve is not a market supply curve, and it is not the simple sum of individual supply curves. For this reason, it is helpful to think of the AS curve as a "price/output response" curve—that is, a curve that traces out the price and output decisions of all firms in the economy under a given set of circumstances.
2. The shape of the short-run AS curve is a source of much controversy in macroeconomics. Many economists believe that at low levels of aggregate output, the AS curve is fairly flat and that at high levels of aggregate output, the AS curve is vertical or nearly vertical.
3. Anything that affects an individual firm's marginal cost curve can shift the AS curve. The two main factors are wage rates and energy prices.

26.2 THE AGGREGATE DEMAND (AD) CURVE p. 572

4. The IS curve summarizes the relationship between the interest rate and equilibrium output in the goods market. Government spending (G) shifts the IS curve.
5. Fed behavior is described by an interest rate rule, the Fed rule. The Fed's choice of the interest rate value depends on the state of the economy, approximated in the rule by output (Y), the price level (P), and other factors (Z). The Fed uses

open market operations to achieve the interest rate value that it wants.

6. Each point on the AD curve is, for a given value of P, an equilibrium in the goods market with the Fed rule. Increases in G shift the AD curve to the right, and increases in Z shift the AD curve to the left.

26.3 THE FINAL EQUILIBRIUM p. 578

7. The final equilibrium is the point of intersection of the AS and AD curves. Determined at this point are equilibrium values of output, the price level, the interest rate, consumption, planned investment, the demand for money, and the supply of money. Exogenous variables (variables not explained by the model) are government spending, the factors in Z, net taxes (used in the next chapter), and cost shocks.

26.4 OTHER REASONS FOR A DOWNWARD-SLOPING AD CURVE p. 578

8. Consumption as well as planned investment depends on the interest rate, and this is another reason for a downward-sloping AD curve. Another reason is that consumption also depends on real wealth.

26.5 THE LONG-RUN AS CURVE p. 579

9. The long-run AS curve is vertical if wages adjust completely to prices in the long run.

REVIEW TERMS AND CONCEPTS

aggregate supply, p. 569

aggregate supply (AS) curve, p. 569

cost shock, or supply shock, p. 571

Fed rule, p. 574

IS curve, p. 573

potential output, or potential GDP, p. 580

real wealth effect, p. 579

Equations: $AE = C + I + G$, p. 572

$r = \alpha Y + \beta P + \gamma Z$, p. 574

PROBLEMS

Similar problems are available on MyEconLab.

26.1 THE AGGREGATE SUPPLY (AS) CURVE

LEARNING OBJECTIVE: Define the aggregate supply curve and discuss shifts in the short-run AS curve.

- 1.1 Illustrate each of the following situations with a graph showing short-run aggregate supply:
 - a. A decrease in the size of the labor force
 - b. An increase in available capital
 - c. An increase in productivity as a result of a technological change
 - d. A decrease in the price of oil

26.2 THE AGGREGATE DEMAND (AD) CURVE

LEARNING OBJECTIVE: Derive the aggregate demand curve and explain why the AD curve is downward sloping.

- 2.1 On November 9, 2011, the European Central Bank acted to decrease the short-term interest rate in Europe by one-fourth of a percentage point, to 1.25 percent, and additional cuts were made over the next three years, to a low rate of 0.05 percent by September 2014. The rate cuts were made because European countries were growing very slowly or were in recession. What

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effect did the bank hope the action would have on the economy? Be specific. What was the hoped-for result on C , I , and Y ?

- 2.2 Some economists argue that the “animal spirits” of investors are so important in determining the level of investment in the economy that interest rates do not matter at all. Suppose that this were true, that investment in no way depends on interest rates.
- How would Figure 26.4 be different?
 - What would happen to the level of planned aggregate expenditure if the interest rate changed?
- 2.3 Between June 2014 and October 2015, The Bank of Canada’s “target for the overnight rate” has been reduced from 1.00 percent to 0.50 percent. What are the likely effects of this decrease on aggregate demand in Canada? Explain using an appropriate graph.
- 2.4 For each of the following situations, explain using the IS and Federal rule curves, what happens to the equilibrium value of aggregate output and interest rate:
- The government increases public spending while the money supply remains constant.
 - The central bank decides to increase interest rates to offset the effects of a reduction in taxation on prices.
 - The aggregate price level increases due to a rise in world energy prices. The central bank and the government do not react.
 - In front of inflationary pressures, the central bank reduces money supply so that to keep the real money supply constant.
 - While the government has announced a decrease in public spending, the central bank just announced it would do all it takes to maintain interest rates constant.
- 2.5 The AD curve slopes downward because when the price level is lower, people can afford to buy more and aggregate demand rises. When prices rise, people can afford to buy less and aggregate demand falls. Is this a good explanation of the shape of the AD curve? Why or why not?
- 2.6 In the first few chapters of this book, we introduced the notion of supply and demand. One of the first things we did was to derive the relationship between the price of a product and the quantity demanded per time period by an individual household. Now we have derived what is called the *aggregate demand curve*. The two look the same and both seem to have a negative slope, but the logic is completely different. Tell one story that explains the negative slope of a simple demand curve and another story that explains the more complex AD curve.
- 2.7 [Related to the *Economics in Practice* on p. 575]
In a June 17, 2015, press conference, Fed Chair Janet Yellen indicated the possibility of the Fed raising interest rates by the end of the year. On this date, the federal funds rate target set by the Fed was 0.00 – 0.25 percent, where it had been since January 2009. What has happened to the Fed’s target for the federal funds rate since June 2015? Using the Fed rule, explain the Fed’s decision to either change or not change the interest rate.

- 2.8 [Related to the *Economics in Practice* on p. 577] Check the website of your country’s central bank and find the price level indicator the central bank relies on to formulate its monetary policy. Does it differ from the indicators used by the Federal Reserve or the European Central Bank? How? What is the impact of using various price indexes on decisions made by the Central Bank?

26.3 THE FINAL EQUILIBRIUM

LEARNING OBJECTIVE: Explain why the intersection of the AD and AS curves is an equilibrium point.

- 3.1 Illustrate each of the following situations with a graph showing AS and AD curves, and explain what happens to the equilibrium values of the price level and aggregate output:
- A decrease in G with the money supply held constant by the Fed
 - A decrease in the price of oil with no change in government spending
 - An increase in Z with no change in government spending
 - An increase in the price of oil and a decrease in G

26.4 OTHER REASONS FOR A DOWNWARD-SLOPING AD CURVE

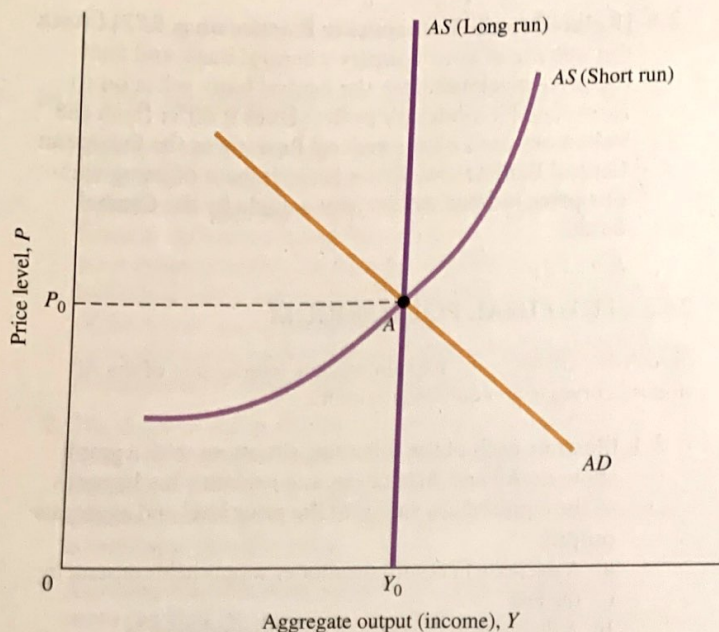
LEARNING OBJECTIVE: Give two additional reasons why the AD curve may slope down.

- 4.1 In the tiny island nation of Bongo, the nation’s wealth is broken down as follows: 50 percent is cash in checking and savings accounts, 25 percent is housing, and 25 percent is stock holdings. Last year, Bongo experienced an inflation rate of 25 percent, and housing prices and stock prices each increased by 10 percent. Explain what happened to real wealth in Bongo last year, and how this change in real wealth helps explain the downward slope of the aggregate demand curve.

26.5 THE LONG-RUN AS CURVE

LEARNING OBJECTIVE: Discuss the shape of the long-run aggregate supply curve and explain long-run market adjustment to potential GDP.

- 5.1 The economy of Mayberry is currently in equilibrium at point A on the graph. Prince Barney of Mayberry has decided that he wants the economy to grow and has ordered the Royal Central Bank of Mayberry to print more currency so banks can expand their loans to stimulate growth. Explain what will most likely happen to the economy of Mayberry as a result of Prince Barney’s actions and show the result on the graph.



5.2 Two separate capacity constraints are discussed in this chapter: (1) the actual physical capacity of existing plants and equipment, shown as the vertical portion of the short-run AS curve, and (2) potential GDP, leading to a vertical long-run AS curve. Explain the difference between the two. Which is greater, full-capacity GDP or potential GDP? Why?

5.3 Imagine that the economy of your country is growing at its full potential. Given long years of growth of your country's consumers have formed very high expectations regarding the future performance of the economy, and this translates

into an abnormally high level of consumer confidence. By using aggregate supply and demand curves and other useful graphs, illustrate how this will affect the equilibrium output.

5.4 Using AS and AD curves to illustrate, describe the effects of the following events on the price level and on equilibrium GDP in the *long run* assuming that input prices fully adjust to output prices after some lag:

- An increase occurs in the money supply above potential GDP
- GDP is above potential GDP, and a decrease in government spending and in the money supply occurs
- Starting with the economy at potential GDP, a war in the Middle East pushes up energy prices temporarily. The Fed expands the money supply to accommodate the inflation.

5.5 [Related to the Economics in Practice on p. 581] The *Economics in Practice* describes the simple Keynesian AS curve as one in which there is a maximum level of output given the constraints of a fixed capital stock and a fixed supply of labor. The presumption is that increases in demand when firms are operating below capacity will result in output increases and no input price or output price changes but that at levels of output above full capacity, firms have no choice but to raise prices if demand increases. In reality, however, the short-run AS curve isn't flat and then vertical. Rather, it becomes steeper as we move from left to right on the diagram. Explain why. What circumstances might lead to an equilibrium at a very flat portion of the AS curve? At a very steep portion?

27.4 MONETARY POLICY SINCE 1970 p. 593

9. The Fed generally had high interest rates in the 1970s and early 1980s as it fought inflation. Since 1983, inflation has been low by historical standards, and the Fed focused between 1983 and 2008 on trying to smooth fluctuations in output. Since the end of 2008, there has been a zero interest rate bound.

10. Inflation targeting is the case where the monetary authority weights only inflation. It chooses its interest rate value with the aim of keeping the inflation rate within some specified band over some specified horizon.

REVIEW TERMS AND CONCEPTS

binding situation, p. 589

cost-push, or supply-side inflation, p. 592

demand-pull inflation, p. 592

inflation targeting, p. 595

stagflation, p. 592

zero interest rate bound, p. 589

PROBLEMS

Similar problems are available on MyEconLab.

27.1 FISCAL POLICY EFFECTS

LEARNING OBJECTIVE: Use the AS/AD model to analyze the short-run and long-run effects of fiscal policy.

- 1.1 During the third quarter of 1997, Japanese GDP was falling at a rate of over 11 percent. Many blamed the big increase in Japan's taxes in the spring of 1997, which was designed to balance the budget. Explain how an increase in taxes with the economy growing slowly could precipitate a recession. Do not skip steps in your answer. If you were head of the Japanese central bank, how would you respond? What impact would your policy have on the level of investment?
- 1.2 By using aggregate supply and aggregate demand curves to illustrate your points, discuss the impacts of the following events on the price level and on equilibrium GDP (Y) in the *short run*:
- A tax cut holding government purchases constant with the economy operating well below full capacity
 - An increase in consumer confidence and business optimism with the economy operating at near full capacity

27.2 MONETARY POLICY EFFECTS

LEARNING OBJECTIVE: Use the AS/AD model to analyze the short-run and long-run effects of monetary policy.

- 2.1 In each of the following cases, explain what would likely happen to the equilibrium level of the aggregate output (Y) and the interest rate (r):
- Faced with a likely recession, country A's government and central bank decide to act jointly by increasing government expenditure on infrastructure and launching a new bond acquisition program (by the central bank).
 - Country B's government decides to reduce the debt-to-GDP ratio by implementing austerity policies consisting of public spending cuts and tax increases. To alleviate the impact of fiscal policy on output and employment, the central bank expands money supply.
- 2.2 Paranoia, the largest country in central Antarctica, receives word of an imminent penguin attack. The news causes expectations about the future to be shaken. As a consequence, there is a sharp decline in investment spending plans.
- Explain in detail the effects of such an event on the economy of Paranoia, assuming no response on the part of the central bank or the Treasury (M^s , T , and G all remain constant.) Make sure you discuss the adjustments in the goods market and the money market.
 - To counter the fall in investment, the King of Paranoia calls for a proposal to increase government spending. To finance the program, the Chancellor of the Exchequer has proposed three alternative options:
 - Finance the expenditures with an equal increase in taxes
 - Keep tax revenues constant and borrow the money from the public by issuing new government bonds
 - Keep taxes constant and finance expenditures by printing new money
 Consider the three financing options and rank them from most expansionary to least expansionary. Explain your ranking.
- 2.3 A few months ago, a new program of "quantitative easing" was launched by the European Central Bank, with the aim to stimulate a sluggish growth across the Eurozone, while most Eurozone governments have stuck to "austerity" programs consisting in spending cuts and tax hikes. Economic conditions do not look very good indeed in Eurozone member countries: unemployment is high across the Eurozone (on average, 10 percent in the

first half of 2015) and productive capacity is underused. At the same time, interest rates are already very low, and there are signs that the financial sector is growing fast again. Does this fiscal and monetary policy combination strike you as optimal? Why (not)?

- 2.4 Describe what will happen to the interest rate and aggregate output with the implementation of the following policy mixes:
- Expansionary fiscal policy and expansionary monetary policy
 - Expansionary fiscal policy and contractionary monetary policy
 - Contractionary fiscal policy and expansionary monetary policy
 - Contractionary fiscal policy and contractionary monetary policy
- 2.5 Contractionary policies are designed to slow the economy and reduce inflation by decreasing aggregate demand and aggregate output. Explain why contractionary fiscal policy and contractionary monetary policy have opposite effects on the interest rate despite having the same goal of decreasing aggregate demand and aggregate output. Illustrate your answer with graphs of the money market.
- 2.6 Explain the effect, if any, that each of the following occurrences should have on the aggregate demand curve.
- The government decreases income tax to encourage consumer spending.
 - The central bank reduces the reserve requirement rate.
 - A movement along the AD curve sets off in the economy: the price level decreases.
 - Business confidence picks up and investment spending increases.
 - Production costs are positively affected by a worldwide drop in oil prices.
 - The central bank announces a surprise program of bond sales.
- 2.7 In Japan during the first half of 2000, the Bank of Japan kept interest rates at a near zero level in an attempt to stimulate demand. In addition, the government passed a substantial increase in government expenditure and cut taxes. Slowly, Japanese GDP began to grow with absolutely no sign of an increase in the price level. Illustrate the position of the Japanese economy with aggregate supply and aggregate demand curves. Where on the short-run AS curve was Japan in 2000?
- 2.8 By using aggregate supply and aggregate demand curves to illustrate your points, discuss the impacts of the following events on the price level and on equilibrium GDP (Y) in the short run:
- An increase in the money supply with the economy operating at near full capacity
 - A decrease in taxes and an increase in government spending supported by a cooperative Fed acting to keep output from rising
- 2.9 In country A, all wage contracts are indexed to inflation. That is, each month wages are adjusted to reflect increases in the cost of living as reflected in changes in the price level. In country B, there are no cost-of-living adjustments

to wages, but the workforce is completely unionized. Unions negotiate 3-year contracts. In which country is an expansionary monetary policy likely to have a larger effect on aggregate output? Explain your answer using aggregate supply and aggregate demand curves.

27.3 SHOCKS TO THE SYSTEM

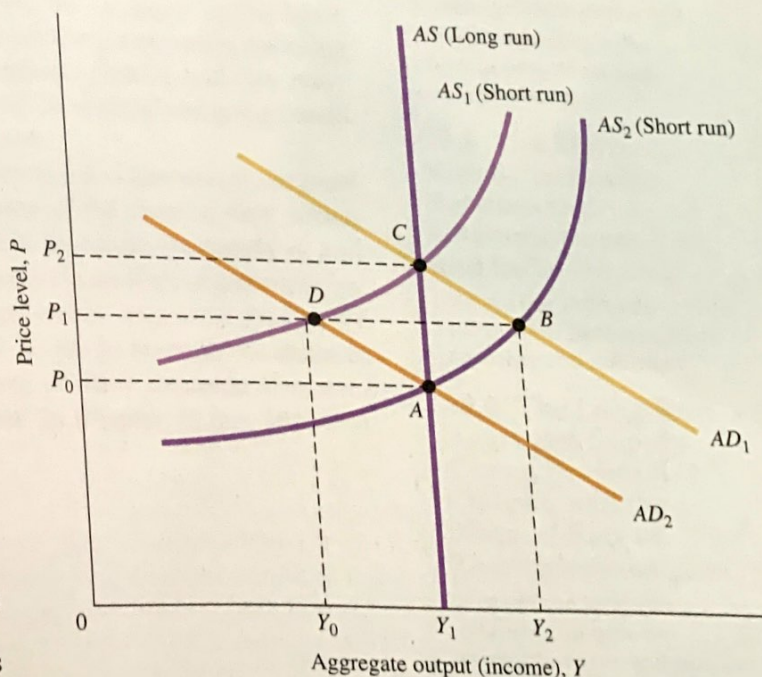
LEARNING OBJECTIVE: Explain how economic shocks affect the AS/AD model.

- 3.1 Renewed tensions in the Middle-East threaten to push the oil prices upwards. What impact might a new increase in oil prices have on the aggregate price level and on real GDP in your country? Illustrate your answer with aggregate demand and aggregate supply curves. What could your central bank do, if it desired to maintain aggregate output at its actual level?
- 3.2 From the following graph, identify the initial equilibrium, the short-run equilibrium, and the long-run equilibrium based on the scenarios below. Explain your answers and identify what happened to the price level and aggregate output.

Scenario 1. The economy is initially in long-run equilibrium at point A, and a cost shock causes cost-push inflation. The government reacts by implementing an expansionary fiscal policy.

Scenario 2. The economy is initially in long-run equilibrium at point A, and an increase in government purchases causes demand-pull inflation. In the long run, wages respond to the inflation.

Scenario 3. The economy is initially in long-run equilibrium at point C, and the federal government implements an increase in corporate taxes and personal income taxes. In the long run, firms and workers adjust to the new price level and costs adjust accordingly.



Scenario 4. The economy is initially in long-run equilibrium at point C, and energy prices decrease significantly. The government reacts by implementing a contractionary fiscal policy.

- 3.3** Evaluate the following statement: In the short run, if an economy experiences inflation of 10 percent, the cause of the inflation is unimportant. Whatever the cause, the only important issue the government needs to be concerned with is the 10 percent increase in the price level.

- 3.4 [Related to the Economics in Practice on p. 592]** Use aggregate supply and aggregate demand curves to illustrate the effect the mild monsoon season had on the rice crop in India. Explain what affect this had on the levels of aggregate output and inflation in India.

27.4 MONETARY POLICY SINCE 1970

LEARNING OBJECTIVE: Discuss monetary policy since 1970.

- 4.1** During 2001, the U.S. economy slipped into a recession. For the next several years, the Fed and Congress used monetary and fiscal policies in an attempt to stimulate the economy. Obtain data on interest rates (such as the prime rate or the federal funds rate). Do you see evidence of the Fed's action? When did the Fed begin its expansionary policy? Obtain data on total federal expenditures, tax receipts, and the deficit. (Try www.commerce.gov). When did fiscal policy become "expansionary"? Which policy seems to have suffered more from policy lags?

REVIEW TERMS AND CONCEPTS

aggregate production function, p. 657
 catch-up, p. 657
 disembodied technical change, p. 662
 embodied technical change, p. 661

foreign direct investment (FDI), p. 660
 innovation, p. 663
 invention, p. 663

labor productivity growth, p. 655
 output growth, p. 655
 per-capita output growth, p. 655

PROBLEMS

Similar problems are available on MyEconLab.

31.1 THE GROWTH PROCESS: FROM AGRICULTURE TO INDUSTRY

LEARNING OBJECTIVE: Summarize the history and process of economic growth.

- 1.1 Go to a recent issue of *The Economist* magazine. In the back of each issue is a section called “economic indicators.” That section lists the most recent growth data for a substantial number of countries. Which countries around the world are growing most rapidly according to the most recent data? Which countries around the world are growing more slowly? Flip through the stories in *The Economist* to see if there is any explanation for the pattern that you observe. Write a brief essay on current general economic conditions around the world.

- 1.2 The data in the following table represents real GDP from 2011–2014 for five countries.

- Calculate the growth rate in real GDP for all five countries from 2011–2012. Which country experienced the highest rate of economic growth from 2011–2012?
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- Calculate the growth rate in real GDP for all five countries from 2013–2014. Which country experienced the highest rate of economic growth from 2013–2014?
- Calculate the average annual growth rate in real GDP for all five countries from 2011–2014. Which country experienced the highest average annual rate of economic growth from 2011–2014?

Country	2011	2012	2013	2014
United States	15,204.00	15,556.86	15,902.12	16,271.05
El Salvador	21.89	22.30	22.68	23.18
Republic of South Africa	378.11	387.44	394.76	408.58
Cambodia	11.98	12.86	13.82	14.83
Russia	1,589.91	1,644.53	1,666.22	1,670.38

All values are in billions of 2010 U.S. dollars.

Source: United States Department of Agriculture.

- 1.3 The data in the following table represents real GDP per capita in 1974 and 2014 for five countries. Fill in the table by calculating the annual growth rate in real GDP per capita from 1974 to 2014. Is the data in the completed table consistent with convergence theory? Explain.

Country	Real GDP per Capita in 1974	Real GDP per Capita in 2014	Annual Growth in Real GDP per Capita 1974–2014
United States	25,602	51,056	
El Salvador	2,884	3,785	
Republic of South Africa	6,214	8,446	
Cambodia	157	959	
Russia	7,192	11,724	

All values are in 2010 U.S. dollars.

Source: United States Department of Agriculture.

- 1.4 Use the data in the following table to explain what happened with respect to economic growth and the standard of living in each of the three countries.

Country	Real GDP 2015	Real GDP 2014	Population 2015	Population 2014
Astoria	12,400	10,850	1,800	1,575
Tiberius	4,275	3,820	575	450
Zorba	60,500	64,100	13,800	15,250

31.2 SOURCES OF ECONOMIC GROWTH

LEARNING OBJECTIVE: Describe the sources of economic growth.

- 2.1 One way that less developed countries catch up with the growth of the more developed countries is by adopting the technology of the developed countries. On average, however, developed countries are capital-rich and labor-short relative to the developing nations. Think of the kinds of technology that a typical developing country with a short supply of capital and a large marginally employed labor force would find when “shopping” for technology in a more developed country. As a hint, the Japanese have developed the field of robotics such as assembly line machines. Such machines are designed to replace expensive workers with capital (robots) to lower the overall cost of production. In what ways does it help a developing country to transfer and use a new technology in its country? What are the costs?
- 2.2 Tables 1, 2, and 3 that follow present some data on three hypothetical economies. Complete the tables by figuring the measured productivity of labor and the rate of output growth. What do the data tell you about the causes of economic growth? (Hint: How fast are L and K growing?)

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TABLE 1

PERIOD	L	K	Y	Y/L	GROWTH RATE OF OUTPUT
1	1,120	3,205	4,650		
2	1,135	3,500	4,795		
3	1,152	3,798	4,945		
4	1,170	4,045	5,100		

TABLE 2

PERIOD	L	K	Y	Y/L	GROWTH RATE OF OUTPUT
1	1,120	3,205	4,650		
2	1,175	3,246	4,775		
3	1,255	3,288	4,904		
4	1,344	3,315	5,036		

TABLE 3

PERIOD	L	K	Y	Y/L	GROWTH RATE OF OUTPUT
1	1,120	3,205	4,650		
2	1,135	3,246	4,840		
3	1,152	3,288	5,038		
4	1,170	3,315	5,244		

2.3 In 2003, the long term capital gains tax rates in the U.S. were slashed from around 20/18 percent to around 15 percent. In what ways do you expect this amendment is going to affect economic growth?

2.4 [Related to the Economics in Practice on p. 658] In a March 2013 press release, the World Bank announced its support to assist Indonesia in accelerating its economic growth through the Research and Innovation in Science and Technology Project (RISET). This project is designed to boost research and innovation in Indonesia and assist the country in evolving into a knowledge-based economy. According to Stefan G. Koeberle, World Bank Country Director for Indonesia, "Improving human resources and national capabilities in science and technology is a key pillar in Indonesia's masterplan to accelerate and expand its economy. Shifting from a resource-based economy to a knowledge-based economy will bring Indonesia up the value chain in a wide range of sectors, with the help of homegrown innovation and a vast pool of human resources." The press release states that a large part of the RISET program will involve assistance in raising the academic credentials of Indonesian researchers involved with science and engineering, and it is hoped that the program will eventually lead to increased

investment in R&D, where as a percentage of GDP, Indonesia's R&D investment falls significantly below many of its Asian neighbors. Using the information presented in this chapter, explain how increasing research and innovation and raising the academic credentials of researchers can assist in increasing long-run economic growth in Indonesia.

Source: "World Bank Supports Move to Accelerate Indonesia's Economic Growth through Science, Technology, and Innovation," www.worldbank.org, March 29, 2013. Used by permission.

- 2.5 Education is an area in which it has been hard to create productivity gains that reduce costs. Collect data on the tuition rates of your own college in the last 20 years and compare that increase to the overall rate of inflation using the consumer price index. What do you observe? Can you suggest some productivity-enhancing measures?
- 2.6 Economists generally agree that high budget deficits today will reduce the growth rate of the economy in the future. Why? Do the reasons for the high budget deficit matter? In other words, does it matter whether the deficit is caused by lower taxes, increased defense spending, more job-training programs, and so on?
- 2.7 Why can growth lead to a more unequal distribution of income? By assuming this is true, how is it possible for the poor to benefit from economic growth?
- 2.8 According to the Bureau of Labor Statistics, during the first quarter of 2015 nonfarm business productivity in the United States fell 3.1 percent and manufacturing productivity fell 1.0 percent compared to the first quarter of 2014. During this same time, real GDP in the United States increased by 2.9 percent. Explain how productivity can decrease when real GDP is increasing.
- 2.9 How do each of the following relate to the rates of productivity and growth in an economy?
- Spending on research and development
 - Government regulation
 - Changes in human capital
 - Output per worker hour
 - Embodied technical change
 - Disembodied technical change
- 2.10 [Related to the Economics in Practice on p. 662] Human capital has often been cited as one of the driving forces of economic growth. Go to <http://ec.europa.eu/eurostat> and look up the current unemployment rate. Compare this to the unemployment rates across different levels of educational attainment. What does this data suggest about changes in education requirements for jobs in the EU? Also look at the percentage of people who have completed tertiary education or more in the age band of 25 to 64 for the years 2003 to 2014. Compare this data with the unemployment data. What does this information suggest about future productivity and growth for the economy of the European Union?

31.3 GROWTH AND THE ENVIRONMENT AND ISSUES OF SUSTAINABILITY

LEARNING OBJECTIVE: Discuss environmental issues associated with economic growth.

- 3.1** In June 2013, the President's Climate Action Plan was announced. One the aims of this plan was to reduce

greenhouse gas emissions in the U.S. in the range of 17 percent below 2005 levels by 2020. Also note that the per capita GDP of the U.S. has grown by 2.4 percent in 2013-14. In this context explain how the attainment of the goals of this plan reconciles with the inverted-U relationship as characterized by Gene Grossman and Alan Krueger.