

PART THREE

Answers to End-of-Chapter Problems

Chapter 1

ANSWERS TO QUESTIONS

1. The interest rate on three-month Treasury bills fluctuates more than the other interest rates and is lower on average. The interest rate on Baa corporate bonds is higher on average than the other interest rates.
2. The lower price for a firm's shares means that it can raise a smaller amount of funds, so investment in facilities and equipment will fall.
3. Higher stock prices mean that consumers' wealth is higher, and they will be more likely to increase their spending.
4. They channel funds from people who do not have a productive use for them to people who do, thereby resulting in higher economic efficiency.
5. The United States economy was hit by the worst financial crisis since the Great Depression. Defaults in subprime residential mortgages led to major losses in financial institutions, producing not only numerous bank failures, but also the demise of two of the largest investment banks in the United States. These factors led to the "Great Recession" which began late in 2007.
6. The basic activity of banks is to accept deposits and make loans.
7. Savings and loan associations, mutual savings banks, credit unions, insurance companies, mutual funds, pension funds, and finance companies.
8. Answers will vary.
9. In the period from 2007 to 2011, both inflation and interest rates have generally trended downward compared to before that period.
10. The data in Figures 3, 5, and 6 suggest that real output, the inflation rate, and interest rates would all fall.
11. Businesses would increase investment spending because the cost of financing this spending is now lower, and consumers would be more likely to purchase a house or a car because the cost of financing their purchase is lower.
12. No. It is true that people who borrow to purchase a house or a car are worse off because it costs them more to finance their purchase; however, savers benefit because they can earn higher interest rates on their savings.
13. Because the Federal Reserve affects interest rates, inflation, and business cycles, all of which have an important impact on the profitability of financial institutions.
14. The deficit as a percentage of GDP has expanded dramatically since 2007; in 2010 the deficit to GDP ratio was 10%, well above the historical average of around 2% since 1950.
15. It makes foreign goods more expensive, so British consumers will buy fewer foreign goods and more domestic goods.

16. It makes British goods more expensive relative to American goods. Thus American businesses will find it easier to sell their goods in the United States and abroad, and the demand for their products will rise.
17. Changes in foreign exchange rates change the value of assets held by financial institutions and thus lead to gains and losses on these assets. Also changes in foreign exchange rates affect the profits made by traders in foreign exchange who work for financial institutions.
18. In the mid- to late 1970s and in the late 1980s and early 1990s, the value of the dollar was low, making travel abroad relatively more expensive; thus it was a good time to vacation in the United States and see the Grand Canyon. With the rise in the dollar's value in the early 1980s, travel abroad became relatively cheaper, making it a good time to visit the Tower of London. This was also true, to a lesser extent, in the early 2000s.
19. When the dollar increases in value, foreign goods become less expensive relative to American goods; thus you are more likely to buy French-made jeans than American-made jeans. The resulting drop in demand for American-made jeans because of the strong dollar hurts American jeans manufacturers. On the other hand, the American company that imports jeans into the United States now finds that the demand for its product has risen, so it is better off when the dollar is strong.
20. As the dollar becomes stronger (worth more) relative to a foreign currency, one dollar is equivalent to (can be exchanged for) more foreign currency. Thus, for a given face value of bond holdings, a stronger dollar will yield more home currency to foreigners, so the asset will be worth more to foreign investors. Likewise, a weak dollar will lead to foreign bond holdings worth less to foreigners.

ANSWERS TO APPLIED PROBLEMS

21. The best day is 4/25. At a rate of \$1.6674/pound, you would have £119.95. The worst day is 4/7. At \$1.961/pound, you would have £101.99, or a difference of £17.96.

Chapter 2

ANSWERS TO QUESTIONS

1. Yes, I should take out the loan, because I will be better off as a result of doing so. My interest payment will be \$4,500 (90% of \$5,000), but as a result, I will earn an additional \$10,000, so I will be ahead of the game by \$5,500. Since Larry's loan-sharking business can make some people better off, as in this example, loan sharking may have social benefits. (One argument against legalizing loan sharking, however, is that it is frequently a violent activity.)
2. Yes, because the absence of financial markets means that funds cannot be channeled to people who have the most productive use for them. Entrepreneurs then cannot acquire funds to set up businesses that would help the economy grow rapidly.
3. The share of Microsoft stock is an asset for its owner, because it entitles the owner to a share of the earnings and assets of Microsoft. The share is a liability for Microsoft, because it is a claim on its earnings and assets by the owner of the share.
4. You would rather hold bonds, because bondholders are paid off before equity holders, who are the residual claimants.
5. This statement is false. Prices in secondary markets determine the prices that firms issuing securities receive in primary markets. In addition, secondary markets make securities more liquid and thus easier to sell in the primary markets. Therefore, secondary markets are, if anything, more important than primary markets.
6. Treasury bills are short-term debt instruments issued by the United States government to cover immediate spending obligations, i.e. finance deficit spending. Certificates of deposit (CDs) are issued by banks and sold to depositors. Commercial paper is issued by corporations and large banks as a method of short-term funding in debt markets. Repos are issued primarily by banks, and funded by corporations and other banks through loans in which treasury bills serve as collateral, with an explicit agreement to pay off the debt (repurchase the treasuries) in the near future. Fed funds are overnight loans from one bank to another.
7. Mortgages are loans to households or firms to purchase housing, land, or other real structures, where the structure or land itself serves as collateral for the loans. Mortgage-backed securities are bond-like debt instruments which are backed by a bundle of individual mortgages, whose interest and principal payments are collectively paid to the holders of the security. In other words, when an individual takes out a mortgage, that loan is bundled with other individual mortgages to create a composite debt instrument, which is then sold to investors.
8. The British gained because they were able to earn higher interest rates as a result of lending to Americans, while the Americans gained because they now had access to capital to start up profitable businesses such as railroads.
9. The international trade of mortgage-backed securities is generally beneficial in that the European banks that held the mortgages could earn a return on those holdings, while providing needed capital to U.S. financial markets to support borrowing for new home construction and other productive uses. In this sense, both European banks and U.S. borrowers should have benefitted. However, with the sharp decline in the U.S. housing market, default rates on mortgages rose sharply, and the value of

the mortgage-backed securities held by European banks fell sharply. Even though the financial crisis began primarily in the United States as a housing downturn, it significantly affected European markets; Europe would have been much less affected without such internationalization of financial markets.

10. Financial intermediaries benefit by carrying risk at relatively low transaction costs. Since higher risk assets on average earn a higher return, financial intermediaries can earn a profit on a diversified portfolio of risky assets. Individual investors benefit by earning returns on a pooled collection of assets issued by financial intermediaries at lower risk. Risk to individual investors is lowered through the pooling of assets by the financial intermediary.
11. Because you know your family member better than a stranger, you know more about the borrower's honesty, propensity for risk taking, and other traits. There is less asymmetric information than with a stranger and less likelihood of an adverse selection problem, with the result that you are more likely to lend to the family member.
12. The issuance of subprime mortgages represents lenders loaning money to the pool of potential homeowners who are the highest credit risk and have the lowest net wealth and other financial resources. In other words, this group of borrowers most in need of mortgage credit was also the highest risk to lenders, a perfect example of adverse selection.
13. Loan sharks can threaten their borrowers with bodily harm if borrowers take actions that might jeopardize their paying off the loan. Hence borrowers from a loan shark are less likely to increase moral hazard.
14. They might not work hard enough while you are not looking or may steal or commit fraud.
15. Yes, because even if you know that a borrower is taking actions that might jeopardize paying off the loan, you must still stop the borrower from doing so. Because that may be costly, you may not spend the time and effort to reduce moral hazard, and so the problem of moral hazard still exists.
16. True. If there are no informational or transactions costs, people could make loans to each other at no cost and would thus have no need for financial intermediaries.
17. Because the costs of making the loan to your neighbor are high (legal fees, fees for a credit check, and so on), you will probably not be able earn 5% on the loan after your expenses even though it has a 10% interest rate. You are better off depositing your savings with a financial intermediary and earning 5% interest. In addition, you are likely to bear less risk by depositing your savings at the bank rather than lending them to your neighbor.
18. Potentially competing interests may lead an individual or firm to conceal information or disseminate misleading information. A substantial reduction in the quality of information in financial markets increases asymmetric information problems and prevents financial markets from channeling funds into the most productive investment opportunities. Consequently, the financial markets and the economy become less efficient. That is, false information as a result of a conflict of interest can lead to a more inefficient allocation of capital than just asymmetric information alone.
19. Financial firms that provide multiple types of financial services can be more efficient through economies of scope, that is, by lowering the cost of information production. However, this can be problematic since it can also lead to conflicts of interest, in which the financial firm provides false or

misleading information to protect its own interests. This can lead to a worsening of the asymmetric information problem, making financial markets less efficient.

20. You would likely use a credit union if you are a member, since their primary business is consumer loans. In some cases it is possible to borrow directly from pension funds, but it can come with high borrowing costs and tax implications. Investment banks do not provide loans to the general public.
21. Most life insurance companies hold large amounts of corporate bonds and mortgage assets, thus poor corporate profits or a downturn in the housing market can significantly adversely impact the value of asset holdings of insurance companies.
22. During the financial panic, regulators were concerned that depositors worried their banks would fail, and that depositors (especially with accounts over \$100,000) would pull money from banks, leaving cash-starved banks with even less cash to satisfy customer demands and day-to-day operations. This could create a contagious bank panic in which otherwise healthy banks would fail. Raising the insurance limit would reassure depositors that their money was safe in banks and prevent a bank panic, helping to stabilize the financial system.

ANSWERS TO APPLIED PROBLEMS

23. a. With Option 1, since deposits are insured it can be assumed a riskless investment. Thus, the expected total payoff would be $\$10,000 \times 1.02 = \$10,200$. With Option 2, a bond return of 5% implies a potential payoff of $\$10,000 \times 1.05 = \$10,500$, and there is a 90% chance that this outcome will occur, thus the expected payoff is $\$10,500 \times 0.9 = \$9,450$. Under Option 3, the expected payoff is $\$10,000 \times 1.08 \times 0.93 = \$10,044$. Option 4 is riskless, so the expected total payoff is \$10,000. Given these choices and the assumption that you don't care about risk, Option 1 is the best investment.
- b. This option implies the very real possibility of either receiving nothing (if he actually leaves town), or \$10,800 (if he indeed pays as promised). If you don't pay Mike, you have an expected return of \$10,044 as shown above. If you paid your friend the \$100 and learned that Mike would leave without paying, then obviously you wouldn't loan Mike the money, and you would be left with \$9,900. However, if you paid the friend \$100 and learned that Mike would pay, you would have \$10,700 ($= \$10,000 \times 1.08 - \100). After paying your friend Mike, but before knowing the true outcome, your expected return would be \$10,644 ($\$9,900 \times 0.07 + \$10,700 \times 0.93$). Paying your friend the \$100 is definitely worth it because it increases your expected return and in addition dramatically reduces the downside risk that you make a bad loan, and increases the certainty of the payoff amount. That is, with asymmetric information (not paying your roommate), you have a range of payoffs of \$0 to \$10,800 versus \$9,900 to \$10,700 without asymmetric information. Thus, paying a small amount to improve risk assessment can be very beneficial, a task for which financial intermediaries are well suited.

Chapter 3

ANSWERS TO QUESTIONS

1. Since a lot of other assets have liquidity properties that are similar to currency but can be used as money to purchase goods and services, not counting them would understate an economy's access to liquidity for transactions purposes. For this reason, counting assets such as checking deposits or savings accounts more accurately reflects the stock of assets that can be considered money.
2. Even if he or she is a non-smoker, since the prisoner knows that others in the prison will accept cigarettes as a form of payment, they themselves would be willing to accept cigarettes as a form of payment. So, rather than prisoners having to barter and trade favors, cigarettes satisfy the double coincidence of wants in that both parties to a trade stand ready to use them to "purchase" goods or services.
3. Because the orchard owner likes only bananas but the banana grower doesn't like apples, the banana grower will not want apples in exchange for his bananas, and they will not trade. Similarly, the chocolatier will not be willing to trade with the banana grower because she does not like bananas. The orchard owner will not trade with the chocolatier because he doesn't like chocolate. Hence, in a barter economy, trade among these three people may well not take place, because in no case is there a double coincidence of wants. However, if money is introduced into the economy, the orchard owner can sell his apples to the chocolatier and then use the money to buy bananas from the banana grower. Similarly, the banana grower can use the money he receives from the orchard owner to buy chocolate from the chocolatier, and the chocolatier can use the money to buy apples from the orchard owner. The result is that the need for a double coincidence of wants is eliminated, and everyone is better off because all three producers are now able to eat what they like best.
4. Cavemen did not need money. In their primitive economy, they did not specialize in producing one type of good and they had little need to trade with other cavemen.
5. (a) This situation illustrates the medium-of-exchange function of money. We often do not think why we accept money in exchange for hours spent working, as we are so accustomed to using money. The medium-of-exchange function of money refers to its ability to facilitate trades (hours worked for money and then money for groceries) in a society. (b) In this case we observe money performing its unit-of-account function. If modern societies did not use money as a unit of account, then the price of apples would have to be quoted in terms of all the other items in the market. This quickly becomes an impossible task. Suppose that a pound of apples sells for 0.80 pounds of oranges, half a gallon of milk, one third of a pound of meat, 2 razor blades, 1.5 pound of potatoes, etc., etc., etc! (c) Maria is contemplating the store-of-value function of money. As a medium of exchange and unit of account, measures of money known as M1 or M2 have no important rivals. With respect to the store-of-value function, however, there are many assets that can preserve value better than a checking account. Maria's choice to preserve the purchasing power of her income by increasing her savings account balance is fine for a small period of time. For a period of 20 years, however, you might choose to buy a U.S. Treasury bond that matures in 20 years (as many grandparents have done as a way to pay for their grandchildren's educations).
6. Because of the rapid inflation in Brazil, the domestic currency, the real, was a poor store of value. Thus many people preferred to hold dollars, which were a better store of value, and used them in their daily shopping.

7. Because money was losing value at a slower rate (the inflation rate was lower) in the 1950s than in the 1970s, it was a better store of value then, and you would have been willing to hold more of it.
8. Money loses its value at an extremely rapid rate in hyperinflation, so you want to hold it for as short a time as possible. Thus money is like a hot potato that is quickly passed from one person to another.
9. Because a check was so much easier to transport than gold, people would frequently rather be paid by check even if there was a possibility that the check might bounce. In other words, the lower transactions costs involved in handling checks made people more willing to accept them.
10. Wine is more difficult to transport than gold and is also more perishable. Gold is thus a better store of value than wine and also leads to lower transactions cost. It is therefore a better candidate for use as money.
11. Neither. Although PayPal and many other e-money systems work as other forms of money do to facilitate purchases of goods and services, it does not count in the M1 or M2 money supplies. Because PayPal and similar payment systems are generally credit-based, this requires payment at a future date for funds used today; those future payments must be made using existing money that is already in the system, such as currency or funds in a bank deposit account. In other words, the M1 and M2 money supplies would theoretically remain the same, but money would move from your checking account to a third party, once the credit transaction is settled.
12. The ranking from most liquid to least liquid is: (c), (a), (e), (f), (d), and (b).
13. M1 contains the most liquid assets. M2 is the largest measure.
14. The degree of liquidity of an asset is measured by considering how much time and effort (i.e., transaction costs) are needed to convert that asset into currency. Currency is by definition the most liquid type of money. Different types of money have different degrees of liquidity. A check, which represents a balance on a checking account, is a quite liquid type of money. After all, all that is needed to pay for a good or service using a check is the two minutes it takes to include the date and amount and sign the check. However, the above example shows that some merchants refuse to accept checks as a means of payment. (They cannot refuse to accept dollars, as dollars are legal tender in the United States.) This can result in significant transaction costs in trying to find a bank or an ATM. It is even possible that the transaction never takes place. This example illustrates the point that even inside the same monetary aggregate, different types of money do not have the same degree of liquidity.
15.
 - a. M1 and M2,
 - b. M2,
 - c. M2,
 - d. M1 and M2.
16. Your actions will reduce your checking account balance and increase your holdings of money market mutual fund shares. Considering this transaction only, M1 will decrease as one of its components decreased. M2 will remain constant, as M2 is composed of all items that add up to M1 plus some other types of money that are not so liquid to be considered part of M1. One of these categories is money market mutual fund shares. The decrease in your checking account balance is offset by the increase in money market mutual fund shares, and therefore M2 remains constant.

17. During the period in question, the M1 growth rate increased by 17 percentage points, while the M2 growth rate increased by only 3 percentage points. Although both measures are moving in the same *direction*, the *magnitude* of the difference in growth rates between the two makes it difficult to judge the appropriateness of monetary policy by just looking at the money supply measures alone. For instance, if one focused just on the M2 money supply, knowing the economy was in severe economic contraction would suggest that the growth rate of M2 perhaps should be even higher than the 3 percentage point increase over this time. On the other hand, if one just focused on the M1 growth increase of 17 percentage points, this may seem alarmingly high and suggest an inflationary problem in the future.
18. Not necessarily. Although the total amount of debt has predicted inflation and the business cycle better than M1 or M2, it may not be a better predictor in the future. Without some theoretical reason for believing that the total amount of debt will continue to predict well in the future, we may not want to define money as the total amount of debt.

ANSWERS TO APPLIED PROBLEMS

19. The M1 money supply is the sum of rows A, E, and G for each year. The M2 money supply is the sum of all components A–G for each year. Note that 3-month treasury bills are not considered part of the M1 or M2 money supply, even though they are fairly liquid assets. The table below shows the M1 and M2 money supplies, along with the growth rates from the previous year. Note that while the M1 money supply is relatively flat (and slightly negative for 2010), the M2 money supply grows at a much higher, positive rate. This is because the components of M2 are rising much more rapidly compared to the components of M1 (which are also included in M2). In particular, small denomination time deposits increase 30% from 2010 to 2011, and 39% from 2011 to 2012, driving much of the growth in M2. Moreover, the narrower components which make up just the M1 money supply represent less than 20% (1904/10128) of the broader M2 indicators. Thus movements in the money market, savings account, and time deposit measures will have a much bigger impact on M2 growth than the narrower M1 components will.

	2009	2010	2011	2012
A. Currency	900	920	925	931
B. Money market mutual fund shares	680	681	679	688
C. Savings account deposits	5500	5780	5968	6105
D. Money market deposit accounts	1214	1245	1274	1329
E. Demand and checkable deposits	1000	972	980	993
F. Small denomination time deposits	830	861	1123	1566
G. Traveler's checks	4	4	3	2
H. 3-month treasury bills	1986	2374	2436	2502
Total M1 money stock	1904	1896	1908	1926
Total M2 money stock	10128	10463	10952	11614
M1 growth rate		-0.4	0.6	0.9
M2 growth rate		3.3	4.7	6.0

Chapter 4

ANSWERS TO QUESTIONS

1. It would be worth $1/(1 + 0.20) = \$0.83$ when the interest rate is 20%, rather than $1/(1 + 0.10) = \$0.91$ when the interest rate is 10%. Thus, a dollar tomorrow is worth less with a higher interest rate today.
2. $\$2,000 = \$100/(1 + i) + \$100/(1 + i)^2 + \dots + \$100/(1 + i)^{20} + \$1,000/(1 + i)^{20}$. Solving for i gives the yield to maturity.
3. If the interest rate were 12%, the present discounted value of the payments on the government loan are necessarily less than the \$1,000 loan amount because they do not start for two years. Thus the yield to maturity must be lower than 12% in order for the present discounted value of these payments to add up to \$1,000.
4. When the yield to maturity increases, this represents a decrease in the price of the bond. If the bondholder were to sell the bond at a lower price, the capital gains would be smaller (capital losses larger) and therefore the bondholder would be worse off.
5. No. If interest rates rise sharply in the future, long-term bonds may suffer such a sharp fall in price that their return might be quite low, possibly even negative.
6. People are more likely to buy houses because the real interest rate when purchasing a house has fallen from 3% ($= 5\% - 2\%$) to 1% ($= 10\% - 9\%$). The *real* cost of financing the house is thus lower, even though *nominal* mortgage rates have risen. (If the tax deductibility of interest payments is allowed for, then it becomes even more likely that people will buy houses.)
7. The current yield will be a good approximation to the yield to maturity whenever the bond price is very close to par or when the maturity of the bond is over about ten years. This is because cash flows farther in the future have such small present discounted values that the value of a long-term coupon bond is close to a perpetuity with the same coupon rate.
8. The near-term costs to maintaining a given size loan are much smaller for a perpetuity than for a similar fixed payment loan, discount, or coupon bond. For instance, assuming a 5% interest rate over 10 years, on a \$1000 loan, a perpetuity costs \$50 a year (or \$500 in payments over 10 years). For a fixed payment loan, this would be \$129.50 per year (or \$1295 in payments over the same 10-year period). For a discount loan, this loan would require a lump sum payment of \$1628.89 in 10 years. For a coupon bond, assuming the same \$50 coupon payment as the perpetuity implies a \$1000 face value. Thus, for the coupon bond, the total payments at the end of 10 years will be \$1500.
9. Whenever the current price P is greater than face value F of a discount bond, the yield to maturity will be negative. It is possible for a coupon bond to have a negative nominal interest rate, as long as the coupon payment and face value are low relative to the current price. As an example, with a one-year coupon bond, the yield to maturity is given as $i = (C + F - P)/P$; in this case whenever $C + F < P$, i will be negative. It is impossible for a perpetuity to have a negative nominal interest rate, since this would require either the coupon payment or the price to be negative.
10. True. The return on a bond is the current yield i_C plus the rate of capital gain, g . A discount bond, by definition, has no coupon payments, thus the current yield is always zero (the coupon payment of zero divided by current price) for a discount bond.

11. You would rather be holding long-term bonds because their price would increase more than the price of the short-term bonds, giving them a higher return. Longer-term bonds are more susceptible to higher price fluctuations than shorter-term bonds, and hence have greater interest-rate risk.
12. The economists are right. They reason that nominal interest rates were below expected rates of inflation in the late 1970s, making real interest rates negative. The expected inflation rate, however, fell much faster than nominal interest rates in the mid-1980s, so nominal interest rates were above the expected inflation rate and real rates became positive.
13. While it would appear to them that their wealth is declining as nominal interest rates fall, as long as expected inflation falls at the same rate as nominal interest rates, their real return on savings accounts will be unaffected. However, in practice, expected inflation as reflected by the cost of living for seniors and retired persons often is much higher than standard measures of inflation, thus low nominal rates can adversely affect the wealth of senior citizens and retired persons.

ANSWERS TO APPLIED PROBLEMS

14. $\$1,100/(1 + 0.10) + \$1,210/(1 + 0.10)^2 + \$1,331/(1 + 0.10)^3 = \$3,000$.
15. $PV = FV/(1 + i)^n$, where $FV = 1000$, $i = 0.06$, $n = 5$. Thus, $PV = 747.26$.
16. In present value terms, the lottery prize is worth $\$2,000,000 + \$2,000,000/(1.06) + \$2,000,000/(1.06)^2 + \$2,000,000/(1.06)^3 + \$2,000,000/(1.06)^4$, or $\$8,930,211$.
17. $25\% = (\$1,000 - \$800)/\$800 = \$200/\$800 = 0.25$.
18. 14.9%, derived as follows: The present value of the \$2 million payment five years from now is $\$2/(1 + i)^5$ million, which equals the \$1 million loan. Thus $1 = 2/(1 + i)^5$. Solving for i , $(1 + i)^5 = 2$, so that $i = \sqrt[5]{2} - 1 = 0.149 = 14.9\%$.
19. If the one-year bond did not have a coupon payment, its yield to maturity would be $(\$1,000 - \$800)/\$800 = \$200/\$800 = 0.25$, or 25%. Because it does have a coupon payment, its yield to maturity must be greater than 25%. However, because the current yield is a good approximation of the yield to maturity for a twenty-year bond, we know that the yield to maturity on this bond is approximately 15%. Therefore, the one-year bond has a higher yield to maturity.

20.

Years to Maturity	Yield to Maturity	Current Price
2	2%	1038.83
2	4%	1000.00
3	4%	1000.00
5	2%	1094.27
5	6%	915.75

When yield to maturity is above the coupon rate, the bond's current price is below its face value. The opposite holds true when yield to maturity is below the coupon rate. For a given maturity, the bond's current price falls as yield to maturity rises. For a given yield to maturity, a bond's value rises as its maturity increases. When yield to maturity equals the coupon rate, a bond's current price equals its face value regardless of years to maturity.

21. $\$1044.89 = \$100/(1+i) + \$100/(1+i)^2 + \$1,000/(1+i)^2$. Solving for i gives a yield to maturity of 0.075, or 7.5%.
22. The price would be $\$50/0.025 = \2000 . If the yield to maturity doubles to 5%, the price would fall to half its previous value, to $\$1000 = \$50/0.05$.
23. The taxes on the \$250,000 home are $\$250,000 \times 0.04 = \$10,000$ per year. The PV of all future payments = $\$10,000/0.06 = \$166,666.67$ (a perpetuity).
24. The coupon payment $C = \$100$, thus the current yield is $\$100/\$960 = 0.104$, or 10.4%. The expected rate of capital gain, $g = (\$980 - \$960)/\$960 = 20/960 = 0.021$, or 2.1%. The expected rate of return, $R = i_C + g = 10.4\% + 2.1\% = 12.5\%$.
25. The required nominal rate would be:

$$\begin{aligned} i &= rr + \pi^e \\ &= 2\% + 6\% = 8\%. \end{aligned}$$

At this rate, you would expect to have $\$1,000 \times 1.08$, or \$1,080 at the end of the year. Can you afford the bicycle? In theory, the price of the bicycle will increase with the rate of inflation. So, one year later, the bicycle will cost $\$1,050 \times 1.06$, or \$1,113. You will be short by \$33. If the bicycle does not increase in price with inflation, then you will have enough to purchase it.

Chapter 5

ANSWERS TO QUESTIONS

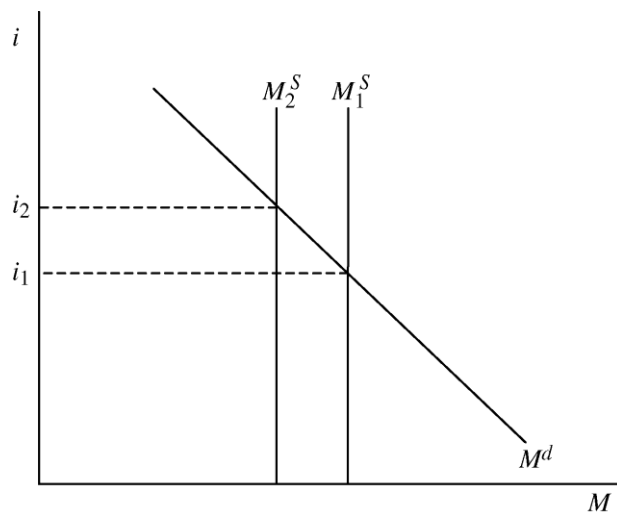
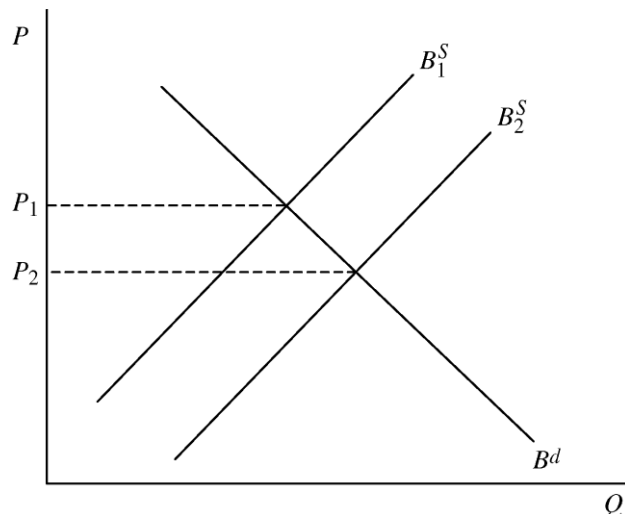
1. (a) Less, because your wealth has declined; (b) more, because its relative expected return has risen; (c) less, because it has become less liquid relative to bonds; (d) less, because its expected return has fallen relative to gold; (e) more, because it has become less risky relative to bonds.
2. (a) More, because your wealth has increased; (b) more, because the house has become more liquid; (c) less, because its expected return has fallen relative to Microsoft stock; (d) more, because it has become less risky relative to stocks; (e) less, because its expected return has fallen.
3. (a) More, because it has become more liquid; (b) less, because it has become more risky; (c) more, because its expected return has risen; (d) more, because its expected return has risen relative to the expected return on long-term bonds, which has declined.
4. (a) More, because the bonds have become more liquid; (b) more, because their expected return has risen relative to stocks; (c) less, because they have become less liquid relative to stocks; (d) less, because their expected return has fallen; (e) more, because they have become more liquid.
5. The rise in the value of stocks would increase people's wealth and therefore the demand for Rembrandts would rise.
6. True, because the benefits to diversification are greater for a person who cares more about reducing risk.
7. True, because for a risk averse person, more risk, a lower expected return, and less liquidity make a security less desirable.
8. Interest rates fall. The increased volatility of gold prices makes bonds relatively less risky relative to gold and causes the demand for bonds to increase. The demand curve, B^d , shifts to the right and the equilibrium interest rate falls.
9. Interest rates would rise. A sudden increase in people's expectations of future real estate prices raises the expected return on real estate relative to bonds, so the demand for bonds falls. The demand curve B^d shifts to the left, bond prices fall, and the equilibrium interest rate rises.
10. Interest rates should rise. The large federal deficits require the Treasury to issue more bonds; thus the supply of bonds increases. The supply curve, B^s , shifts to the right and the equilibrium interest rate rises. Some economists believe that when the Treasury issues more bonds, the demand for bonds increases because the issue of bonds increases the public's wealth. If this is the case, the demand curve, B^d , will also shift to the right, and it is no longer clear that the equilibrium interest rate will rise. Thus there is some potential ambiguity in the answer to this question.
11. Given the answer to question 10 above, the supply effect of large deficits should lead to higher interest rates. The effects of the economic crisis lead to significantly lower wealth and income, which depressed Treasury bond demand, but also decreased corporate bond supply by even more because investment opportunities collapsed. The larger leftward shift in the bond supply curve than the rightward shift in the bond demand curve would then result in a rise in bond prices and a fall in interest rates. In addition, due to the severity of the global crisis, U.S. treasury debt became a safe haven investment, reducing

relative risk and increasing liquidity for U.S. treasury debt. This significantly raised U.S. treasury bond demand, leading to higher bond prices and significantly lower yields. In other words, the decrease in investment opportunities and risk factors significantly offset the wealth effect on demand and the deficit effect on supply.

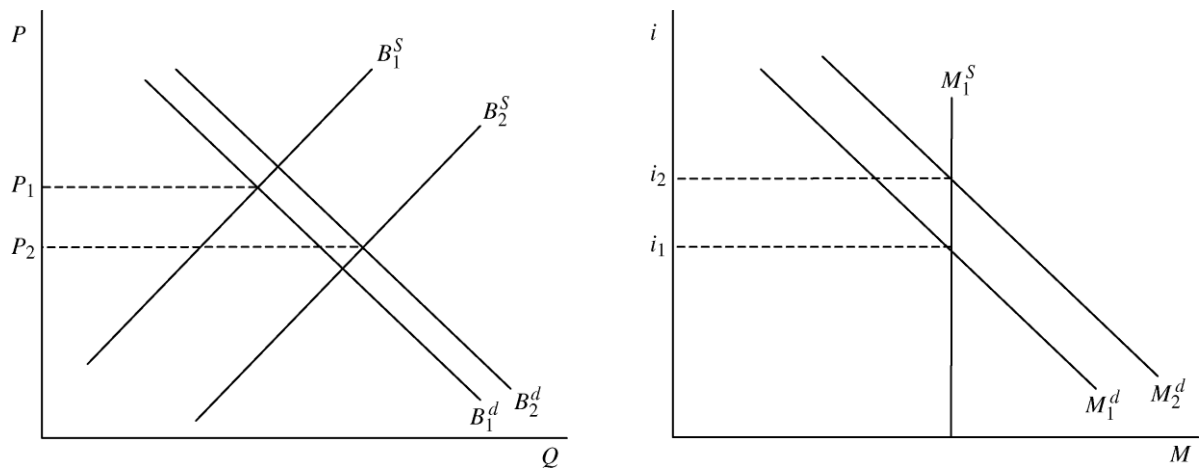
12. Yes, interest rates will rise. The lower commission on stocks makes them more liquid relative to bonds, and the demand for bonds will fall. The demand curve B^d will therefore shift to the left, and the equilibrium interest rate will rise.
13. If the public believes the president's program will be successful, interest rates will fall. The president's announcement will lower expected inflation so that the expected return on goods decreases relative to bonds. The demand for bonds increases and the demand curve, B^d , shifts to the right. For a given nominal interest rate, the lower expected inflation means that the real interest rate has risen, raising the cost of borrowing so that the supply of bonds falls. The resulting leftward shift of the supply curve, B^s , and the rightward shift of the demand curve, B^d , causes the equilibrium interest rate to fall.
14. Interest rates will rise. The expected increase in stock prices raises the expected return on stocks relative to bonds and so the demand for bonds falls. The demand curve, B^d , shifts to the left and the equilibrium interest rate rises.
15. Interest rates will rise. When bond prices become volatile and bonds become riskier, the demand for bonds will fall. The demand curve B^d will shift to the left, the price will fall, and the equilibrium interest rate will rise.
16. Yes, fiscal policymakers should worry about potentially inflationary conditions. If people expect higher inflation, this increases the yield on U.S. treasury debt, meaning that the interest rates paid to debt holders increase. In other words, higher inflation leads to a higher debt service burden and increases the costs of financing deficit spending.
17. When the price level rises, the quantity of money in real terms falls (holding the nominal supply of money constant); to restore their holdings of money in real terms to their former level, people will want to hold a greater nominal quantity of money. Thus the money demand curve M^d shifts to the right, and the interest rate rises.
18. The slower rate of money growth will lead to a liquidity effect, which raises interest rates, while the lower price level, income, and inflation rates in the future will tend to lower interest rates. There are three possible scenarios for what will happen: (a) if the liquidity effect is larger than the other effects, then interest rates will rise; (b) if the liquidity effect is smaller than the other effects and expected inflation adjusts slowly, then interest rates will rise at first but will eventually fall below their initial level; and (c) if the liquidity effect is smaller than the expected inflation effect and there is rapid adjustment of expected inflation, then interest rates will immediately fall.
19. With unusually high rates of money growth, this should lead to higher expected inflation, a jump in the overall price level, and stronger economic growth. These factors should all result in interest rates rising over time, notwithstanding the liquidity effect. However, in the period from 2008 to 2010, unemployment remained high, economic growth was weak, and if anything, policymakers were worried about deflation (a decrease in the price level) rather than any inflationary effects from the money growth. In other words, the income, price-level, and expected inflation effects of the unusually high money growth conditions were very small relative to the liquidity effect. This is similar to case (a) shown in Figure 11.

ANSWERS TO APPLIED PROBLEMS

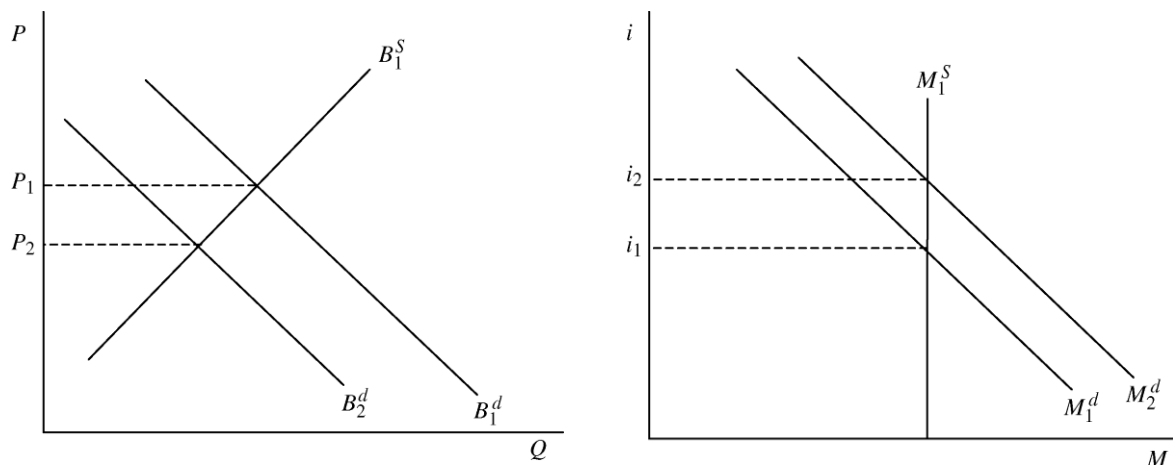
20. (a) The expected return on the stock portfolio is $0.25(12\%) + 0.25(10\%) + 0.25(8\%) + 0.25(6\%) = 9\%$. The expected return on the bond portfolio is $0.6(10\%) + 0.4(7.5\%) = 9\%$. The expected return on the commodities portfolio is $0.2(20\%) + 0.25(12\%) + 0.25(6\%) + 0.25(4\%) + 0.05(0\%) = 9.5\%$. Since the commodities portfolio has the higher expected return, you should choose that. (b) In choosing between the stock or bond portfolio, they both have the same expected return. However, since there is less uncertainty over the outcomes in the bond portfolio than the stock portfolio, a risk-averse individual should choose the bond portfolio.
21. When the Fed sells bonds to the public, it increases the supply of bonds, thus shifting the supply curve B^s to the right. The result is that the intersection of the supply and demand curves B^s and B^d occurs at a lower price and a higher equilibrium interest rate, and the interest rate rises. With the liquidity preference framework, the decrease in the money supply shifts the money supply curve M^s to the left, and the equilibrium interest rate rises. The answer from bond supply and demand analysis is consistent with the answer from the liquidity preference framework.



22. In the bond framework, when the economy booms, the demand for bonds increases. The public's income and wealth rises while the supply of bonds also increases, because firms have more attractive investment opportunities. Both the supply and demand curves (B^d and B^s) shift to the right (shown in graph below), but as is indicated in the text, the demand curve probably shifts less than the supply curve so the equilibrium interest rate rises. Similarly, when the economy enters a recession, both the supply and demand curves shift to the left, but the demand curve shifts less than the supply curve so that the interest rate falls. The conclusion is that interest rates rise during booms and fall during recessions: that is, interest rates are procyclical. The same answer is found with the liquidity preference framework. When the economy booms, the demand for money increases (shown in graph below); people need more money to carry out an increased amount of transactions and also because their wealth has risen. The demand curve, M^d , thus shifts to the right, raising the equilibrium interest rate. When the economy enters a recession, the demand for money falls and the demand curve shifts to the left, lowering the equilibrium interest rate. Again, interest rates are seen to be procyclical.



23. In the bond supply and demand analysis, the increased riskiness of bonds lowers the demand for bonds. The demand curve B^d shifts to the left, and the equilibrium interest rate rises. The same answer is found in the liquidity preference framework. The increased riskiness of bonds relative to money increases the demand for money. The money demand curve M^d shifts to the right, and the equilibrium interest rate rises.



24. (a) Solving for the equilibrium gives:

$$-0.6 \text{ Quantity} + 1140 = \text{Quantity} + 700;$$

$$1.6 \text{ Quantity} = 440; \text{ or } \text{Quantity} = 275.$$

Using the bond supply equation $\text{Price} = 275 + 700 = 975$. (b) The expected interest rate on a one-year discount bond with face value of \$1000 and current price of \$975 is given as $i = (1000 - 975)/975 = 0.0256$, or 2.56%.

25. (a) The monetary policy action, essentially an open market operation, increases the supply of bonds in the market by a quantity of 80, at any given price. Thus, the bond supply equation will become $\text{Quantity} = \text{Price} - 700 + 80$, so that $\text{Price} = \text{Quantity} + 620$. (b) As a result of the Federal Reserve action, the new equilibrium is given as:

$$-0.6 \text{ Quantity} + 1140 = \text{Quantity} + 620;$$

$$1.6 \text{ Quantity} = 520; \text{ or } \text{Quantity} = 325.$$

Using the bond supply curve, $\text{Price} = 325 + 620 = 945$. Thus, the expected interest rate on a one-year discount bond with face value of \$1000 and current price of \$945 is given as $i = (1000 - 945)/945 = 0.0582$, or 5.82%. This is an increase from 2.56% in the initial equilibrium, which was calculated in the answer to the previous question. Note that as we will see in Chapter 14, the open market sale leads to a decline in the money supply and so the liquidity preference framework would then also indicate that the interest rate would rise.

Chapter 6

ANSWERS TO QUESTIONS

1. Junk bonds are referred to as “junk” in that they are very risky investments, but provide high yields to investors who buy them at very low prices and are therefore compensated with a high risk premium.
2. The bond with a *C* rating should have a higher interest rate because it has a higher default risk, which reduces its demand and raises its interest rate relative to that on the *Baa* bond.
3. U.S. Treasury bills have lower default risk and more liquidity than negotiable CDs. Consequently, the demand for Treasury bills is higher, and they have a lower interest rate.
4. The risk of default would significantly decrease demand for AIG corporate debt, resulting in a much higher yield. After the announcement that the government would provide extraordinary assistance to support AIG and keep it from failing, demand for its corporate debt would rise, and yields would fall.
5. During business cycle booms, fewer corporations go bankrupt and there is less default risk on corporate bonds, which lowers their risk premium. Conversely, during recessions default risk on corporate bonds increases and their risk premium increases. The risk premium on corporate bonds is thus anticyclical, rising during recessions and falling during booms.
6. True. When bonds of different maturities are close substitutes, a rise in interest rates for one bond causes the interest rates for others to rise because the expected returns on bonds of different maturities cannot get too far out of line.
7. Since TIPS bonds are traded much more lightly than their nominal counterparts, demand for these bonds is somewhat lower than comparable U.S. treasuries; hence the higher yield (controlling for the effects of inflation) represents a liquidity premium. Note that because this liquidity effect is relatively small, inflation compensation will generally be larger than the liquidity premium, implying that nominal bond yields overall will be higher than TIPS of comparable maturity.
8. The government guarantee will reduce the default risk on corporate bonds, making them more desirable relative to Treasury securities. The increased demand for corporate bonds and decreased demand for Treasury securities will lower interest rates on corporate bonds and raise them on Treasury bonds.
9. Lower brokerage commissions for corporate bonds would make them more liquid and thus increase their demand, which would lower their risk premium.
10. The global financial crisis hit financial companies very suddenly and very hard, creating much uncertainty about the soundness of the financial system, and doubt about the soundness of even the most healthy banks and financial companies. As a result, there was a sharp decrease in demand for financial commercial paper relative to the seemingly safer nonfinancial commercial paper. This resulted in a spike in the yield spread between the two, reflecting the greater risk of financial company investments.
11. Abolishing the tax-exempt feature of municipal bonds would make them less desirable relative to Treasury bonds. The resulting decline in the demand for municipal bonds and increase in demand for

Treasury bonds would raise the interest rates on municipal bonds, while the interest rates on Treasury bonds would fall.

12. Credit rating agencies had a conflict of interest which was said to contribute to the crisis in that the rating agencies had an incentive to provide overly optimistic ratings to clients whom they also advised. Similarly, the way in which lenders and the house inspection process occurred provided incentives for the house inspectors to provide overly optimistic assessments of the value of housing to ensure continued work in the future, and at the same time mortgage lenders benefitted because it continued the cycle of creating and selling mortgages as long as housing value was maintained.
13. False. The expectations theory of the term structure implies that, with a \$1 investment in one-period bonds over two years, the expected return is given as $i_t + i_{t+1}^e$, which equals $2i_t$ assuming that one-period bond rates are expected to be the same across both periods. With a \$1 investment in a two-period bond, the expected return is $2i_{2t}$. Thus, only if the (expected) one-period bond rate for both periods is greater than the expected two-period bond rate will one-period bonds be a better investment.
14. (a) Under the expectations theory of the term structure, if 30-year bonds become less desirable, this will increase the demand for bonds of other maturities, since they are viewed as perfect substitutes. The result is higher price and lower yield at all other maturities, and an increase in yield at the end of the yield curve. In other words, the yield curve would steepen at the end, and flatten somewhat along the rest of the curve. (b) Under the segmented markets theory, the assumption is that each type of bond maturity is an independent market, and therefore not linked in any particular way. Thus changes in long rates won't affect shorter- and medium-term bond yields. Thus, the yield curve under the segmented markets theory will result in a jump in the 30-year rate, with the remainder of the yield curve unchanged.
15. Investor A, even though she receives a lower expected return, clearly prefers to hold short-term debt, perhaps because it is more liquid. Investor A's preferences are consistent with the segmented markets theory. Investor B is apparently maximizing expected return, but since he is indifferent between the five- and ten-year bonds, Investor B doesn't appear to favor any particular maturity, and so views the five- and ten-year bonds as essentially perfect substitutes, an assumption consistent with the expectations theory of the term structure.
16. The flat yield curve at shorter maturities suggests that short-term interest rates are expected to fall moderately in the near future, while the steep upward slope of the yield curve at longer maturities indicates that interest rates further into the future are expected to rise. Because interest rates and expected inflation move together, the yield curve suggests that the market expects inflation to fall moderately in the near future but to rise later on.
17. The steep upward-sloping yield curve at shorter maturities suggests that short-term interest rates are expected to rise moderately in the near future because the initial, steep upward slope indicates that the average of expected short-term interest rates in the near future are above the current short-term interest rate. The downward slope for longer maturities indicates that short-term interest rates are eventually expected to fall sharply. With a positive risk premium on long-term bonds, as in the preferred habitat theory, a downward slope of the yield curve occurs only if the average of expected short-term interest rates is declining, which occurs only if short-term interest rates are expected to fall far into the future. Since interest rates and expected inflation move together, the yield curve suggests that the market expects inflation to rise moderately in the near future but fall later on.

18. If yield curves on average were flat, this would suggest that the risk premium on long-term relative to short-term bonds would equal zero and we would be more willing to accept the expectations hypothesis.
19. You would raise your predictions of future interest rates, because the higher long-term rates imply that the average of the expected future short-term rates is higher.
20. The slope of the yield curve would fall because the drop in expected future short rates means that the average of expected future short rates falls so that the long rate falls.
21. If the Federal Reserve purchases a significant amount of longer-term treasury debt, this will reduce the effective supply of treasuries of those particular maturities, resulting in a higher price and lower yield. This should have the effect of lowering the “long end” of the curve, decreasing medium and longer-term yields. In other words, the yield curve will shift down, but mostly on medium and long-term maturities.

ANSWERS TO APPLIED PROBLEMS

22. As the risk of default by the Greek government increased, this reduced the demand for Greek bonds relative to U.S. treasuries. The result was lower prices and higher yields of Greek debt relative to U.S. debt, similar to the graphs in Figure 2 shown in the text.
23. (a) The yield to maturity would be 5% for a one-year bond, 6% for a two-year bond, 6.33% for a three-year bond, 6.5% for a four-year bond, and 6.6% for a five-year bond. (b) The yield to maturity would be 5% for a one-year bond, 4.5% for a two-year bond, 4.33% for a three-year bond, 4.25% for a four-year bond, and 4.2% for a five-year bond. The upward sloping yield curve in (a) would be even steeper if people preferred short-term bonds over long-term bonds, because long-term bonds would then have a positive liquidity premium. The downward-sloping yield curve in (b) would be less steep and might have a slight positive upward slope if the long-term bonds have a positive liquidity premium.
24. (a) The yield to maturity would be 5% for a one-year bond, 5.5% for a two-year bond, 6% for a three-year bond, 6% for a four-year bond, and 5.8% for a five-year bond; (b) the yield to maturity would be 5% for a one-year bond, 4.5% for a two-year bond, 4% for a three-year bond, 4% for a four-year bond, and 4.2% for a five-year bond. The upward- and then downward-sloping yield curve in (a) would tend to be even more upward sloping if people preferred short-term bonds over long-term bonds because long-term bonds would then have a positive risk premium. The downward- and then upward-sloping yield curve in (b) also would tend to be more upward sloping because of the positive risk premium for long-term bonds.
25. The liquidity premium for a given year is the current rate on a multi-year horizon bond minus the average of expected one year interest rates over that horizon. Thus, the liquidity premiums for each year are given as:

$$l_{11} = 2 - 2/1 = 0\%.$$

$$l_{21} = 3 - (3 + 2)/2 = 0.5\%.$$

$$l_{31} = 5 - (4 + 3 + 2)/3 = 2\%.$$

$$l_{41} = 6 - (6 + 4 + 3 + 2)/4 = 2.25\%.$$

$$l_{51} = 8 - (7 + 6 + 4 + 3 + 2)/5 = 3.6\%.$$

Chapter 7

ANSWERS TO QUESTIONS

1. The value of any investment is found by computing the value today of all cash flows the investment will generate over its life.
2. There are two cash flows from stock: periodic dividends and a future sales price. Dividends are frequently changed when a firm's earnings either rise or fall, which can make them difficult to estimate. The future sales price is also difficult to estimate, because it depends on the dividends that will be paid at some date even further in the future. Bond cash flows also consist of two parts, periodic interest payments and a final maturity payment. These payments are established in writing at the time the bonds are issued and cannot be changed without the firm defaulting and being subject to bankruptcy. Stock prices tend to be more volatile, because their cash flows are more subject to change.
3. A stock market bubble can occur if market participants either believe that dividends will have rapid growth or if they substantially lower the required return on their equity investments, thus lowering the denominator in the Gordon model and thereby causing stock prices to climb. By raising interest rates the central bank can cause the required rate of return on equity to rise, thereby keeping stock prices from climbing as much. Also raising interest rates may help slow the expected growth rate of the economy and hence of dividends, thus also keeping stock prices from climbing.
4. With more certainty over the course future interest rates will follow, uncertainty and risk would likely be reduced, which will lower the required return on investment k_e and lead to a higher stock price. In addition, with a reduction in the uncertainty of future short-term interest rates, this would likely lower longer-term interest rates, increasing capital investment. This would likely raise long-run economic growth and dividend growth, also pushing stock prices higher.
5. False. Expectations can be highly inaccurate and still be rational, because optimal forecasts are not necessarily accurate: A forecast is optimal if it is the best possible even if the forecast errors are large.
6. Although Joe's expectations are typically quite accurate, they could still be improved by his taking account of a snowfall in his forecasts. Since his expectations could be improved, they are not optimal and hence are not rational expectations.
7. No, because he could improve the accuracy of his forecasts by predicting that tomorrow's interest rates will be identical to today's. His forecasts are therefore not optimal, and he does not have rational expectations.
8. True, as an approximation. If large changes in a stock price could be predicted, then the optimal forecast of the stock return would not equal the equilibrium return for that stock. In this case, there would be unexploited profit opportunities in the market and expectations would not be rational. Very small changes in stock prices could be predictable, however, and the optimal forecast of returns would equal the equilibrium return. In this case, an unexploited profit opportunity would not exist.
9. No, you shouldn't buy stocks, because the rise in the money supply is publicly available information that will be already incorporated into stock prices. Hence you cannot expect to earn more than the equilibrium return on stocks by acting on the money supply information.

10. The stock price will rise. Even though the company is suffering a loss, the price of the stock reflects an even larger expected loss. When the loss is less than expected, efficient markets theory then indicates that the stock price will rise.
11. No, because this is publicly available information and is already reflected in stock prices. The optimal forecast of stock returns will equal the equilibrium return, so there is no benefit from selling your stocks.
12. Probably not. Although your broker has done well in the past, efficient markets theory suggests that she has probably been lucky. Unless you believe that your broker has better information than the rest of the market, efficient markets theory indicates that you cannot expect the broker to beat the market in the future.
13. No, if the person has no better information than the rest of the market. An expected price rise of 10% over the next month implies over a 100% annual return on Google stock, which certainly exceeds its equilibrium return. This would mean that there is an unexploited profit opportunity in the market, which would have been eliminated in an efficient market. The only time that the person's expectations could be rational is if the person had information unavailable to the market that allowed him or her to beat the market.
14. False. All that is required for the market to be efficient so that prices reflect information on the monetary aggregates is that some market participants eliminate unexploited profit opportunities. Not everyone in a market has to be knowledgeable for the market to be efficient.
15. False. The people with better information are exactly those who make the market more efficient by eliminating unexploited profit opportunities. These people can profit from their better information.
16. Because inflation is less than expected, expectations of future short-term interest rates would be lowered, and as we learned in Chapter 7, long-term interest rates would fall. The decline in long-term interest rates implies that long-term bond prices would rise.
17. True, in principle. Foreign exchange rates are a random walk over a short interval such as a week, because changes in the exchange rate are unpredictable; if a change were predictable, large unexploited profit opportunities would exist in the foreign exchange market. If the foreign exchange market is efficient, these unexploited profit opportunities cannot exist and so the foreign exchange rate will approximately follow a random walk.
18. No, because this expected change in the value of the dollar would imply that there is a huge unexploited profit opportunity (over a 100% expected return at an annual rate). Since rational expectations rules out unexploited profit opportunities, such a big expected change in the exchange rate could not exist.
19. False. Although human fear may be the source of stock market crashes, that does not imply that there are unexploited profit opportunities in the market. Nothing in rational expectations theory rules out large changes in stock prices as a result of fears on the part of the investing public.
20. It may be considered a bubble in that stock market prices rose well above true fundamental values. However, given the relatively new and rapid technology advances during the time, there was a great deal of uncertainty over what the true fundamental values of many technology-related companies were. Thus, even though it might be easy to identify the bubble after the fact, the efficient market hypothesis could still hold in that market participants were at the time acting on the best information available in valuing the stocks, considering much of the technology was new and had seemingly unlimited growth potential.

21. Behavioral finance suggests that when stock prices rise, market participants are less likely to engage in short sales, which would otherwise capture unexploited profit opportunities and push misaligned stock prices back down to fundamental values. This is due to the notion that people are more averse to downside risk than upside risk, and since short sellers can incur nearly unlimited losses, very little short selling occurs in practice. In addition, short selling is sometimes seen as taboo, since it is viewed as profiting off the losses of others.

ANSWERS TO APPLIED PROBLEMS

22. $\$1/(1.15) + \$20/(\tilde{1}.15) = \$18.26$
23. $P_0 = \$3 \times (1.07)/(-0.18 - 0.07) = \29.18
24. The price five years from now should be \$100. This can be found by solving for P_5 below:
 $\$65.88 = \$1/(1 + 0.1) + \$1/(1 + 0.1)^2 + \$1/(1 + 0.1)^3 + \$1/(1 + 0.1)^4 + \$1/(1 + 0.1)^5 + P_5/(1 + 0.1)^5$.
No, the current stock price will not increase by the full dollar. Since the future stock price is discounted by the required return, the current stock price will only increase by $\$1/(1 + 0.1)^5$, or \$0.62.
25. Prior to the split, each share was worth \$5 billion/100 million, or \$50/share. If the split conveys no new information, the market value of the company does not change, remaining at \$5 billion. But with the split, every share becomes three shares, so 300 million shares are outstanding. The new price/share is \$5 billion/300 million, or \$16.67/share. If the actual price is \$17.00/share, the price appears too high. This can be viewed two ways. One possibility is that markets are inefficient—some type of anomaly has occurred, and it's not clear if the market will correct itself. Another possibility is that the stock split actually conveyed information about the company. Investors may believe (possibly incorrectly) that the price/share is expected to increase significantly, and that is why the firm implemented the stock split.

Chapter 8

ANSWERS TO QUESTIONS

1. For each country, the largest (most important) is listed first, and smallest (least important) is listed second, as reported in Figure 1 in the text. United States: Nonbank loans; Stocks. Germany: Bank loans; Bonds. Japan: Bank loans; Stocks. Canada: Bank loans; Stocks. For the United States, bank loans are relatively unimportant, but for the other countries, this makes up a very large part of overall external financing. For these countries (with the exception of the United States), stock and bond financing is relatively unimportant.
2. Financial intermediaries can take advantage of economies of scale and thus lower transactions costs. For example, mutual funds take advantage of lower commissions because the scale of their purchases is higher than for an individual, while banks' large scale allows them to keep legal and computing costs per transaction low. Economies of scale which help financial intermediaries lower transactions costs explains why financial intermediaries exist and are so important to the economy.
3. Financial intermediaries develop expertise in such areas as computer technology so that they can inexpensively provide liquidity services such as checking accounts that lower transactions costs for depositors. Financial intermediaries can also take advantage of economies of scale and engage in large transactions that have a lower cost per dollar of transaction.
4. Investors in financial instruments who engage in information collection face a free-rider problem, which means other investors may be able to benefit from their information without paying for it. Individual investors therefore have inadequate incentives to devote resources to gather information about borrowers who issue securities. Financial intermediaries avoid the free-rider problem because they make private loans to borrowers rather than buy the securities borrowers have issued. Since they will reap all the benefits from the information they collect, their information collection activities will be more profitable. They thus have greater incentive to invest in information collection.
5. During your visit at the bank you will probably realize that you will receive an annual interest rate of 1% or 2% if you buy a certificate of deposit, while an individual asking for a car loan will be required to pay an annual interest rate of 7% or 8%. At the beginning, it seems tempting for you to offer an interest rate of 4%, which would make both of you better off. However, you would probably like to know that individual better, in particular his net worth (to assess his ability to pay you back), or his credit history (has he or she defaulted on a loan before?). This process will probably be time consuming and costly for you. Even if you decide to engage in this transaction anyway, you will probably want to write a contract to be able to recover your money if this individual does not pay you back. As before, this will be costly. Your local bank is much more efficient in dealing with the adverse selection and moral hazard problems created by asymmetric information, so much so that you are better off by buying a certificate of deposit and avoiding all the transaction costs associated with making a loan.
6. Yes, this is an example of an adverse selection problem. Because a person is rich, the people who are most likely to want to marry him or her are gold diggers. Rich people thus may want to be extra careful to screen out those who are just interested in their money from those who want to marry for love.
7. The lemons problem would be less severe for firms listed on the New York Stock Exchange because they are typically larger corporations that are better known in the market place. Therefore it is easier for investors to get information about them and figure out whether the firm is of good quality or is a lemon. This makes the adverse selection–lemons problem less severe.

8. Yes. The person who is putting her life savings into her business has more to lose if she takes on too much risk or engages in personally beneficial activities that don't lead to higher profits. So she will act more in the interest of the lender, making it more likely that the loan will be paid off.
9. To overcome asymmetric information problems, banks screen potential borrowers before making loans (to lessen adverse selection problems), monitor borrowers' financial conditions and how they are using borrowed funds after making loans (to lessen moral hazard problems), insert restrictive clauses into debt contracts to limit borrowers' behavior (to lessen moral hazard), and require collateral against the loans they make (to lessen both adverse selection and moral hazard problems).
10. The government can produce information about borrowers and provide it to investors free of charge, it can require borrowers to report honest information about themselves to investors, and it can set and enforce rules that govern the behavior of financial institutions so they do not take on too much risk. These prudential regulations for banks include banning certain activities and asset categories considered too risky, establishing minimum capital requirements, and requiring disclosure of financial information to regulators and investors.
11. Even though banks are well suited to overcome the adverse selection and moral hazard problems inherent in lending because they make private loans and have incentives to invest in information production about the borrowers to whom they lend, bank depositors face an asymmetric information problem of their own: They do not know as much as bank managers do about how much risk banks are taking and are uncertain about the safety of their deposits and their banks' ability to pay them back in full. If some banks fail because they have become insolvent and cannot repay their deposits, these bank failures increase the uncertainty facing all depositors, who lack the information needed to determine whether their banks (and their deposits) are safe or not. This increase in uncertainty, the result of asymmetric information, can lead to bank runs in which depositors are scrambling to withdraw their deposits before their banks run out of cash, and in extreme cases can lead to a contagion in which a large number of banks fail within a short period of time.
12. Information asymmetries are also present in government bond markets. Usually investors resort to many information sources about the characteristics of particular governments to assess their ability or willingness to honor their debt. As the Argentinean case illustrates, sometimes this lack of information results in huge losses for bondholders. In this respect, the problem is not significantly different from an investor who decides which corporate bond to buy, although it may be fair to say that information about corporate bonds is more standardized (making it easier to compare firms). After the Argentinean default, investors were willing to buy bonds issued by its government only at a significant risk premium, making it very costly for Argentina to raise funds in bond markets.
13. The free-rider problem means that private producers of information will not obtain the full benefit of their information-producing activities, and so less information will be produced. This means that there will be less information collected to screen out good from bad risks, making adverse selection problems worse, and that there will be less monitoring of borrowers, increasing the moral hazard problem.
14. No. If the lender knows as much about the borrower as the borrower does, then the lender is able to screen out the good from the bad credit risks and so adverse selection will not be a problem. Similarly, if the lender knows what the borrower is up to, then moral hazard will not be a problem because the lender can easily stop the borrower from engaging in moral hazard.

15. Standardized accounting principles make profit verification easier, thereby reducing adverse selection and moral hazard problems in financial markets, hence making them operate better. Standardized accounting principles make it easier for investors to screen out good firms from bad firms, thereby reducing the adverse selection problem in financial markets. In addition, they make it harder for managers to over- or understate profits, thereby reducing the principal-agent (moral hazard) problem.
16. Smaller firms that are not well known are the most likely to use bank financing. Because it is harder for investors to acquire information about these firms, it will be hard for the firms to sell securities in financial markets. Banks that specialize in collecting information about smaller firms will then be the only outlet these firms have for financing their activities.
17. Because there is asymmetric information and the free-rider problem, not enough information is available in financial markets. Thus there is a rationale for the government to encourage information production through regulation so that it is easier to screen out good from bad borrowers, thereby reducing the adverse selection problem. The government can also help reduce moral hazard and improve the performance of financial markets by enforcing standard accounting principles and prosecuting fraud.
18. True. If the borrower turns out to be a bad credit risk and goes broke, the lender loses less, because the collateral can be sold to make up any losses on the loan. Thus adverse selection is not as severe a problem.
19. The separation of ownership and control creates a principal-agent problem. The managers (the agents) do not have as strong an incentive to maximize profits as the owners (the principals). Thus the managers might not work hard, might engage in wasteful spending on personal perks, or might pursue business strategies that enhance their personal power but do not increase profits.
20. Although it might seem a good idea to “copy and paste” regulatory frameworks that ensure the soundness of a financial system from one country to the other, this is usually not a good idea. Developed and developing countries have quite different financial systems. Incorporating a system of deposit insurance will surely result in an increase in deposits at financial intermediaries. However, without proper regulations (i.e., prudential regulation and supervision) to limit the moral hazard problems associated with a system of deposit insurance, banks will probably accept more risks than they would otherwise do. This is obviously not a desired consequence. The increase in moral hazard problems will probably offset the benefit derived from avoiding bank runs (the most immediate effect of a system of deposit insurance).
21. Financial intermediaries operating in countries with relatively weak property rights and legal systems usually require a lot of collateral when making loans. The rationale for that behavior is that in the event that the borrower defaults, the bank knows that it will be quite difficult and expensive to recover its loan. Therefore, requesting extra collateral might help the bank speed up the process. In practice, a bank that has requested two other houses as collateral for a mortgage has better chances to recover its loan in the event of default. Of course this means that fewer individuals will have access to mortgages (even those with excellent credit risk are left out), since it is quite difficult to come up with such an amount of collateral (usually having your parents as cosigners and using your parents’ house as collateral is not enough). Inefficient financial systems make access to credit much more difficult in some countries, but it is fair to say that this might be the result of inefficient legal systems. As explained earlier, inefficient financial systems contribute to lower economic growth rates. This example illustrates how difficult it can be for a young individual to buy a house, resulting in less expenditure in residential investment.

ANSWERS TO APPLIED PROBLEMS

22. You are willing to pay the average price. If the distribution of car values is symmetric, you are willing to pay \$22,000 for a randomly selected car.
23. You are willing to pay the average price up front: \$22,000. However, the dealer will know this, and only sell you a car worth between \$20,000 and \$22,000. But you know this. So you will only pay \$21,000. And so on. This ends with you paying \$20,000, and the car being worth \$20,000. This is OK for you, but the dealer can never sell cars worth more than \$20,000. The resolution, of course, is to get more information. This may include a test drive, mechanical inspection, warranty, etc.

24. Let P be the percent of profits you pay Ron. If Ron is lazy, his expected payment is

$$0.60 \times 10,000 P + 0.40 \times 50,000 P = 26,000 P$$

If Ron works hard, his expected payment is

$$0.20 \times 10,000 P + 0.80 \times 50,000 P - 1,000 = 42,000 P - 1,000$$

To induce Ron to work hard, you need

$$42,000 P - 1,000 = 26,000 P$$

$$16,000 P = 1,000$$

$$P = 0.0625$$

So, offer Ron slightly more than 6.25% of the profits, and this should induce him to work hard.

25. *With full insurance:*

Without a seawall, the expected loss is

$$400,000 \times 0.02 = 8,000$$

With a seawall, the expected loss is

$$400,000 \times 0.005 = 2,000$$

The insurance company will charge the expected loss as a premium. Your expected cost under either scenario each year is the premium.

With partial insurance:

Without a seawall, the expected loss is

$$300,000 \times 0.02 = 6,000$$

With a seawall, the expected loss is

$$300,000 \times 0.005 = 1,500$$

The insurance company will charge the expected loss as a premium. Your expected cost each year is:

Without a seawall:

$$[0.02 \times (300,000 - 400,000) + 0.98(0)] - 6,000 = -8,000$$

With a seawall:

$$[0.005 \times (300,000 - 400,000) + 0.98(0)] - 1,500 = -2,000$$

Unfortunately, neither insurance policy is better or worse. Although the premiums under the partial insurance policy are lower, the *expected* cost each year is the same as with full insurance. In either scenario, you will build the seawall if the annual cost of building and maintaining a seawall is less than \$6,000/year.

Chapter 9

ANSWERS TO QUESTIONS

1. Asymmetric information problems (adverse selection and moral hazard) are always present in financial transactions but normally do not prevent the financial system from efficiently channeling funds from lender-savers to borrowers. During a financial crisis, however, asymmetric information problems intensify to such a degree that the resulting financial frictions lead to flows of funds being halted or severely disrupted, with harmful consequences for economic activity.
2. When an asset-price bubble bursts and asset prices realign with fundamental economic values, the resulting decline in net worth means that businesses have less skin in the game and so have incentives to take on more risk at the lender's expense, increasing the moral hazard problem. In addition, lower net worth means there is less collateral and so adverse selection increases. The bursting of an asset-price bubble therefore makes borrowers less credit-worthy and causes a contraction in lending and spending. The asset price bust can also lead to a deterioration in financial institutions' balance sheets, which causes them to deleverage, further contributing to the decline in lending and economic activity.
3. An unanticipated decline in the price level leads to firms' real burden of indebtedness increasing while there is no increase in the real value of their assets. The resulting decline in firms' net worth increases adverse selection and moral hazard problems facing lenders, making it more likely a financial crisis will occur in which financial markets do not work efficiently to get funds to firms with productive investment opportunities.
4. A decline in real estate prices lowers the net worth of households or firms that are holding real estate assets. The resulting decline in net worth means that businesses have less at risk and so have more incentives to take on risk at the lender's expense. In addition, lower net worth means there is less collateral and so adverse selection increases. The decline in real estate prices can thus make borrowers less credit-worthy and cause a contraction in lending and spending. The real estate decline can also lead to a deterioration in financial institutions' balance sheets, which causes them to deleverage, further contributing to the decline in lending and economic activity.
5. If financial institutions suffer a deterioration in their balance sheets and they have a substantial contraction in their capital, they will have fewer resources to lend, and lending will decline. The contraction in lending then leads to a decline in investment spending, which slows economic activity. When there are simultaneous failures of financial institutions, there is a loss of information production in financial markets and a direct loss of banks' financial intermediation. In addition, a decrease in bank lending during a banking crisis decreases the supply of funds available to borrowers, which leads to higher interest rates, which increases asymmetric information problems and leads to a further contraction in lending and economic activity.
6. The failure of a major financial institution, which leads to a dramatic increase in uncertainty in financial markets, makes it hard for lenders to screen good from bad credit risks. The resulting inability of lenders to solve the adverse selection problem makes them less willing to lend, which leads to a decline in lending, investment, and aggregate economic activity.
7. Credit spreads measure the difference between interest rates on corporate bonds and Treasury bonds of similar maturity that have no default risk. The rise of credit spreads during a financial crisis (as occurred during the Great Depression and again during 2007–2009) reflects the escalation of asymmetric

information problems that make it harder to judge the riskiness of corporate borrowers and weaken the ability of financial markets to channel funds to borrowers with productive investment opportunities.

8. Government fiscal imbalances may create fears of default on government debt. As a result, demand from individual investors for the government bonds may fall, causing the government to force financial institutions to purchase them. If the debt then declines in price, as will occur if a government default is likely—financial institutions' balance sheets will weaken and their lending will contract for the reasons described earlier. Fears of default on the government debt can also spark a foreign exchange crisis in which the value of the domestic currency falls sharply because investors pull their money out of the country. The decline in the domestic currency's value will then lead to the destruction of the balance sheets of firms with large amounts of debt denominated in foreign currency. These balance sheet problems lead to an increase in adverse selection and moral hazard problems, a decline in lending, and a contraction of economic activity.
9. With restrictions lifted or the introduction of new financial products, financial institutions often go on a lending spree and expand their lending at a rapid pace. Unfortunately, the managers of these financial institutions may not have the expertise to manage risk appropriately in these new lines of business, leading to overly risky lending. In addition, regulation and government supervision may not keep up with the new activities, further leading to excessive risk taking. When loans eventually go sour, this causes a deterioration in financial institutions' balance sheets, a decrease in lending, and therefore a decrease in economic activity.
10. Weak regulation and supervision mean that financial institutions will take on excessive risk, especially if market discipline is weakened by the existence of a government safety net. When the risky loans eventually go sour, this causes a deterioration in financial institution balance sheets, which then means that these institutions cut back lending and economic activity declines.
11. Answers may vary. Both the Great Depression and the 2007–2009 crisis were preceded by sharp increases in asset prices. During the two episodes, credit spreads widened, the availability of credit shrank, and economic activity sharply declined. The two episodes differ in the source of asset price increases: During the Great Depression, rising stock prices were the trigger, whereas in the recent crisis a housing bubble was the primary trigger. During the Great Depression, many bank failures lead to a bank panic, causing more banks to fail. During the recent crisis, even though the banking system was hit hard and bank failures did occur, they were much less pronounced, and no bank panic occurred. Finally, although both episodes resulted in significant declines in GDP and increases in unemployment, this was much more pronounced during the Great Depression, when unemployment peaked at 25% (as opposed to the recent crisis, in which the unemployment rate reached 10.2%). In part, this is the result of Federal Reserve policymakers trying much more aggressively to contain the financial crisis and reverse the decline in economic activity during the recent crisis than was true during the Great Depression.
12. Answers may vary. In general, it is believed that the country as a whole probably learned from the experience of the Great Depression, and have put in place more sophisticated policy frameworks to help deal with severe economic downturns more effectively. For instance, bank panics, which were widespread during the Great Depression, were virtually nonexistent during the 2007–2009 crisis; this is probably due to bank accounts now being insured by the FDIC, when they were not during the Great Depression. Another factor seems to be the resolve by policymakers not to make the same mistakes made during the Great Depression by instituting more aggressive, swifter policies to avoid any contagion effects that would unnecessarily deepen or lengthen the crisis.

13. The use of data mining to give households numerical credit scores which can be used to predict defaults and the use of computer technology to bundle together many small mortgage loans and cheaply package them into securities. Together both enable the origination of subprime mortgages, which then can be sold off as securities.
14. Because the agent for the investor, the mortgage originator, has little incentive to make sure that the mortgage is a good credit risk.
15. False. Financial engineering may create financial products that are so complex that it can be hard to value the cash flows of the underlying assets for a security or to determine who actually owns these assets. In other words, the increased complexity of structured products can actually destroy information, thereby making asymmetric information worse in the financial system and increasing the severity of adverse selection and moral hazard problems.
16. The decline in housing prices led to many subprime borrowers finding that their mortgages were “underwater” because they owed more on them than their houses were worth. When this happened, struggling homeowners had tremendous incentives to walk away from their homes and just send the keys back to the lender. Defaults on mortgages shot up sharply, causing losses to financial institutions which then deleveraged, causing a collapse in lending.
17. The shadow banking system is composed of hedge funds, investment banks, and other nondepository financial firms that are not subject to the tight regulatory frameworks of traditional banks. Due to the light regulation, they had lower capital requirements (if any at all) and were able to take on significantly more risk than other financial firms. They are important because a large amount of funds flowed through the shadow banking system to support low interest rates, which fueled some of the housing bubble. Because of their large presence in financial markets, when credit markets began tightening, funding from the shadow banking system decreased significantly, which further reduced access to needed credit.
18. During a financial crisis, asset prices fall, oftentimes very rapidly and unexpectedly. This leads to the expectation that asset prices may fall further in the future, and increases the uncertainty over the value of assets put up as collateral. As a result, firms accepting collateral assets require larger and larger haircuts, or discounts on the value of collateral in expectation of future lower values. This requires firms to put up increasingly more collateral for the same loans over time. Due to the falling asset prices and rising haircuts, it becomes a “buyers market” for these rapidly falling assets; any firms needing to raise funds quickly would then be forced to sell assets at a fraction of their original worth.
19. In both the United States and Ireland, soaring real estate prices fueled by sharp increases in mortgage lending as a result of lax credit standards created a housing bubble, which eventually collapsed in 2007. Both countries experienced painful recessions, with unemployment rising to 12.5% in Ireland and 10.2% in the United States.
20. With debt contracts denominated in foreign currency, the debt burden of domestic firms increases when there is an unanticipated decline in the value of the domestic currency. Since assets are typically denominated in domestic currency, there is a resulting deterioration in firms’ balance sheets and a decline in net worth, which then increases adverse selection and moral hazard problems. The increase in asymmetric information problems leads to a decline in investment and economic activity.

21. Because in advanced countries, debt is usually long term. When the price level falls real indebtedness increases, lowering net worth and increasing adverse selection and moral hazard problems. In emerging market countries, debt tends to be very short-term so that a decline in the price level does not raise real indebtedness very much because the debt is repriced so frequently.
22. Capital flows from abroad can fuel a credit boom and excessive risk taking. When the credit boom bursts, there is a deterioration of financial institution balance sheets, which causes a contraction of lending and economic activity.
23. This is primarily due to “liability dollarization” in which financial firms issue debt denominated in dollars (or another stable currency). Thus, when there is a currency crisis and the currency collapses, indebtedness in terms of domestic currency increases, leading to banks and other borrowing financial firms not being able to pay back loans. The resulting loan losses at creditor banks cause them to fail, creating a banking crisis. Hence a currency crisis and a banking crisis go hand in hand.
24. The central banks in most emerging market countries have little credibility as inflation fighters. Thus, a sharp depreciation of the currency after a currency crisis leads to immediate upward pressure on import prices. A dramatic rise in both actual and expected inflation will likely follow, and hence interest rates will rise.
25. When the banking system is in trouble, the government and central bank are now between a rock and a hard place: If they raise interest rates too much, they will destroy their already weakened banks, and if they don’t, they can’t maintain the value of their currency. Once market participants recognize this, they know that the government can’t defend its currency so they have a one-way bet and pile on, selling the currency, leading to a speculative attack and a currency crisis.

Chapter 10

ANSWERS TO QUESTIONS

1. Because if the bank borrows too frequently from the Fed, the Fed may restrict its ability to borrow in the future.
2. The rank from most to least liquid is (c), (b), (a), (d).
3. The \$50 million deposit outflow means that reserves fall by \$50 million to \$25 million. Since required reserves are \$45 million (10% of the \$450 million of deposits), your bank needs to acquire \$20 million of reserves. You could obtain these reserves by either calling in or selling off \$20 million of loans, borrowing \$20 million in discount loans from the Fed, borrowing \$20 million from other banks or corporations, selling \$20 million of securities, or some combination of all of these.
4. The bank would rather have the balance sheet shown in this problem, because after it loses \$50 million due to deposit outflow, the bank would still have excess reserves of \$5 million: \$50 million in reserves minus required reserves of \$45 million (10% of the \$450 million of deposits). Thus the bank would not have to alter its balance sheet further and would not incur any costs as a result of the deposit outflow. By contrast, with the balance sheet in question 3 the bank would have a shortfall of reserves of \$20 million (\$25 million in reserves minus the required reserves of \$45 million). In this case, the bank will incur costs when it raises the necessary reserves through the methods described in the text.
5. Because when a deposit outflow occurs, a bank is able to borrow reserves in these overnight loan markets quickly; thus, it does not need to acquire reserves at a high cost by calling in or selling off loans. The presence of overnight loan markets thus reduces the costs associated with deposit outflows, so banks will hold fewer excess reserves.
6. No. When you turn a customer down, you may lose that customer's business forever, which is extremely costly. Instead, you might go out and borrow from other banks, corporations, or the Fed to obtain funds so that you can make loans to the customer. Alternatively, you might sell negotiable CDs or some of your securities to acquire the necessary funds.
7. To lower capital and raise ROE, holding its assets constant, it can pay out more dividends or buy back some of its shares. Alternatively, it can keep its capital constant, but increase the amount of its assets by acquiring new funds and then seeking out new loan business or purchasing more securities with these new funds.
8. It can raise \$1 million of capital by issuing new stock. It can cut its dividend payments by \$1 million, thereby increasing its retained earnings by \$1 million. It can decrease the amount of its assets so that the amount of its capital relative to its assets increases, thereby meeting the capital requirements.
9. Because ROE, the return on equity, tells stock holders how much they are earning on their equity investment, while ROA, the return on assets, only provides an indication how well the bank's assets are being managed.
10. ROE will fall in half.

11. The benefit is that the bank now has a larger cushion of bank capital and so is less likely to go broke if there are losses on its loans or other assets. The cost is that for the same ROA, it will have a lower ROE, return on equity.
12. In order for a banker to reduce adverse selection she must screen out good from bad credit risks by learning all she can about potential borrowers. Similarly, in order to minimize moral hazard, she must continually monitor borrowers to ensure that they are complying with restrictive loan covenants. Hence it pays for the banker to be nosy.
13. Compensating balances can act as collateral. They also help establish long-term customer relationships, which make it easier for the bank to collect information about prospective borrowers, thus reducing the adverse selection problem. Compensating balances help the bank monitor the activities of a borrowing firm so that it can prevent the firm from taking on too much risk, thereby not acting in the interest of the bank.
14. No, because the bank president is not managing the bank well. The fact that the bank has never incurred costs as a result of a deposit outflow means that the bank is holding a lot of reserves that do not earn any interest. Thus the bank's profits are low, and stock in the bank is not a good investment.
15. False. Although diversification is a desirable strategy for a bank, it may still make sense for a bank to specialize in certain types of lending. For example, a bank may have developed expertise in screening and monitoring borrowers for a particular kind of loan, thus improving its ability to handle problems of adverse selection and moral hazard.
16. You should want to make short-term loans. Then, when these loans mature, you will be able to make new loans at higher interest rates, which will generate more income for the bank.
17. False. If an asset has a lot of risk, a bank manager might not want to hold it even if it has a higher return than other assets. Thus a bank manager has to consider risk as well as the expected return when deciding to hold an asset.
18. Because the off-balance sheet activities mentioned in this chapter, which generate fee income, have become a more important part of banks' business.

ANSWERS TO APPLIED PROBLEMS

19. The T-accounts for the two banks are as follows:

First National Bank			
Assets		Liabilities	
Reserves	–\$50	Checkable Deposits	–\$50
Second National Bank			
Assets		Liabilities	
Reserves	\$50	Checkable Deposits	\$50

20. Reserves drop by \$500. The T-account for the first National Bank is as follows:

First National Bank			
Assets		Liabilities	
Reserves	-\$500	Checkable Deposits	-\$500

21.

Assets		Liabilities	
Required Reserves	\$ 8 million	Checkable Deposits	\$100 million
Excess Reserves	\$48 million	Bank Capital	\$ 6 million
Loans	\$50 million		

22. The bank can purchase \$45 M/\$4,986.70, which is about 9,024 T-bills. The actual cost is \$44,999,980.80.

After the transaction, the balance sheet is:

Assets		Liabilities	
Required Reserves	\$ 8 million	Checkable Deposits	\$100 million
Excess Reserves	\$ 3 million	Bank Capital	\$ 6 million
T-bills	\$45 million		
Loans	\$50 million		

23. $ROE = ROA \times EM$

$$0.15 = 0.01 \times EM$$

$$EM = 15 = \text{assets/equity}$$

So equity/assets = 6.66%. This is a well-capitalized bank.

24. The assets fall in value by \$8 million ($= \$100 \text{ million} \times -2\% \times 4 \text{ years}$) while the liabilities fall in value by \$10.8 million ($= \$90 \text{ million} \times -2\% \times 6 \text{ years}$). Because the liabilities fall in value by \$2.8 million more than the assets do, the net worth of the bank rises by \$2.8 million. The interest-rate risk can be reduced by shortening the maturity of the liabilities to a duration of four years or lengthening the maturity of the assets to a duration of six years. Alternatively, you could engage in an interest-rate swap, in which you swap the interest earned on your assets with the interest on another bank's assets that have a duration of six years.
25. The gap is \$10 million (\$30 million of rate-sensitive assets minus \$20 million of rate-sensitive liabilities). The change in bank profits from the interest rate rise is +\$0.5 million ($5\% \times \10 million); the interest-rate risk can be reduced by increasing rate-sensitive liabilities to \$30 million or by reducing rate-sensitive assets to \$20 million. Alternatively, you could engage in an interest-rate swap in which you swap the interest on \$10 million of rate-sensitive assets for the interest on another bank's \$10 million of fixed-rate assets.

Chapter 11

ANSWERS TO QUESTIONS

1. A government safety net can short-circuit runs on banks and bank panics, and overcome reluctance by depositors to put funds in the banking system. This helps to eliminate a contagion effect, in which both good and bad banks could become insolvent in the event of a bank panic. Without confidence in the banking system, such panics could result in a collapse of the financial system and severely inhibit investment and economic growth.
2. There would be adverse selection, because people who might want to burn their property for some personal gain would actively try to obtain substantial fire insurance policies. Moral hazard could also be a problem, because a person with a fire insurance policy has less incentive to take measures to prevent fire.
3. Eliminating or limiting the amount of deposit insurance would help reduce the moral hazard of excessive risk taking on the part of banks. It would, however, make bank failures and panics more likely, so it might not be a very good idea.
4. The economy would benefit from reduced moral hazard; that is, banks would not want to take on too much risk, because doing so would increase their deposit insurance premiums. The problem is, however, that it is difficult to monitor the degree of risk in bank assets because often only the bank making the loans knows how risky they are.
5. The benefits of a too-big-to-fail policy are that it makes bank panics less likely. The costs are that it increases the incentives for moral hazard by big banks who know that depositors do not have incentives to monitor the banks' risk-taking activities. In addition, it is an unfair policy because it discriminates against small banks.
6. Regulations that restrict banks from holding risky assets directly decrease the moral hazard of risk taking by the bank. Requirements that force banks to have a large amount of capital also decrease the banks' incentives for risk taking, because banks now have more to lose if they fail. Such regulations will not completely eliminate the moral hazard problem, because bankers have incentives to hide their holdings of risky assets from the regulators and to overstate the amount of their capital.
7. Because with higher amounts of capital, banks have more to lose if they take on too much risk. Thus capital requirements make it less likely that banks will take on excessive risk.
8. If the banks that did not need or want the capital injections were not forced to take the capital, then only the weakest banks would be the ones that would have received the needed capital injections to avoid insolvency. This could have started a run on those banks, which then would have accelerated their insolvency problem and created a contagion effect on the rest of the financial system, harming all banks. By forcing all banks to accept capital, this helped to reduce sending unnecessarily adverse signals to investors and depositors of the weakest banks.
9. Because off-balance-sheet activities do not appear on bank balance sheets, they cannot be dealt with by simple bank capital requirements, which are based on bank assets, such as a leverage ratio. Banking regulators have dealt with this problem by imposing an additional risk-based bank capital requirement that banks set aside additional bank capital for different kinds of off-balance-sheet activities.

10. The original Basel Accord takes into account the riskiness of capital, but in practice the risk weights can differ substantially from the actual risk the bank faces. The Basel 2 Accords were created to address this limitation; however, addressing these shortfalls greatly increased the complexity of the accord, and there was substantial delay with countries adopting and implementing the regulations. More specifically, Basel 2 did not require banks to hold adequate capital to survive financial crises. Moreover, risk weights were dependent on credit ratings, which can be unreliable, particularly in financial crises. In addition, Basel 2 implies procyclical capital requirements, whereas countercyclical capital requirements would be more prudent. Also, there is not a sufficient focus on the need for liquidity, which is necessary particularly during financial crises. Basel 3 attempts to address these shortfalls by increasing the quality and quantity of capital requirements, making capital requirements less procyclical, establishing rules on the use of credit ratings, and requiring firms to have access to more stable funding to increase liquidity.
11. Chartering banks helps reduce the adverse selection problem because it attempts to screen proposals for new banks to prevent risk-prone entrepreneurs and crooks from controlling them. It will not always work because risk-prone entrepreneurs and crooks have incentives to hide their true nature and thus may slip through the chartering process.
12. With the advent of new financial instruments, a bank that is quite healthy at a particular point in time can be driven into insolvency extremely rapidly from risky trading in these instruments. Thus, a focus on bank capital at a point in time may not be effective in indicating whether a bank will be taking on excessive risk in the near future. Therefore, to make sure that banks are not taking on too much risk, bank supervisors now are focusing more on whether the risk-management procedures in banks keep them from excessive risk taking that might make a future bank failure more likely.
13. More public information about the risks incurred by banks and the quality of their portfolio helps stockholders, creditors, and depositors to evaluate and monitor banks and pull their funds out if the banks are taking on too much risk. Thus, in order to prevent this from happening banks are likely to take on less risk, and this makes bank failures less likely.
14. (a) Probably not. Since these assets are relatively high risk, the bank is subject to fluctuations in the values of these assets, which can be substantial. This could result in a significant decrease in the value of its assets to the point where it can no longer cover its immediate liabilities, and would become insolvent. It is for this reason that the government places restrictions on the types and amounts of assets that financial institutions can hold. (b) If the housing market crashed, it is likely that many of the mortgage loans would default, and the value of collateral on those loans (the market price of the house) would decline dramatically. If the collateral from the nonperforming loans were valued at historical cost, these would likely be much higher than current or near future mark-to-market values would be. As a result, the bank's apparent capital position would be better off under a historical-cost accounting system. (c) If the price of commodities spiked, this would lead to a significant increase in the value of the bank's assets. In this case, using a mark-to-market valuation would be better. The original price paid for the commodities would be lower, hence a historical valuation would indicate a lower capital position than would be reflected by the actual current liquidation value of the commodities. (d) Although mark-to-market rules can be more efficient in that they generally provide a more accurate picture of a bank's capital position, in severe downturns such as the one experienced during the 2007–2009 crisis they can propagate poorly functioning financial markets by reducing the value of collateral, making access to liquidity more difficult. On the other hand, using historical cost can provide more capital stability for banks; however, as noted, historical-cost basis often does not provide an accurate picture of a bank's capital position.

15. With more competition in financial markets, there are more firms making less profits. Thus, there is greater incentive for financial firms to take on greater risk in an effort to increase profits. Although restrictions on competition would decrease the incentive for risk by financial firms, it may not be altogether beneficial. It is likely that lower competition would result in higher fees to consumers and decreased efficiency of banking institutions.
16. Leverage cycles indicate that over business cycles, lending increases substantially in booms and decreases substantially in downturns. If countercyclical capital requirements were initiated, this would require more capital held at institutions during booms, which would reduce lending and help to mitigate credit bubbles that can be damaging later on. Likewise, when the economy goes into a downturn, capital requirements could be lowered, which would encourage more lending and facilitate faster economic growth.
17. The process of financial innovation is generally good for the economy: Its goal is to create new financial instruments as a response to the ever-changing preferences of financial system participants. One of its most beneficial effects is to increase the efficiency of the financial system. This process also can be risky at times. The creation of new financial instruments is often associated with their mismanagement. Sometimes this can result in the creation of asset-price bubbles, as happened with mortgage-backed securities (or CDOs, or SIVs) in the 2007–2009 crisis. When these instruments are improperly priced, this can disrupt the financial system. Regulators can at best be one step behind in this process, since usually as a profitable opportunity is created (e.g., by trading MBSs, CDOs, etc.) many financial intermediaries will follow this path. Only after there is a thorough understanding of the structure and risk of new financial instruments can proper regulations be written and enforced. But this usually only happens after there is a disruption in the financial system.
18. The S&L crisis can be blamed on the principal-agent problem because politicians and regulators (the agents) did not have the same incentives to minimize costs of deposit insurance as do the taxpayers (the principals). As a result, politicians and regulators relaxed capital standards, removed restrictions on holdings of risky assets, and engaged in regulatory forbearance, thereby increasing the cost of the S&L bailout.
19. One of the main provisions in this section of legislation is the authority to examine and enforce regulations for businesses related to the issuance of residential mortgages. Much of the financial crisis of 2007–2009 was triggered from excesses in the residential housing market in the United States, for instance with the issuance of subprime mortgages, or other types of mortgage structures that would never possibly be repaid in good faith. Had these provisions been in place prior to the housing market crash, it is possible that the effects in the housing market and broader financial markets could have been averted (or could have been much more limited in length and severity).
20. Prior to 2009, the U.S. government had no legal authority to seize the largest failing financial institutions, such as bank holding companies, and liquidate their assets in an orderly fashion. This became apparent during the 2007–2009 crisis, as there was no way for the government to rescue Lehman Brothers and unwind its assets. Since these types of financial institutions are considered systemically important, they pose a risk to the overall financial system because their failure can cause widespread damage. Having resolution authority allows the government to quickly take over a failing firm and wind down its assets, with the health of the overall financial system as a priority.

ANSWERS TO APPLIED PROBLEMS

21. Under the payoff method, large deposits pay better than \$0.90/dollar. In this case, the \$350,000 is worth better than $\$350,000 \times 0.90 = \$315,000$. Under the *purchase and assumption* policy, the bank is completely absorbed, and all accounts are worth their full value. Upfront, the first method will have a lower cost to the insurance fund. However, if depositors fear loss under the payoff method, they are less likely to maintain account balances in excess of \$250,000 in a single bank.
22. Before the commitment, the capital ratio = $6/106 = 5.66\%$. Since the loan commitment is not an accounting transaction yet, the capital ratio is the same after.

Before, the loan commitment, for risk-weighted assets:

Reserves and T-bills have a zero weight. So, \$56 million has zero weight.

Commercial loans carry a 100% weight. RW Assets = \$50 million.

Total risk-weighted assets = \$50 million.

After the loan commitment, risk-weighted assets:

Reserves and T-bills have a zero weight. So \$56 million has zero weight.

Commercial loans carry a 100% weight. RW Assets = \$50 million.

Commercial loan commitments are at 100%. RW Assets = \$10 million.

Total risk-weighted assets = \$60 million.

The actual risk-weighted assets for the loan commitment may vary depending on the terms of the commitment and other factors. However, under the idea of risk-weighted assets, the \$10 million would be correct.

23. (a)

Assets		Liabilities	
Required Reserves	\$10.4 million	Checkable Deposits	\$130 million
Excess Reserves	\$53.6 million	Bank Capital	\$ 9 million
Loans	\$75 million		

- (b) The bank is well capitalized, at $9/139 = 6.47\%$. (c) Reserves have a zero weight. So, \$64 million has zero weight. Residential mortgages carry a 50% weight, which implies \$25 million in risk-weighted assets. Commercial loans carry a 100% weight, which implies another \$25 million in risk-weighted assets; thus total risk-weighted assets is \$50 million. The bank's risk-weighted capital ratio = $9/50 = 18\%$.

24. The sale of each mortgage would be recorded as:

Debit		Credit	
Cash	\$124,798	Mortgages	\$250,000
Loss	\$125,202		

After the fact, the actual balance sheet is:

Assets		Liabilities	
Required Reserves	\$10.4 million	Checkable Deposits	\$130 million
Excess Reserves	\$28.6 million	Bank Capital	–\$ 16 million
Loans	\$75 million		

Now, the true state of the bank's position is realized; bank capital is now negative, so the bank is in a dire capital position.

25. The effect of the capital injection and bank run are shown in the balance sheet below:

Assets		Liabilities	
Required Reserves	\$ 8 million	Checkable Deposits	\$100 million
Excess Reserves	\$26 million	Bank Capital	\$ 9 million
Loans	\$75 million		

The bank now has a $9/109 = 8.3\%$ capital ratio; it is again well capitalized. With the run on the bank, checkable deposits fall to \$100 million. In order to have a bank capital ratio of 10%, it must be the case that $0.10 = BC/(100 + BC)$, where BC represents the required level of bank capital. Solving for BC yields a level of bank capital needed of \$11.1 million. Thus, the regulators would need to inject an additional \$2.1 million to reach a 10% capital ratio.

Chapter 12

ANSWERS TO QUESTIONS

1. Agricultural and other interests in the United States were quite suspicious of centralized power and thus opposed the creation of a central bank.
2. Throughout most of the history of banking in the United States, there has been a fear of centralized banking power. As a result all banks had been chartered locally by each state. Due to lax regulation by some states, banks regularly failed due to lack of sufficient capital or fraud. To stabilize the banking system, the federal government introduced the National Banking Act of 1863, which created a system of federally chartered banks which were subject to greater regulation and scrutiny. Since federally chartered banks were less prone to failure, they increased in number over the years. However, the skepticism of centralized power in the banking system still allowed state banks to operate effectively. And although there have been attempts over the years to force all banks to be federally chartered, due to more uniformity in the chartering process, the distinctions between state and federally chartered banks have diminished, and so the two standards are still in operation today.
3. During the Great Depression there were many bank failures, and at the time deposits were not insured so many bank customers lost their deposits. One of the provisions of the Act was to create the FDIC, which guaranteed deposits up to a certain amount if the bank fails. A second provision of the Act was to separate investment banking functions from commercial banking. This was as a response to the view that investment banking activities created too much risk, and was responsible for many of the bank failures that occurred.
4. (a) Office of the Comptroller of the Currency; (b) the Federal Reserve; (c) state banking authorities and the FDIC; (d) the Federal Reserve; (e) Office of Thrift Supervision ; (f) National Credit Union Administration.
5. Large fluctuations in interest rates during the 1970s and 1980s led to a need for financial products that could help reduce risk related to unexpected interest rate fluctuations. Two examples of this type of innovation are adjustable-rate mortgages and financial derivatives, both developed during the 1970s.
6. New technologies such as electronic banking facilities are frequently shared by several banks, so these facilities are not classified as branches. Thus they can be used by banks to escape limitations on offering services in other states and, in effect, to escape limitations from restrictions on branching.
7. Uncertain. The invention of the computer did help lower transaction costs and the costs of collecting information, both of which have made other financial institutions more competitive with banks and have allowed corporations to bypass banks and borrow directly from securities markets. Therefore, computers were an important factor in the decline of the banking system. However, another source of the decline in the banking industry was the loss of cost advantages for the banks in acquiring funds, and this loss was due to factors unrelated to the invention of the computer, such as the rise in inflation and its interaction with regulations, which produced disintermediation.
8. True. Higher inflation helped raise interest rates, which caused the disintermediation process to occur and helped create money market mutual funds. As a result, banks lost cost advantages on the liabilities side of their balance sheets, leading to a less healthy banking industry. However, improved information technology would still have eroded the banks' income advantages on the assets side of their balance sheet, so the decline in the banking industry would still have occurred.

9. With a sweep account, any account funds left at the end of the business day are technically transferred to another account, which is invested in overnight securities. Since they are no longer classified as checkable deposits, the funds are not subject to reserve requirements. Money market mutual funds are set up such that deposits are used to invest in short-term money market securities. And although money market mutual fund accounts have check writing functions like checkable deposits, they are also not subject to reserve requirements.
10. Money market mutual funds are not subject to reserve requirements and so they avoid the tax effect of reserve requirements and have a cost advantage over banks in acquiring funds. Eliminating reserve requirements would reduce the cost advantage of money market mutual funds and would significantly reduce their size.
11. Since the banking sector is so heavily regulated, there is a strong incentive for banks to find ways to skirt regulations that restrict their ability to earn profits. Through loophole mining, banks can create new financial products which allow them to operate within existing regulations, but make (or increase) profits that were stifled due to regulation.
12. The rise in inflation and the resulting higher interest rates on alternatives to checkable deposits meant that banks had a big shrinkage in this low-cost way of raising funds. The innovation of money market mutual funds also meant that the banks lost checking account business. The abolishment of Regulation Q and the appearance of NOW accounts did help decrease disintermediation, but raised the cost of funds for American banks, which now had to pay higher interest rates on checkable and other deposits. Foreign banks were also able to tap a large pool of domestic savings, thereby lowering their cost of funds relative to American banks.
13. The growth of the commercial paper market and the development of the junk bond market meant that corporations were now able to issue securities rather than borrow from banks, thus eroding the competitive advantage of banks on the lending side. Securitization has enabled other financial institutions to originate loans, again taking away some of the banks' loan business.
14. False. Although there are many more banks in the United States than in Canada, this does not mean that the American banking system is more competitive. The reason for the large number of U.S. banks has been anticompetitive regulations such as restrictions on banking.
15. Because restrictions on branching are stricter for commercial banks than for savings and loans. Thus small commercial banks have greater protection from competition and are more likely to survive than small savings and loans.
16. Credit unions are small because they only have members who share a common employer or are associated with a particular organization.
17. Because becoming a bank holding company allows a bank to: (a) circumvent branching restrictions since it can own a controlling interest in several banks even if branching is not permitted, and (b) engage in other activities related to banking that can be highly profitable.
18. One advantage is increased efficiency of the banking industry as consolidation occurs. Another advantage is a convenience factor for bank customers: Depositors can have access to account banking services outside of their home state. Perhaps most importantly, interstate banking allows banks to have geographical diversification of their loan portfolios, which can help alleviate localized bank failures. Disadvantages are that it tends to reduce competition as consolidation occurs, creating a few larger

banks at the expense of many smaller banks. As a result, many smaller community banks, which are thought to be an important source of credit for small businesses, may go out of business. In addition, it is worried that as banks expand into new geographical markets, they may take on increased risk, which could lead to bank failures.

19. Brokerage firms began to engage in the traditional banking business of issuing deposit instruments, while foreign bank activities in the United States further eroded the competitive position of U.S. banks. This led to the Federal Reserve's allowing bank holding companies to enter the underwriting business through a loophole in Glass-Steagall in order to keep them competitive. Finally, legislation in 1999 was passed to repeal Glass-Steagall.
20. The Gramm-Leach-Bliley Act opened the door to consolidation, not only in terms of the number of banking institutions, but also across financial service activities. Banking institutions have thus become larger and increasingly complex organizations, engaging in the full gamut of financial services activities.
21. There are three main factors which have contributed to rapid growth in international banking: The growth in international trade and expansion of multinational corporations; the increased profitability of global investment banking; and the expansion of dollar-denominated deposits abroad (eurodollars).
22. International banking has been encouraged by giving special tax treatment and relaxed branching regulations to Edge Act corporations and to international banking facilities (IBFs); this was done to make American banks more competitive with foreign banks. The hope is that it will create more banking jobs in the United States.
23. IBFs encourage American and foreign banks to do more banking business in the United States, thus shifting employment from Europe to the United States.
24. No, because the foreign-owned bank is subject to the same regulations as the American-owned bank.
25. Because of tighter regulation in the United States compared to the rest of the world, there are many more banks, which has kept even the largest banks in the United States relatively small compared to those in other countries. In addition, the United States has been slower to consolidate in the banking sector than most other countries. However, as the banking sector continues toward consolidation, it is likely that the size of the largest U.S. banks will grow.

Chapter 13

ANSWERS TO QUESTIONS

1. Because of traditional American hostility to a central bank and centralized authority, the system of 12 regional banks was set up to diffuse power along regional lines.
2. When the Federal Reserve districts were created in 1913, the districts were drawn up to reflect roughly equal populations and economic interests that prevailed at the time. Since the West coast was so sparsely populated relative to the East coast, this implied a much larger area in the 12th district, as compared to New York's 2nd district.
3. In theory it sounds sensible to redraw the districts to reflect the larger economic interests and population movements to western and southern states since the original Federal Reserve Act of 1913. However, in practice this would require Congress to rewrite the Federal Reserve Act and redraw the boundaries, which could create more opportunities for political interests to interfere with the monetary policy process and could take a long time to resolve.
4. True. Like the U.S. Constitution, the Federal Reserve System, originally established by the Federal Reserve Act, has many checks and balances and is a peculiarly American institution. The ability of the twelve regional banks to affect discount policy was viewed as a check on the centralized power of the Board of Governors, just as states' rights are a check on the centralized power of the federal government. The provision that there be three types of directors (*A*, *B*, and *C*) representing different groups (professional bankers, business people, and the public) was again intended to prevent any group from dominating the Fed. The Fed's independence from the federal government and the setting up of the Federal Reserve banks as incorporated institutions were further intended to restrict government power over the banking industry.
5. The Board of Governors sets reserve requirements and the discount rate; the FOMC directs open market operations. In practice however, the FOMC helps make decisions about reserve requirements and the discount rate.
6. The Federal Reserve Banks influence the conduct of monetary policy through their administration of the discount facilities at each bank and by having five of their presidents sit on the FOMC, the main policymaking arm of the Fed.
7. This is important since, even if they are currently non-voting members, it gives them an opportunity to provide information on the health of the economy in their region, which could be quite different from other regions, giving important context to any policy decision.
8. The New York Fed plays an extremely important role in the functioning of the Federal Reserve and monetary policy. Its district contains many of the largest commercial banks in the country, has regulatory authority over bank holding companies, and is very close to most financial market operations, so the New York Fed can maintain close monitoring of how the economy and financial markets are operating. In addition, the open market desk is housed at the New York Fed, which is tasked with executing the directives of monetary policy open market operations. In this capacity, the New York Fed interfaces directly with bond and foreign exchange dealers. In addition, it is a member of the Bank for International Settlements, and houses the largest gold deposit in the United States. For these reasons, the New York Fed is extremely important, and is always given a vote at FOMC deliberations.

9. Some may argue that the presidents of the regional Federal Reserve banks should be nominated and go through the same formal process as those on the Board of Governors, to ensure that they are qualified and will serve in a capacity that furthers the interests of the public. After all, the presidents of the regional Federal Reserve banks participate in monetary policy decisions either as voting or non-voting members on the FOMC, so they can have an influential role in policy matters. Moreover, some worry that because banks within the region help decide who will be their district Fed president, conflicts of interest could result since the district Federal Reserve bank has oversight responsibility of those banks. However, setting up a formal political appointment and approval process could be lengthy, and leave many district Federal Reserve banks without leadership for quite some time, which could create more problems than it solves.
10. The 14-year terms do not completely insulate the governors from political influence. The governors know that their bureaucratic power can be reined in by congressional legislation and so must still curry favor with both Congress and the president. Moreover, in order to gain additional power to regulate the financial system, the governors need the support of Congress and the president to pass favorable legislation.
11. Since members on the Board of Governors must be appointed by the president and confirmed by the Senate, the political process involved with empty seats being filled can sometimes be arduous and lengthy, particularly if the Senate majority is from the opposite party of the presidency. Thus finding qualified people who are willing to serve, and endure the vetting process, can be difficult sometimes.
12. The president can influence the Fed in several ways. For one, the president can influence Congress, which has in the past threatened legislation to reduce independence of the Fed in various ways. Also, it is not uncommon for a president to appoint several members to the Board of Governors, so the president has the opportunity to pick people who may have particular economic ideologies. Also, the president can appoint a new chair of the Board of Governors every four years; although the previous chair can fill out his or her term on the Board, tradition dictates that they are usually expected to resign.
13. Even though each person on the FOMC gets one vote, the policy deliberations will undoubtedly reflect the preferences of the chairman. For one, the Chair is the face of monetary policy, so if his or her recommendations get voted down on important policy matters, this could create a great amount of uncertainty among the public and financial markets. Moreover, the Chair sets the agenda, and chooses staff for research and analysis purposes, so he or she has an opportunity to shape the way a meeting evolves, as well as present data that would support his or her recommendation well.
14. It has a high degree of instrument independence in the sense that it can choose any method it wants in order to achieve a given set of policy objectives. This has taken the form of adjusting the money supply in the past, however the Fed now (along with most other central banks) chooses to use a short-term interest rate as its main policy instrument. The Fed has a fair amount of goal independence, despite the objectives of “maximum employment” and “low, stable prices” because it has a lot of latitude in interpreting exactly what “maximum employment” and “low, stable prices” actually means. In many other countries, goal independence is much lower, particularly for countries with a formal inflation target, which may be mandated by the government.
15. The Fed is more independent because its substantial revenue from securities and discount loans allows it to control its own budget.
16. The threat that Congress will acquire greater control over the Fed’s finances and budget.

17. On the one hand, if the Fed were subject to additional scrutiny, particularly on policy matters, it is possible that the prospects of policy auditing could place implicit pressure on the Fed to pursue (or not pursue) particular policies for political reasons. This could make the Fed less independent, leading to less desirable economic outcomes. On the other hand, auditing the Fed makes it more accountable, which is consistent with democratic principles.
18. The theory of bureaucratic behavior indicates that the Fed will want to acquire as much power as possible by requiring all banks to become members. Although the Fed did not succeed in obtaining legislation requiring all banks to become members of the system, it was successful in getting Congress to legislate extension of many of the regulations that were previously imposed solely on member banks (for instance, reserve requirements) to all other depository institutions. Thus the Fed was successful in extending its power.
19. False. Maximizing one's welfare does not rule out altruism. Operating in the public interest is clearly one objective of the Fed. The theory of bureaucratic behavior merely points out that other objectives, such as maximizing power, also influence Fed decision making.
20. Eliminating the Fed's independence might make it more shortsighted and subject to political influence. Thus, when political gains could be achieved by expansionary policy before an election, the Fed might be more likely to engage in this activity. As a result, more pronounced political business cycles might result.
21. False. The Fed is still subject to political pressure, because Congress can pass legislation limiting the Fed's power. If the Fed is performing badly, Congress can make the Fed accountable by passing legislation that the Fed does not like.
22. Uncertain. Although independence may help the Fed take the long view, because its personnel are not directly affected by the outcome of the next election, the Fed can still be influenced by political pressure. In addition, the lack of Fed accountability because of its independence may make the Fed more irresponsible. Thus it is not absolutely clear that the Fed is more farsighted as a result of its independence.
23. The argument for not releasing the FOMC minutes immediately is that it keeps Congress off the Fed's back, thus enabling the Fed to pursue an independent monetary policy that is less subject to inflation and political business cycles. The argument for releasing the minutes immediately is that it would make the Fed more accountable. And as will be seen in later chapters, increased transparency can help develop market expectations that help to further promote the objectives of monetary policy actions.
24. The ECB is more independent than the Fed because its charter can only be changed by revision of the Maastricht Treaty, a very difficult process because all signatories to the treaty must agree to accept any proposed change, while the Fed's charter can be changed by legislation, which is much easier to do. On the other hand, the goal for the ECB is more clearly specified than it is for the Fed because the Maastricht Treaty states that the overriding long-run goal of the ECB is price stability, although it doesn't specify exactly what "price stability" means.
25. Prior to 1997, the Bank of England had very little independence, since interest rate policy was determined exclusively by Her Majesty's Treasury (Chancellor of the Exchequer).

Chapter 14

ANSWERS TO QUESTIONS

- (a) Public: Assets rise by \$10,000 due to automobile purchase, liabilities rise by \$10,000 due to loan. Banks: Assets rise by \$10,000 due to loan; this is offset by a decrease in reserves assets of \$10,000.

(b) Public: Assets are unaffected (\$400 increase in checking deposits is offset by a \$400 decrease in currency holdings). Banks: Assets increase by \$400 from reserves; liabilities increase by \$400 due to checking account balance. Fed: Liabilities are unaffected (reserves increase by \$400, currency decreases by \$400).

(c) Banks: Assets increase by \$1,000,000 in reserves; liabilities increase by the same amount due to borrowing from the Fed. Fed: Assets increase by the \$1,000,000 from the loan; liabilities increase by \$1,000,000 due to the increase in reserves.

(d) Assets and liabilities of the banking system as a whole are unaffected; however, individual banks' balance sheets will change due to the loan.

(e) Public: Assets rise by the value of the meal of \$100, and are offset by a fall in assets due to lower checking account balances of \$100. Assets and liabilities of the banking system as a whole are unaffected; however, individual banks' balance sheets will change as funds are transferred from your bank account to the restaurant's bank account.
- None. Since there are no loans created from the new reserves, no additional deposit creation will occur.
- Checkable deposits will remain the same.
- Reserves will decrease by \$1000, checkable deposits will decrease by \$1000, but the monetary base will be unchanged, since reserves decrease by the same amount as currency increases.
- None. The reduction of \$10 million in discount loans and increase of \$10 million of bonds held by the Fed leaves the level of reserves unchanged so that checkable deposits remain unchanged.
- The deposit of \$100 in the bank increases its reserves by \$100. This starts the process of multiple deposit expansion, leading to an increase in the money supply.
- False. Even though it can control the monetary base fairly precisely through open market operations, it has much less control over the amount of bank reserves in the system because banks decide how much to borrow from the fed, while the public decides how much currency it wants to hold relative to deposits, both of which affect the amount of bank reserves. In addition, float and Treasury deposits can unexpectedly change the amount of reserves in the banking system, which is essentially out of the control of the Fed.
- False. Since the Fed cannot control the amount of discount lending to financial institutions, it does not have perfect control over the amount of reserves, and hence does not have perfect control over the monetary base.
- Both the Fed's purchase of \$100 million of bonds (which raises the monetary base) and the lowering of the required reserve ratio (which increases the amount of multiple expansion and raises the money multiplier) lead to a rise in the money supply.
- (a) The central bank can affect the money supply through open market operations, which changes the nonborrowed monetary base. It can also affect the monetary base, and hence money supply by issuing loans to financial institutions, which increases borrowed reserves. Finally, the central bank can change reserve requirements, which affects the money multiplier, and hence the money supply for a given

monetary base. (b) Banks can affect the money supply through their holdings of excess reserves; less excess reserves means more loans, and hence a greater money supply. (c) Depositors can influence the money supply through their holdings of currency versus deposits. A higher currency-deposit ratio leads to a lower money multiplier, and hence a lower money supply for a given monetary base.

11. False. As the formula in Equation (4) indicates, if $rr + e$ is greater than 1, the money multiplier can be less than 1. In practice, however, e is so small that $rr + e$ is less than 1 and the money multiplier is greater than 1.
12. A financial panic would probably decrease the money multiplier and the money supply, for a given monetary base. In a financial panic, you would expect banks to want to make less risky loans, and have more liquidity on hand, which would increase the excess reserve ratio and decrease the money multiplier. In addition, depositors may get worried about the health of banks, and increase their holdings of currency, which also would decrease the money multiplier.
13. Both of these factors worked to reduce the money multiplier. This can be seen in Figure 3 in the chapter, which indicates a dramatically declining money supply, while the monetary base grew modestly, if at all.
14. Paying interest on reserves gives banks incentive to hold more reserves rather than lend them out, which should raise the excess reserve ratio, reduce the money multiplier, and reduce the money supply, holding the monetary base constant.
15. The difference is that the monetary base increased dramatically during the recent financial crisis, which was more than enough to offset the fall in the multiplier. During the Great Depression, the monetary base rose modestly, if at all.

ANSWERS TO APPLIED PROBLEMS

16. Reserves and the monetary base fall by \$2 million, as the following T-accounts indicate:

First National Bank			
Assets		Liabilities	
Reserves	−\$2 million		
Securities	+\$2 million		
Federal Reserve System			
Assets		Liabilities	
Securities	−\$2 million	Reserves	−\$2 million

17. Reserves are unchanged, but the monetary base decreases by \$2 million due to the currency reduction, as the following T-accounts show:

Irving the Investor			
Assets		Liabilities	
Currency	−\$2 million		

Securities	+\$2 million		
Federal Reserve System			
Assets		Liabilities	
Securities	−\$2 million	Currency	−\$2 million

18. The initial effect of the loans on the banking system, Federal Reserve, and public are shown below.

Banking System (all five banks)			
Assets		Liabilities	
Reserves	+\$100 million	Loans (borrowings from the Fed)	+\$100 million
Federal Reserve System			
Assets		Liabilities	
Loans (borrowings from the Fed)	+\$100 million	Reserves	+\$100 million
Public			
Assets		Liabilities	
No change		No change	

After the public withdraws \$50 million in deposits to hold as currency, the T-accounts look like this:

Banking System (all five banks)			
Assets		Liabilities	
Reserves	+\$50 million	Loans (borrowings from the Fed)	+\$100 million
		Checkable Deposits	−\$ 50 million
Federal Reserve System			
Assets		Liabilities	
Loans (borrowings from the Fed)	+\$100 million	Reserves	+\$50 million
		Currency	+\$50 million
Public			
Assets		Liabilities	
Checkable Deposits	−\$50 million		
Currency	+\$50 million		

19. The initial effect of the loans provided by the Fed is shown in the T-accounts below:

Federal Reserve System			
Assets		Liabilities	
Loans (borrowings from the Fed)	+\$1 million	Reserves	+\$1 million

Banking System			
Assets		Liabilities	
Reserves	+\$1 million	Loans (borrowings from the Fed)	+\$1 million

After the banks receive the reserves, those excess reserves are loaned out; through multiple deposit creation, the increase in reserves of the banking system will support \$10 million in new loans and checkable deposits, increasing the money supply by \$10 million. The final effect of the multiple deposit creation is shown in the T-accounts below:

Federal Reserve System			
Assets		Liabilities	
Loans (borrowings from the Fed)	+\$1 million	Reserves	+\$1 million

Banking System			
Assets		Liabilities	
Reserves	+\$ 1 million	Loans (borrowings from the Fed)	+\$ 1 million
Loans	+\$10 million	Checkable Deposits	+\$10 million

20. The Fed sale of bonds to the First National Bank reduces reserves by \$2 million. The net result is that checkable deposits in the banking system decline by \$20 million. The initial effect on the Fed and the banking system is shown below:

Federal Reserve System			
Assets		Liabilities	
Securities	-\$2 million	Reserves	-\$2 million

Banking System			
Assets		Liabilities	
Securities	+\$2 million		
Reserves	-\$2 million		

After the decline in bank reserves, the multiple deposit creation process works in reverse, so the final effect on the Fed and banking system balance sheets is shown below:

Federal Reserve System			
Assets		Liabilities	
Securities	−\$2 million	Reserves	−\$2 million

Banking System			
Assets		Liabilities	
Securities	+\$ 2 million	Checkable Deposits	−\$20 million
Reserves	−\$ 2 million		
Loans	−\$20 million		

21. The total increase in checkable deposits is only \$5 million, substantially less than the \$10 million that occurs when no excess reserves are held. The reason is that banks now end up holding 20% of deposits as reserves and only lend out 80%, so that the increase in deposits found in the T-accounts is $\$1,000,000 + \$800,000 + \$640,000 + \$512,000 + \$409,600 + \dots = \5 million. The T-accounts below show the effect of the securities purchase:

Federal Reserve System			
Assets		Liabilities	
Securities	+\$1 million	Reserves	+\$1 million

Banking System			
Assets		Liabilities	
Securities	−\$1 million		
Reserves	+\$1 million		

After the increase in reserves and the multiple deposit creation process, the Fed and Banking system balance sheets are as follows:

Federal Reserve System			
Assets		Liabilities	
Securities	+\$1 million	Reserves	+\$1 million

Banking System			
Assets		Liabilities	
Securities	−\$1 million	Checkable Deposits	+\$5 million
Reserves	+\$1 million		
Loans	+\$5 million		

22. The banking system is still not in equilibrium because there continues to be \$100 million of excess reserves (+\$1 billion of reserves minus \$900 million of required reserves, 10% of the \$9 billion of deposits). The excess reserves will be lent out until equilibrium is reached with an additional \$1 billion of checkable deposits. The T-account for the banking system when it is in equilibrium is as follows:

Banking System			
Assets		Liabilities	
Reserves	+\$ 1 billion	Loans (borrowings from the Fed)	+\$ 1 billion
Loans	+\$10 billion	Checkable deposits	+\$10 billion

23. Checkable deposits will decrease by \$50 million when the banking system is in equilibrium (as a result of the \$5 million decrease in reserves supporting the money supply). The T-account is shown below:

Banking System			
Assets		Liabilities	
Reserves	–\$ 5 million	Checkable deposits	–\$50 million
Securities	+\$ 5 million		
Loans	–\$50 million		

24. The Fed's sale of \$1 million of bonds shrinks the monetary base by \$1 million, and the reduction of borrowing from the Federal Reserve lowers the monetary base by another \$1 million. The resulting \$2 million decline in the monetary base leads to a decline in the money supply.
25. (a) The money supply is given as $M = C + D = \$600 \text{ billion} + \$900 \text{ billion} = \$1500 \text{ billion}$; $c = C/D = 600/900 = 0.667$; $e = ER/D = 15/900 = 0.017$; $m = (1 + c)/(rr + e + c) = 1.667/0.783 = 2.13$. (b) The monetary base will increase to $\$600 + \$90 + \$15 + \$1400 = \$2105 \text{ billion}$; given the money multiplier calculated in part (a), this implies the money supply should increase to $\$2105 \times 2.13 = \4483.65 billion . (c) $ER = \$1415 \text{ billion}$; $e = \$1415/\$900 = 1.57$; $m = (1 + 0.667)/(0.1 + 1.57 + 0.667) = 0.71$. The money supply is still \$1500 billion, since both currency and deposits have not changed. (d) The results from part (c) demonstrate that if large amounts of reserves enter the banking system but are held as excess reserves, it is possible for the money multiplier to fall below one.

Chapter 15

ANSWERS TO QUESTIONS

1. The snowstorm would cause float to increase, which would increase the monetary base. To counteract this effect, the manager will undertake a defensive open market sale of securities using a reverse repo transaction.
2. When the public's holding of currency increases during holiday periods, the currency–checkable deposits ratio increases and the money supply falls. To counteract this decline in the money supply, the Fed will conduct a defensive open market purchase of securities.
3. As we saw in Chapter 14, when the Treasury's deposits at the Fed fall, the monetary base increases. To counteract this increase, the manager would undertake an open market sale of securities.
4. Because the decrease in float is only temporary, the monetary base is expected to decline only temporarily. A repurchase agreement only temporarily injects reserves into the banking system, so it is a sensible way of counteracting the temporary decline in the monetary base due to the decline in float.
5. False. The Fed also can affect the level of borrowed reserves by directly limiting the amount of loans to an individual bank or the broader financial system.
6. Uncertain. In theory, the market for reserves model indicates that once the fed funds rate reaches the discount rate, it would never surpass the discount rate since banks would then borrow directly from the Fed, and not in the fed funds market, which would prevent the fed funds rate from ever rising above the discount rate. However, in practice, the fed funds rate can (and has) been above the discount rate. This may occur due to the stigma associated with banks borrowing directly from the Fed; i.e., banks may prefer to pay a higher market rate than to borrow directly from the Fed and incur the perceived stigma. In addition, nonbank financial institutions, which do not have access to the discount window, can and do participate in the federal funds market. The extent to which nonbank financial companies participate in the fed funds market may mean that the gap when the fed funds rate is above the discount rate may not be arbitrated away.
7. Uncertain. In theory, the market for reserves model indicates that once the fed funds rate reaches the interest rate on reserves, it would never go below this rate since banks could then earn a risk-free interest rate paid directly from the Fed, rather than loaning excess reserves in the more risky fed funds market at an equivalent or lower rate; this should prevent the fed funds rate from ever falling below the interest rate paid on reserves. However, in practice, the fed funds rate can (and has) been below the interest rate paid on reserves. This is because nonbank financial institutions, which cannot earn interest on reserves, participate in the federal funds market and provide a significant amount of funding to the market. The extent to which nonbank financial companies participate in the fed funds market may mean that the gap when the fed funds rate is below the interest rate on reserves may not be arbitrated away.
8. During crises, the Fed may need to provide a large amount of liquidity to the banking and financial system, which would reduce the fed funds rate. If the Fed needs to sterilize these effects, it would need to conduct open market sales of securities to maintain a given fed funds rate target. If the liquidity provision is large, then offsetting the liquidity could eventually result in the Fed running out of securities to sell. In this case, the interest rate on reserves can be raised to push the fed funds rate

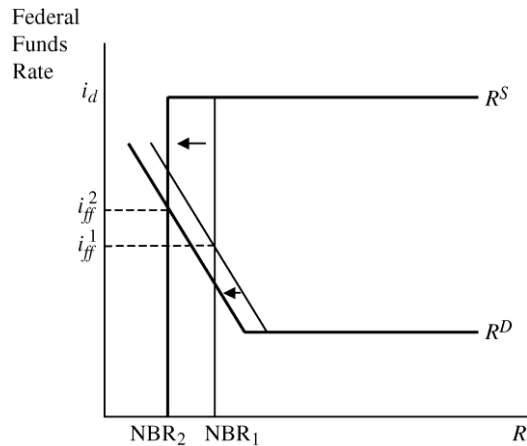
up, without having to conduct offsetting open market sales that decrease the holdings of government securities by the Fed.

9. Repurchase agreements are used because they are temporary, and allow the Fed to adjust open market operations relatively easy in response to day-to-day changes in conditions in the market for reserves.
10. It suggests that defensive open market operations are far more common than dynamic operations because repurchase agreements are used primarily to conduct defensive operations to counteract temporary changes in the monetary base.
11. Because of the large amount of liquidity in banks and the financial system, this could eventually lead to substantial inflation problems as liquidity in the form of excess reserves leaves the banking system through bank lending and ends up as deposits or currency in the hands of the public. But because of the longer maturities of some of the assets held by the Fed, these assets may not be easily drawn off the balance sheet in order to remove liquidity from banks and financial markets. As a result, reverse repos could be used to temporarily but continually remove reserves from the banking system until the longer maturity securities can be drawn off the balance sheet of the Fed.
12. This statement is false. The FDIC alone would likely be ineffective in eliminating bank panics without the Fed's ability to provide discount loans to troubled banks to keep bank failures from spreading. In particular, the FDIC's insurance only covers about 1% of total bank deposits. Since the Fed has unlimited ability to provide loans to the banking system, it can be much more effective in stabilizing the banking system in a panic.
13. Providing loans to financial institutions creates a moral hazard problem. If firms know that they will have access to Fed loans, they are more likely to take on risk, knowing that the Fed will bail them out if a panic should occur. As a result, banks that deserve to go out of business because of poor management may survive because of Fed liquidity provision to prevent panics. This might lead to an inefficient banking system with many poorly run banks.
14. Most likely not. If the federal funds rate target is initially below the discount rate and the decline in the discount rate still leaves it above the federal funds target, then the shift in the supply curve has no effect on the federal funds rate. However, the Fed usually moves the discount rate in line with changes in the federal funds rate target, so that changes in the discount rate provide no additional information about the direction of monetary policy separate from what the fed funds rate target demonstrates.
15. When interest rates rise during a boom, if they rise above the discount rate, there will be borrowing from the discount window and the level of borrowed reserves will increase. The result is a rise in the monetary base and the money supply during a boom. Similarly, during a recession, if market interest rates were above the discount rate, then when they fall, there will be less borrowing from the discount window and the monetary base will fall, leading to a decline in the money supply. The procyclical movement of the money supply would be undesirable because it would be expansionary when the economy is booming and contractionary when the economy is going into recession.
16. False. As the analysis in the market for reserves demonstrates, central banks can still tightly control interest rates by putting in place standing facilities where the difference between the interest rate paid on reserves kept at the central bank and the interest rate charged by the Fed to banks is kept small.
17. One problem with this proposal is that it provides perfect control over the official measure of the money supply, but it may weaken control over the measure of the money supply that is economically relevant. An additional problem is that it will result in a costly restructuring of the financial system, as banks are forced to get out of the loan business.

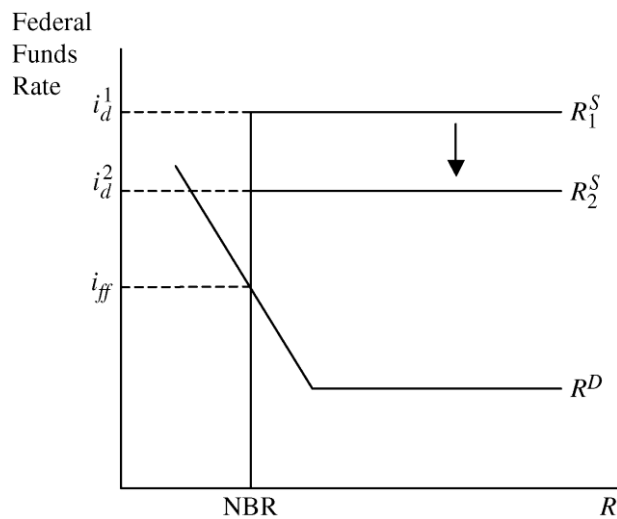
18. Open market operations are more flexible, reversible, and faster to implement than the other two tools. Discount policy is more flexible, reversible, and faster to implement than changing reserve requirements, but it is less effective than either of the other two tools.
19. It proved to be more widely used because the interest rate on these loans was set through a competitive process, and that interest rate was less (in some cases much less) than the discount rate. In addition, because of the structure of the Term Auction Facility there was some anonymity in the banks that were accessing these funds, which helped to avoid the stigma associated with discount window lending.
20. Since short-term interest rates cannot be lowered below the zero bound in this environment, conventional monetary policy would be ineffective. Thus, the main advantage of quantitative easing is that purchases of intermediate and longer term securities could reduce longer-term interest rates, increase the money supply further, and lead to expansion. One disadvantage of quantitative easing is that it may not actually have the effect of increasing economic activity through greater loans and monetary expansion: If credit and financial markets are significantly damaged, banks may simply hold the extra liquidity as excess reserves, which would not lead to greater loans and monetary expansion.
21. By purchasing particular types of securities, the Fed can impact interest rates and liquidity in particular sectors of credit and financial markets, thereby providing a more surgical provision of liquidity where it may be needed the most (as opposed to typical open market purchases, which add reserves to the general banking system). For example, as a result of the global financial crisis the Fed purchased a significant amount of mortgage-backed securities from government sponsored enterprises, which helped to lower mortgage rates and support the housing market.
22. The main advantage to an unconditional policy commitment is that it provides a significant amount of transparency and certainty, which makes it easier for markets and households to make decisions about the future. The main disadvantage is that it represents a tacit commitment by the central bank; if conditions suddenly change where a change in the policy stance may be warranted, then holding to the commitment could be destabilizing. On the other hand, not strictly maintaining the commitment could then be viewed as reneging on a promise, and the central bank could lose significant credibility.

ANSWERS TO APPLIED PROBLEMS

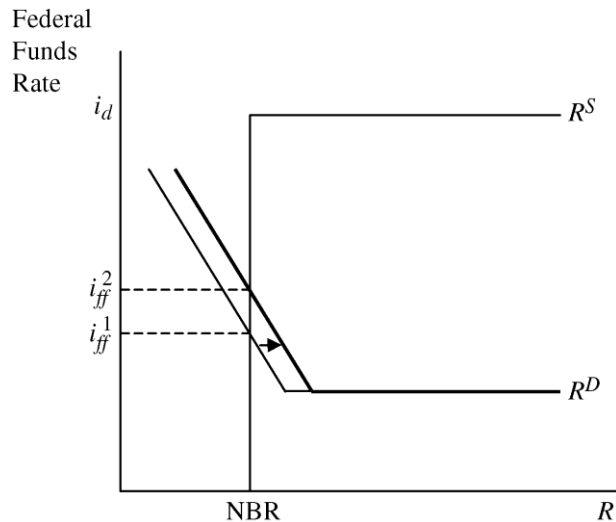
23. The switch from deposits into currency lowers the amount of reserves as was shown in the T-accounts of Chapter 14, and this lowers the supply of reserves at any given interest rate, thus shifting the supply curve to the left. The fall in deposits also leads to lower required reserves and hence a shift in the demand curve to the left. However, because the fall in required reserves is only a fraction of the fall in the supply of reserves (because the required reserve ratio is much less than one), the supply curve shifts left by more than the demand curve. Thus if the discount rate is initially above the fed funds target, the fed funds rate will rise (as shown in the graph below). However, if the fed funds rate is at the discount rate, then the fed funds rate will remain at the discount rate.



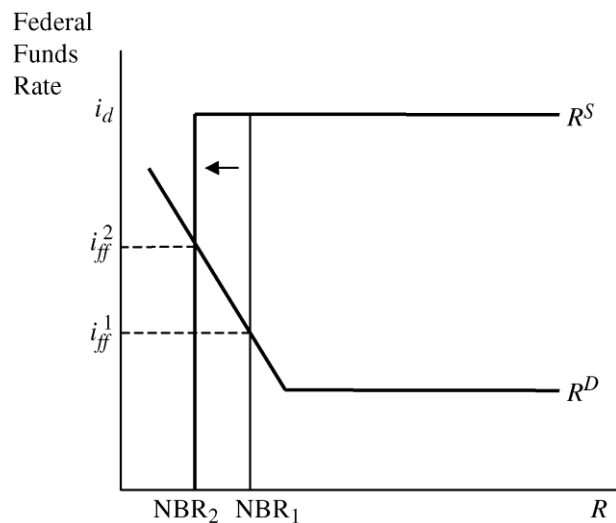
24. In most cases, the discount rate is set far enough above the fed funds target rate such that, even if there was a reduction in the discount rate with no change in the target fed funds rate, the equilibrium rate would still be below the discount rate, thus banks would still be better off borrowing at the market rate rather than the discount rate. In other words, even if the discount rate decreases, the amount of borrowed reserves may not change since the equilibrium will still fall below the discount rate, as shown in the graph below.



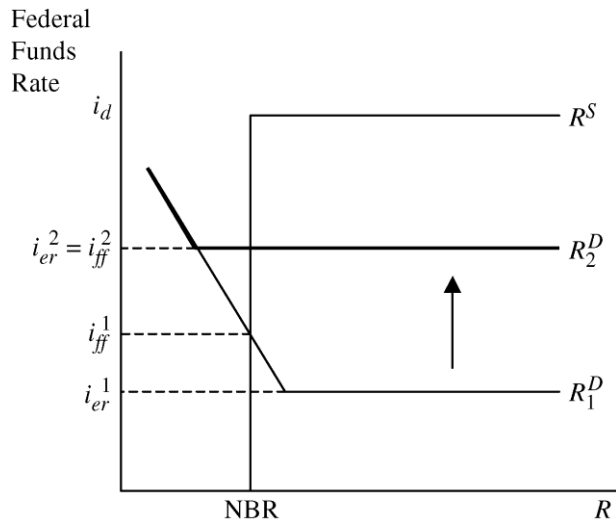
25. (a) A rise in checkable deposits leads to a rise in required reserves at any given interest rate, and thus shifts the demand curve to the right. If the federal funds rate is initially below the discount rate, this then leads to a rise in the federal funds rate. As shown below, borrowed reserves and non-borrowed reserves do not change. If the federal funds rate is initially at the discount rate, then the federal funds rate will just remain at the discount rate, but borrowed reserves will increase.



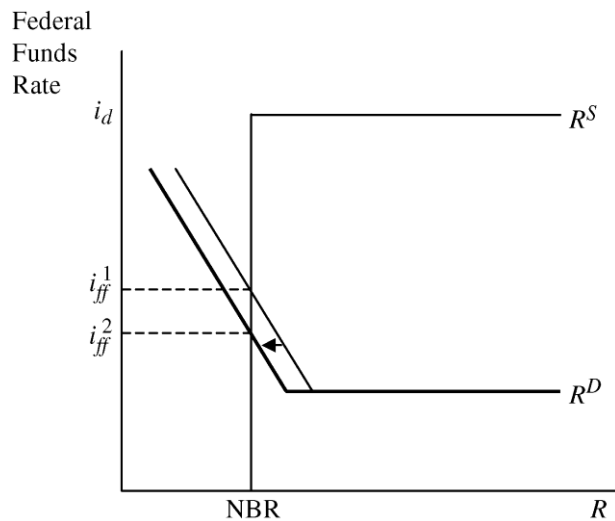
- (b) If banks expect that an unusually large increase in withdrawals will occur in the future, they will want to hold more excess reserves today, meaning the demand for reserves will increase at any given interest rate. This will have the same effect on the fed funds rate, NBR , and BR as in part (a) above.
- (c) To raise the target fed funds rate, the Fed will have to conduct an open market sale of securities, which will shift the supply of non-borrowed reserves to the left. The fed funds rate will increase, and as long as the equilibrium fed funds rate remains below the discount rate, borrowed reserves will remain the same.



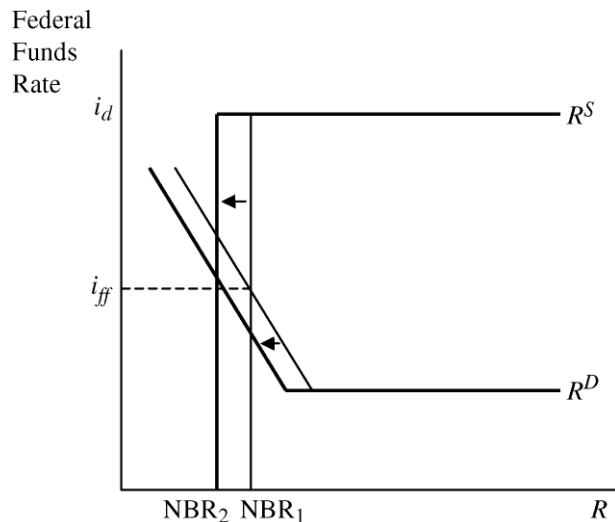
- (d) Raising the interest rate on reserves above the current fed funds rate means that the floor of reserve demand will push the equilibrium fed funds rate up along with the interest rate on reserves. Both borrowed reserves and non-borrowed reserves will remain the same.



- (e) A decrease in required reserves shifts the demand for reserves line to the left, at any given interest rate. The result is that the fed funds rate decreases, and NBR and BR remain unchanged.



- (f) With the decrease in required reserves, this reduces reserve demand as shown in part (e) above. This will decrease the equilibrium fed funds rate. In order to sterilize the effects and keep the fed funds rate unchanged, the Fed will conduct an open market sale of securities, shifting the reserve supply line to the left. The end result is that the fed funds rate and borrowed reserves will be unchanged, and non-borrowed reserves will decrease.



Chapter 16

ANSWERS TO QUESTIONS

1. A nominal anchor helps promote price stability by tying inflation expectations to low levels directly through its constraint on the value of money. It can also limit the time-inconsistency problem by providing an expected constraint on monetary policy.
2. Central bankers might think they can boost output or lower unemployment by pursuing overly expansionary monetary policy even though in the long run this just leads to higher inflation with no gains to increasing output or lowering unemployment. Alternatively, politicians may pressure the central bank to pursue overly expansionary policies.
3. This could pose a problem for a couple reasons. First of all, monetary policy has limited ability to encourage long-run economic growth other than through its ability to maintain low, stable long-run inflation and interest rates. Moreover, a strictly interpreted focus on economic growth may result in an unhealthy focus on keeping short-term interest rates low for a prolonged period of time to raise investment and consumption in the near-term. This could lead to imbalances in the economy that, if not properly addressed, could lead to bubbles and financial crises.
4. Uncertain. Most economists probably would not dispute that trying to maintain stability in financial markets is important to the economy. However, having a constant and prioritized focus on financial market stability in order to prevent crises in most cases is probably unnecessary since financial crises are generally pretty rare. In addition, constantly focusing on maintaining stability in financial markets could come at the expense of ignoring more important factors that can be far more costly to the economy on a day-to-day basis, such as stabilizing output, unemployment, or other related short-term movements in the business cycle.
5. False. There is no long-run trade-off between inflation and unemployment, so in the long run a central bank with a dual mandate that attempts to promote maximum employment by pursuing inflationary policies would have no more success at reducing unemployment than one whose primary goal is price stability.
6. The success of inflation targeting relies on its ability to credibly anchor inflation expectations at a low, desirable level. Without formal public announcements and reminders about the numerical inflation target, markets and the public may have less faith that policymakers are committed to maintaining the inflation target. And if a formal inflation target is not announced at all, market participants and the public may not know the exact target and be forced to infer or estimate the target, creating uncertainty which can raise inflation expectations and unanchor inflation expectations from a low, desirable level.
7. Inflation targeting increases the accountability of monetary policymakers, and is a mechanism of self-discipline which effectively ties the hands of policymakers to commit to a policy path. Because of the transparency of an inflation targeting framework, it is very easy to verify whether policymakers are faithful to a committed policy path. As a result, there is much less ability and incentive for policymakers to deviate to a discretionary policy which could increase output or raise the inflation rate, therefore mitigating the time-inconsistency problem.

8. Inflation-targeting central banks engage in extensive public information campaigns that include the distribution of glossy brochures, the publication of *Inflation Report*-type documents, making speeches to the public, and continual communication with the elected government.
9. Sustained success in the conduct of monetary policy as measured against a pre-announced and well-defined inflation target can be instrumental in building public support for a central bank's independence and for its policies. Also inflation targeting is consistent with democratic principles because the central bank is more accountable.
10. False. Inflation targeting does not imply a *sole* focus on inflation. In practice, inflation targeters do worry about output fluctuations, and inflation targeting may even be able to reduce output fluctuations because it allows monetary policymakers to respond more aggressively to declines in demand because they don't have to worry that the resulting expansionary monetary policy will lead to a sharp rise in inflation expectations.
11. This strategy has the following advantages: (a) it enables monetary policy to focus on domestic considerations; (b) underscoring the importance of price stability has helped it to mitigate the time-inconsistency problem, and (c) it has had a demonstrated success, producing low inflation with the longest business cycle expansion since World War II. However, it has the following disadvantages: (a) there has been an inherent lack of transparency (although this has begun to change in the last few years under Bernanke); (b) it is strongly dependent on the preferences, skills, and trustworthiness of individuals in the central bank and the government; and (c) it has some inconsistencies with democratic principles because the central bank is not highly accountable.
12. False. Although it is true that quantitative easing and other types of nonconventional policy can be used once the zero lower bound is reached on short-term interest rates, it is not a panacea. In particular, when the economy reaches the zero lower bound, this often can be coupled with deflationary conditions, which can be hard to design effective policies for, since the outcomes from such policies are much more uncertain than conventional interest rate policy under typical conditions. In addition, nonconventional policies such as quantitative easing are more complex to implement, so it may be harder to effectively use these programs to push the economy away from the zero lower bound.
13. The zero lower bound on nominal interest rates makes it harder to implement expansionary policy as actual inflation (and hence short-term interest rates) fall closer to zero. As a result, there is less room to use monetary policy as a stabilization tool in a low inflation environment. In this context, it is argued that a higher inflation target may be appropriate to give policymakers more flexibility. The downside of this of course is that in general higher inflation rates can be costly to society, posing a tradeoff for monetary policymakers in terms of flexibility versus efficiency of monetary policy.
14. There are several reasons why monetary policy may not be effective in eliminating asset price bubbles. The main reason is that asset price bubbles are extremely difficult to identify in real time; in many cases, by the time there is a consensus among policymakers and the public that a bubble exists, it is usually too late to implement policies to effectively deflate the bubble. And even if an asset price bubble is identified in a timely manner, monetary policy is often thought of as too blunt an instrument to be able to deal effectively with most asset price bubbles. In particular, interest rate changes may have some modest short-term effects on reducing the asset price bubble, but the interest rate changes may have far more consequential effects on real economic activity and cause far worse collateral damage.
15. In general, the question of appropriate policy response is one of minimizing loss. Credit-driven bubbles (such as the housing bubble experience that resulted in the global financial crisis) can be far

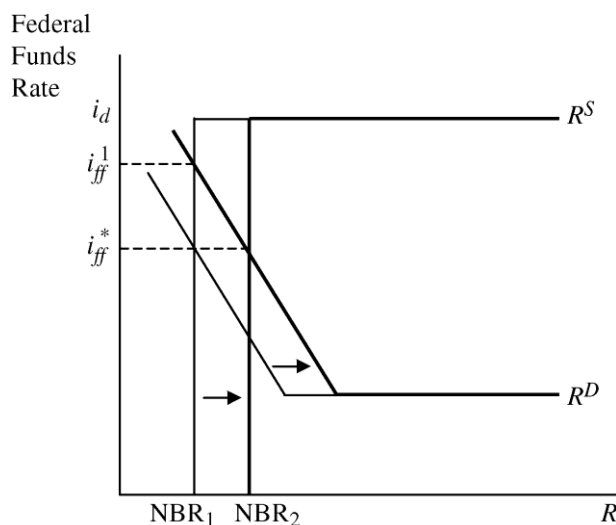
more devastating to the economy if a crash occurs than if policymakers acted to reduce the size of the bubble preemptively. In other words, raising interest rates to try to reduce the bubble may cause collateral damage to the economy, but it would result in far less damage than would presumably occur if nothing were done at all and the bubble were allowed to continue to build. On the other hand, non-credit driven bubbles can more easily be dealt with after a crash; since financial markets generally function relatively normally following these types of bubble crashes, conventional monetary policy can be relatively effective at mitigating any recessionary conditions in the aftermath. Acting preemptively to address the bubble is likely to cause more collateral damage than is inflicted by any downturn related to a non-credit driven bubble crashing.

16. Because a stock market bubble may be hard to identify (at least through consensus) and policy could cause more damage than necessary, in general Greenspan would advocate not acting directly on the stock market bubble. However, insofar as the stock market bubble raised wealth and increased consumption and investment, raising interest rates would be seen as prudent in order to maintain low, stable inflation and minimize near-term output fluctuations as a result of the higher wealth. In other words, the Greenspan Doctrine would say not to act directly on the bubble, but to pursue policy as normal to maintain price stability and stability in real economic activity.
17. (a) The ten-year bond is an intermediate target because it is not directly affected by the tools of the Fed, but is linked to economic activity. (b) The monetary base is a policy instrument because it can be directly affected by the tools of the Fed and is only linked to economic activity through its effect on the money supply. (c) M1 is an intermediate target because it is not directly affected by the tools of the Fed and has some direct effect on economic activity. (d) The fed funds rate is a policy instrument because it can be directly affected by the tools of the Fed.
18. True. In such a world, hitting a reserves target would mean that the Fed would also hit its interest-rate target, or vice versa. Thus the Fed could pursue both a reserves target and an interest-rate target at the same time, but only if there were no variation in reserve demand.
19. The Fed can control the federal funds rate by buying and selling bonds in the open market. When the fed funds rate rises above the target level, the Fed would buy bonds, which would increase nonborrowed reserves and lower the interest rate to its target level. Similarly, when the fed funds rate falls below the target level, the Fed would sell bonds to raise the interest rate to the target level. The resulting open market operations would of course affect the quantity of reserves and the money supply and cause them to change. The Fed would be giving up control of reserves and the money supply to pursue its interest-rate target.
20. The monetary base is more controllable than M1 because it is more directly influenced by the tools of the Fed. It is measured more accurately and quickly than M1 because the Fed can calculate the base from its own balance sheet data, while it constructs M1 numbers from surveys of banks, which take some time to collect and are not always that accurate. Even though the base is a better intermediate target on the grounds of measurability and controllability, it is not necessarily a better intermediate target because its link to economic activity may be weaker than that between M1 and economic activity.
21. Disagree. Although *nominal* interest rates are measured more accurately and more quickly than reserve aggregates, the interest-rate variable that is of more concern to policymakers is the *real* interest rate. Because the measurement of real interest rates requires estimates of expected inflation, it is not true that real interest rates are necessarily measured more accurately and more quickly than reserves. Interest-rate targets are therefore not necessarily better than reserve targets.

22. Bank behavior can lead to procyclical money growth because when interest rates rise in a boom, they decrease excess reserves and increase their borrowing from the Fed, both of which lead to a higher money supply. Similarly, when interest rates fall in a recession, they increase excess reserves and decrease their borrowing from the Fed, leading to a lower money supply. The result is that the money supply will tend to grow faster in booms and slower in recessions—it is procyclical. Fed behavior also can lead to procyclical money growth because (as the answer to problem 24 indicates) an interest-rate target can lead to a slower rate of growth of the money supply during recessions and a more rapid rate of growth during booms.
23. (a) If unemployment rises, this would lower the output gap, and trigger a lower fed funds rate according to the Taylor rule. (b) If inflation rises by 1%, this alone would prompt the fed funds rate to rise by 1.5 percentage points. The decrease in the output gap alone would imply the fed funds rate would fall by 0.5 percentage points. Thus, the two factors together imply a net effect of increasing the fed funds rate by one percentage point according to the Taylor rule. (c) Prolonged increases in productivity growth would increase potential output, and with the same rate of actual output growth this would cause the output gap to decline, resulting in a decline in the fed funds rate according to the Taylor rule. (d) If potential output declines, this is the opposite of (c) above, so the fed funds rate would rise according to the Taylor rule. (e) If the inflation target is revised downward, this would increase the inflation gap at any given inflation rate. This would result in a higher fed funds rate according to the Taylor rule.

ANSWERS TO APPLIED PROBLEMS

24. An increase in the demand for reserves will raise the federal funds rate. In order to maintain the interest rate target, the Fed will buy bonds, thereby increasing the amount of nonborrowed reserves, which shifts the supply curve for reserves to the right, thereby keeping the fed funds rate from rising, as shown below. The open market purchase will then cause the monetary base and the money supply to rise.



25. (a) Assuming the output gap and all other parameters remain constant, the Taylor Rule is $\bar{r} = \pi^e + 2 + 0.5(\pi^e - 2) + 0.5(1)$, where π^e is expected inflation. Thus, if $\pi^e = 4\%$, then the fed funds rate should be set to $4 + 2 + 0.5(2) + 0.5 = 7.5\%$. (b) If the measure of expected inflation is the average of the two forecasts, then $\pi^e = 0.5(3\% + 5\%) = 4\%$. In this case, again the Taylor rule would imply a setting of the fed funds rate of 7.5%. (c) If the measure of expected inflation is the average of the two forecasts, then $\pi^e = 0.5(0\% + 8\%) = 4\%$. In this case, again the Taylor rule would imply a setting of the fed funds

rate of 7.5%. (d) Probably not. In the situation in part (a), it is assumed that there is very little uncertainty about what inflation will be, thus a Taylor rule approach to policy may work fine. However, in (b) and (c), there is clearly more uncertainty about the state of the economy, and therefore having a mechanical rule to dictate policy without accounting for this uncertainty could be problematic. For instance, in part (c), if future inflation actually turned out to be closer to 0%, the Taylor rule policy may prove to be too tight, and could push the economy into a deflationary situation. This example highlights why judgment and discretion in interpreting data are important parts of the monetary policy process.

Chapter 17

ANSWERS TO QUESTIONS

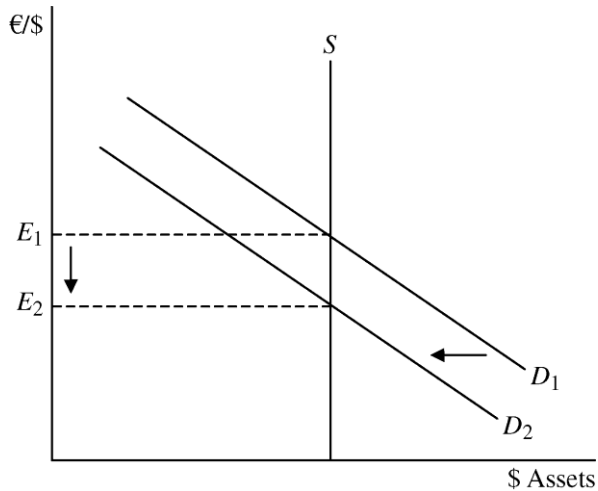
1. You are more likely to drink California wine because the euro appreciation makes French wine relatively more expensive than California wine.
2. False. Although a weak currency has the negative effect of making it more expensive to buy foreign goods or to travel abroad, it may help domestic industry. Domestic goods become cheaper relative to foreign goods, and the demand for domestically produced goods increases. The resulting higher sales of domestic products may lead to higher employment, a beneficial effect on the economy.
3. U.S. dollar depreciation makes U.S. domestic goods cheaper, thus both domestic and foreign consumers buy more U.S.-produced goods. At the same time, imported goods become more expensive since they require more dollars per foreign currency to purchase. Thus, U.S. exports will increase and imports into the United States will decrease.
4. It predicts that the value of the yen will fall 5% in terms of dollars.
5. In the long run, the fall in the demand for a country's exports leads to a depreciation of its currency, but the higher tariffs lead to an appreciation. Therefore, the effect on the exchange rate is uncertain.
6. The money supply increases, but this has an insignificant effect on the supply of dollar assets. Since dollar currency is a small part of total U.S. dollar denominated assets, changes in the money supply are relatively small and therefore do not shift the supply curve.
7. This would reduce the demand for euro-denominated assets, resulting in a depreciation of the euro and an appreciation of the Swiss franc and Australian dollar.
8. Even though the Japanese price level rose relative to the American, the yen appreciated because the increase in Japanese productivity relative to American productivity made it possible for the Japanese to continue to sell their goods at a profit at a high value of the yen.
9. The dollar will appreciate. Because expected U.S. inflation falls as a result of the announcement, there will be an expected appreciation of the dollar and so the expected return on dollar assets will rise. As a result, the demand curve will shift to the right and the equilibrium value of the dollar will rise.
10. The pound depreciates, declining in both the short run and the long run. Consider Britain to be the domestic country. The lower domestic interest rate on pound assets lowers the expected return on them at any given exchange rate, shifting the demand curve to the left in the short run. The outcome is a lower value of the pound. In the long run, the domestic interest rate returns to its previous value, and the demand curve shifts back to the right somewhat. The exchange rate rises to some extent, but still remains below its initial level due to the permanently higher relative price level.
11. The Indian rupee will appreciate. The announcement of tariffs will raise the expected future exchange rate for the rupee and so increase the expected appreciation of the rupee. This means that the demand for rupee denominated assets will increase, shifting the demand curve to the right, and the rupee exchange rate therefore rises.

12. The dollar will depreciate. A rise in nominal interest rates but a decline in the real rate implies a rise in expected inflation that produces an expected depreciation of the dollar that is larger than the increase in the domestic interest rate. As a result, the expected return on dollar assets falls at any exchange rate, shifting the demand curve to the left and leading to a fall in the exchange rate.
13. The dollar will appreciate. The increase in U.S. productivity raises the expected future exchange rate and thus raises the expected return on dollar assets at any exchange rate. The resulting rightward shift of the demand curve leads to a rise in the equilibrium exchange rate.
14. The peso will depreciate. Consider Mexico to be the domestic country. An increased demand for imports would lower the expected future exchange rate and result in a lower expected appreciation of the peso. The resulting lower expected return on peso assets at any given exchange rate would then shift the demand curve to the left, leading to a fall in the peso exchange rate.
15. This should (and did) lead to a sharp appreciation of the dollar relative to many other currencies. The strong demand for U.S. treasuries led to a rise in the demand for U.S. dollar-denominated assets during this time, hence appreciating the dollar.
16. The quantitative easing program should reduce the demand for U.S. dollar-denominated assets, and lead to an appreciation of the euro (a depreciation of the dollar). In fact, after the policy announcement on March 18, 2009 the dollar depreciated more than 4% against the euro.

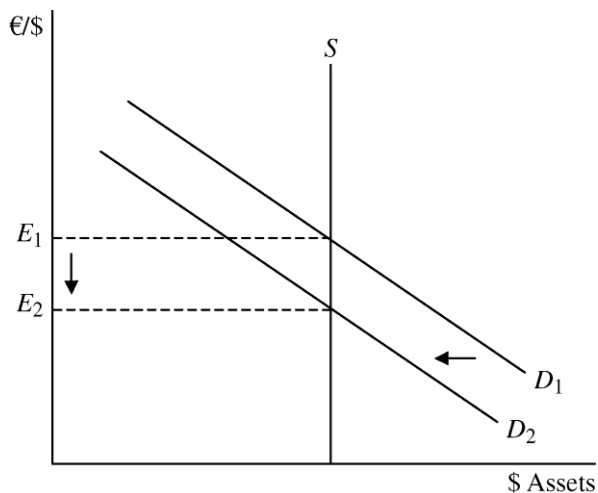
ANSWERS TO APPLIED PROBLEMS

17. $70,000 \text{ euros} \times (\$1/0.90 \text{ euros}) = \$77,777.77$.
18. $\text{Spot exchange rate} = 1.28 \text{ CAD}/\$ \times (\$1/£0.62) = 2.0645 \text{ Canadian dollars/pound}$
19. Complete the following transactions simultaneously:
 - i. Exchange \$1.00 into 1.36 New Zealand dollars.
 - ii. Exchange the 1.36 New Zealand dollars into 0.6664 British pounds.
 - iii. Exchange the 0.6664 British pounds into \$1.0748.This yields a riskless \$0.0748 per U.S. dollar invested.
20. $\% \text{ Change} = (1.16 - 0.90)/0.90 = 28.88\%$. The euro has appreciated by 28.88%.
21. $\text{Expected exchange rate} = 10 \times (1.23/1.02) = 12.059 \text{ pesos per dollar}$.
22. If prices rise relative to the United States by $(20 + 5)\% = 25\%$, then 25% more pounds will be required to buy the same U.S. goods. Thus, this will require the exchange rate to be $1.25 \times £0.55/\$ = £0.6875/\$$.

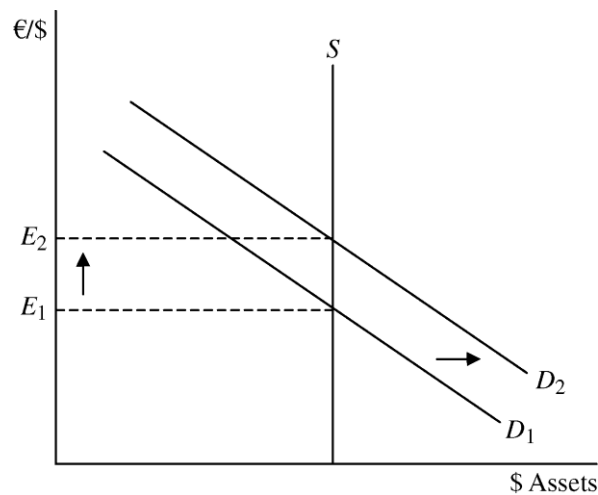
23. The dollar will depreciate. The drop of expected inflation in Europe, which leads to a decline in the foreign interest rate (which is smaller than the drop in expected inflation), leads to a decline in the relative expected return on dollar assets, because the expected euro appreciation is greater than the decline in the foreign interest rate. The result of the decline in the relative expected return on dollar assets is a leftward shift of the demand curve, and the equilibrium U.S. dollar exchange rate falls. The graph is shown below.



24. The contractionary policy will increase European interest rates and raise the future value of the euro, both of which will decrease the relative expected return on dollar assets. The demand curve will then shift to the left, and the dollar will depreciate. The graph is shown below.



25. Consider France to be the domestic country. Because it is harder to get French goods, people will buy more foreign goods and the value of the euro in the future will fall. The expected depreciation of the euro lowers the expected return on euro assets at any exchange rate, so the demand for euros declines and the demand for dollars shifts to the right, as shown in the graph below. Thus, the dollar will appreciate.



Chapter 18

ANSWERS TO QUESTIONS

1. The purchase of dollars involves a sale of foreign assets, which means that international reserves fall. However, the offsetting open market purchase means that the monetary base and the money supply will remain unchanged. There is thus no change in the expected return on dollar assets, so the demand curve does not shift, and the exchange rate also remains unchanged.
2. The purchase of dollars involves a sale of foreign assets, which means that international reserves fall and the monetary base decreases. The resulting fall in the money supply causes interest rates to rise and lowers the future price level, thereby raising the future expected exchange rate. Both of these effects raise the expected return on dollar assets at any given exchange rate, shifting the demand curve to the right and raising the equilibrium exchange rate.
3. (a) A receipt in the capital account; (b) a payment in the current account; (c) a negative change in net international reserves; (d) a receipt in the current account; (e) a payment in the current account; (f) a payment in the capital account; and (g) a receipt in the capital account.
4. Because other countries often intervene in the foreign exchange market when the United States has a deficit so that U.S. holdings of international reserves do not change. By contrast, when the Netherlands has a deficit, it must intervene in the foreign exchange market and buy euros, which results in a reduction of international reserves for the Netherlands and the Euro area.
5. A large balance-of-payments surplus may require a country to finance the surplus by selling its currency in the foreign exchange market, thereby gaining international reserves. The result is that the central bank will have supplied more of its currency to the public, and the monetary base will rise. The resulting rise in the money supply can cause the price level to rise, leading to a higher inflation rate.
6. To finance the deficits, the central banks in these countries might intervene in the foreign exchange market and buy domestic currency, thereby implementing a contractionary monetary policy. The result is that they sell off international reserves and their monetary base falls, leading to a decline in the money supply.
7. The increase in British productivity would create a tendency for the pound to appreciate relative to the dollar. The higher value of the pound would now cause Americans to exchange dollars for gold, ship the gold to Britain, and then buy British pounds with the gold. The result is that British holdings of gold (international reserves) would increase, which would raise the money supply because the monetary base would increase. The higher British money supply would then tend to lower the exchange rate back down to its par level because it would cause the price level to rise, which would lead to a depreciation of the pound.
8. Two francs per dollar.
9. False. Inflation occurred when the world was under the gold standard before World War I. The gold discoveries in the Klondike and South Africa before World War I led to a continuing increase in the quantity of gold, which caused a more rapid growth in money supplies throughout the world. The result was worldwide inflation.

10. There are several disadvantages to China's exchange rate strategy. First, diversification is a problem in that the Chinese own a very large amount of U.S. assets, including low-yielding U.S. treasuries. Secondly, it has created a backlash among trading countries who have threatened trade sanctions due to the cheap prices of Chinese exports due to the low yuan peg. Finally, having the undervalued yuan has resulted in the central bank selling large amounts of yuan currency and raising the domestic Chinese monetary base and money supply, which has the potential to create high inflation in the future.
11. The situation would be as depicted in Figure 2, Panel (b). The central bank would need to sell domestic currency and buy foreign assets, thus increasing its international reserves and the monetary base. The resulting rise in the money supply would then lead to a decline in the domestic interest rate, which would shift demand for domestic assets to the left so that the equilibrium exchange rate would be at par.
12. Uncertain. Although after 1973, countries no longer must intervene in the foreign exchange market to keep their currencies at a par level and so could pursue more independent monetary policy, they have not chosen to do so; rather, they have continued to engage in substantial intervention in the foreign exchange market. Thus they continue to have substantial fluctuations in international reserves, which affect their money supply.
13. True, because when the exchange rate is falling, the central bank must buy its currency, which lowers its holdings of international reserves and its monetary base. Similarly, when the exchange rate is rising, it must sell its currency, which raises its holdings of international reserves and its monetary base. The necessary central bank intervention to keep its exchange rate fixed thus affects the monetary base and hence the money supply. [Note: Question 13 could also be answered "false," in terms of the policy trilemma, because a country could opt for fixed exchange rates and independent monetary policy if it imposes restrictions on capital mobility.]
14. There are no direct effects on the money supply, because there is no central bank intervention in a pure flexible exchange rate regime; therefore, changes in international reserves that affect the monetary base do not occur. However, monetary policy can be affected by the foreign exchange market, because monetary authorities may want to manipulate exchange rates by changing the money supply and interest rates.
15. German reunification produced tight monetary policy in Germany to limit inflation, which raised interest rates for the other ERM countries because their currencies were pegged to the German mark. The high interest rates then slowed economic growth and increased unemployment in the other countries.
16. With a pegged exchange rate, speculators are sometimes presented with a one-way bet in which the only direction for a currency to go is down in value when a country's central bank is unable or unwilling to defend the currency's value. In this case, selling the currency before the likely depreciation gives speculators an attractive profit opportunity with potentially high expected returns. As a result, they jump on board and attack the currency.
17. Central banks in emerging market countries can have limited ability to act as a lender of last resort since domestic liquidity provision can lead to higher inflation expectations and a depreciation of the currency. However, the IMF as an international lender of last resort can help avoid some of the political issues involved with liquidity provision and help stabilize the currency. Moreover, it can help prevent speculative attacks which can lead to contagion among other emerging market countries. A disadvantage to the IMF as an international lender of last resort is that it can encourage risky behavior by countries by increasing moral hazard, knowing that they will be bailed out by the IMF. In addition, countries are often required to adopt austerity measures as a condition to lending. However many countries resist

implementing the austerity measures, knowing that they will get bailed out anyway, creating a time-inconsistency problem.

18. The long-term bond market can help reduce the time-inconsistency problem because politicians and central banks will realize that pursuing an overly expansionary policy will lead to an inflation scare in which inflation expectations surge, interest rates rise, and there is a sharp fall in long-term bond prices. Similarly, they will realize that overly expansionary monetary policy will result in a sharp fall in the value of the currency. Avoiding these outcomes constrains policymakers and politicians so time-inconsistent monetary policy is less likely to occur.
19. False. As seen in the chapter, a reserve currency country, such as the United States, can have its balance of payments deficits financed by foreign central banks, leaving its international reserves unchanged.
20. When other countries buy U.S. dollars to keep their exchange rates from changing vis-à-vis the dollar because of the U.S. deficits, they gain international reserves and their monetary base increases. The outcome is that the money supply in these countries grows faster and leads to higher inflation throughout the world.
21. First, the exchange-rate target directly keeps inflation under control by tying the inflation rate for internationally traded goods to that found in the anchor country to which its currency is pegged. Second, it provides an automatic rule for the conduct of monetary policy that helps mitigate the time-inconsistency problem. Third, it has the advantage of simplicity and clarity.
22. Exchange rate targeting is likely to be a sensible strategy for industrialized countries when domestic monetary and political institutions are not conducive to good monetary policymaking, and when there are other important benefits of an exchange rate target that have nothing to do with monetary policy. Exchange rate targeting is likely to be sensible for emerging market countries whose political and monetary institutions are weak so that it is the only way to break inflationary psychology and stabilize the economy.
23. A currency board has the advantage that the central bank no longer can print money to create inflation, and so it is a stronger commitment to a fixed exchange rate. The disadvantage is that it is still subject to a speculative attack, which can lead to a sharp contraction of the money supply. In addition, a currency board limits the ability of the central bank to play a lender-of-last-resort role. Dollarization has the advantage that there is no possibility of a speculative attack. Dollarization has the disadvantage that it results in the loss of seignorage, the revenue to the government from having its own currency.

ANSWERS TO APPLIED PROBLEMS

24. a. The Fed's assets increase by \$1 million, and it increases currency in circulation by \$1 million. This results in the monetary base increasing by \$1 million.

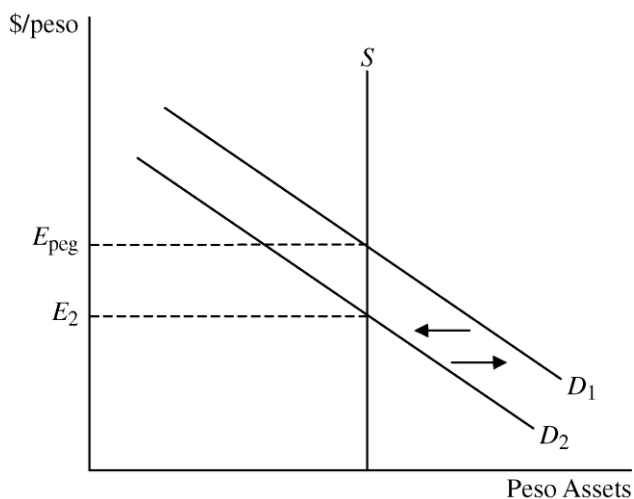
Federal Reserve System			
Assets		Liabilities	
Foreign assets	+\$1 million	Currency in circulation	+\$1 million
(international			

reserves)

- b. The Fed's assets increase by the increased foreign assets, but this is offset by a decrease in T-bill holdings of the same amount. Overall, the Fed's assets are unchanged, and its liabilities and hence the monetary base are also unchanged.

Federal Reserve System		
Assets		Liabilities
Foreign assets (international reserves)	+\$1 million	Currency in circulation
Government bonds	-\$1 million	

25. An increase in U.S. interest rates as a result of the contractionary monetary policy will increase the demand for dollar assets and reduce the demand for peso assets from D_1 to D_2 , which will appreciate the dollar and depreciate the peso. This results in the peso being valued below the peg; in order to maintain the peg, the Mexican central bank must increase domestic interest rates by selling foreign assets, and buying domestic peso currency. This results in the demand for peso assets to increase back up to D_1 as shown in the graph below. This demonstrates one of the main disadvantages to pegging the domestic currency in that domestic monetary policy in the pegging country is dependent on foreign business cycles, meaning that there is no scope for domestic monetary policy stabilization. In this case, Mexico was forced to import a contractionary policy, which could create unexpected and undesirable contraction in the domestic economy.



Chapter 19

ANSWERS TO QUESTIONS

1. Since nominal GDP falls during recessions, and as a result expansionary monetary policy, which increases the money supply is implemented, in most cases velocity will decline during recessions. During expansions, the money supply will be less expansionary, and nominal GDP will rise, typically leading to an increase in velocity.
2. The price level will quadruple.
3. Velocity would fall because a greater quantity of the money supply (M) would be needed to carry out the same level of transactions (PY); $PY/M = V$ would then fall.
4. False. Velocity is equal to nominal GDP divided by the money supply. If nominal GDP increases but the money supply increases by an even greater amount, velocity will decline.
5. Persistent long-term budget deficits can lead to the perception or worry that policymakers will satisfy the government budget constraint by monetizing the debt in the future, leading to large increases in the monetary base that would be highly inflationary. Even if the central bank has no intention of monetizing the debt, the belief or appearance that the central bank may do this will increase inflation expectations, making it harder for monetary policymakers to keep inflation anchored at a low, stable level.
6. Uncertain. As long as a country (such as the United States) has reliable access to bond markets and bond holders are willing to accept and hold treasury debt, a country can continue to rely on borrowing to meet financial obligations. This relies on the perception that the government will be able to repay the debts in the future, and there is low risk of default. However, once bond holders believe that budget deficits have reached unsustainable levels, they may decide not to hold bonds anymore, and this could force the government to monetize the debt in order to meet financial obligations. In this case, higher inflation may result.
7. This would lead to a decreased need to hold cash to make transactions, thus the transactions demand for money would decrease.
8. The need for costly infrastructure to support new payment technologies would mean that cash would be used more in developing countries relative to rich countries. As a result, the transactions demand for money would be greater in developing countries relative to rich countries.
9. The three motives are: precautionary, speculative, and transactions motives. From these three motives, Keynes believed that money demand was positively related to income and negatively related to the nominal interest rate.
10. This would lead to an increase in demand for money through the precautionary motive.
11. The demand for money will decrease. People would be more likely to expect interest rates to fall and therefore more likely to expect bond prices to rise. The increase in the expected return on bonds relative to money will then mean that people would demand less money.
12. Because it indicates that money demand and hence velocity is affected by interest rates, and since interest rates fluctuate a lot, velocity will as well. Furthermore, as the answer to problem 11 suggests, changes in people's expectations about what the normal level of interest rates are will cause money

demand and hence velocity to fluctuate. Keynes's analysis of the speculative demand for money thus suggests that velocity will be far from constant; rather, it will undergo substantial fluctuations.

13. The four factors determining money demand under portfolio theory are: interest rates (decreases in interest rates increase money demand); wealth (higher wealth leads to higher money demand); risk of alternative assets (a higher risk of alternative assets increases money demand); and liquidity of other assets (a decrease in liquidity of alternative assets increases the demand for money).
14. (a) Since risk of alternative assets increases, liquidity of alternative assets likely decreases, and interest rates likely will fall, this will lead to an increase in money demand. Note that even though wealth decreases, this will have a modest negative effect on money demand. (b) Cheaper bond transactions make the bond market more liquid, leading to an increase in demand for bond holdings, and hence a decrease in the demand for money. (c) The stock market crash would lead to higher volatility, and hence risk in stocks, which would increase demand for money. The stock market crash would reduce wealth, but this would likely have a modest negative effect on money demand, leaving money demand overall higher.
15. The demand for money would likely fall. Compared to other assets, money would be more risky so people would rather hold more stable assets and less money. In addition, high and unpredictable inflation will result in very high interest rates, which would reduce money demand. If the government issues inflation-protected securities, then the demand for money would decrease further as an alternative to risky money holdings.
16. The demand for money would decrease, similar to problem 15 above, but much more sharply. Compared to other assets, money would be more risky so people would rather hold more stable assets and less money. In addition, hyperinflation will result in very high interest rates, which would further reduce money demand.
17. In Keynes's view, a rise in interest rates leads to a lower relative expected return of money and hence a lower demand for money. In the portfolio choice view, a rise in interest rates leads to an increase in the implicit interest paid on checkable deposits, so the relative expected return of money only falls by a small amount. Hence, in the portfolio choice view, the demand for money changes little when interest rates rise.
18. In Keynes's view, velocity is unpredictable because interest rates, which have large fluctuations, affect the demand for money and hence velocity. In addition, Keynes's analysis suggests that if people's expectations of the normal level of interest rates change, the demand for money changes. Keynes thought that these expectations moved unpredictably, meaning that money demand and velocity are also unpredictable.
19. Velocity is used to indicate if the money demand function is stable. If velocity is predictable and stable, then the money demand function is also stable, and vice versa. Up until the early 1970s, the money demand function was stable, but after that, financial innovation made velocity relatively unpredictable and hence implied a more unstable money demand function. Because of this, the Federal Reserve moved away from using the money supply as its main policy indicator, and moved to interest rates as its main monetary policy indicator.
20. This stable relationship implies that the velocity of the M2 money supply is very stable, and hence money demand is relatively stable. In this case, adjusting the money supply would provide a tight link

to aggregate spending, so should be used in the conduct of monetary policy rather than interest rate adjustment.

ANSWERS TO APPLIED PROBLEMS

21. Velocity is approximately 10 in 2010, 10.9 in 2011, and 11.9 in 2012. The rate of velocity growth is approximately 9% per year.
22. Nominal GDP increases from \$1 trillion to \$1.5 trillion.
23. Nominal GDP declines by approximately 10%.
24. The price level declines from 2 (= 2,000/1,000) to 1.5 (= 1,500/1,000).
- 25.

	Period 1	Period 2	Period 3	Period 4	Period 5	Period 6	Period 7
Y (in billions)	12,000	12,500	12,250	12,500	12,800	13,000	13,200
Interest Rate	0.05	0.07	0.03	0.05	0.07	0.04	0.06
$L(i, Y)$	1450	1492.5	1501.25	1512.5	1530	1585	1590
$V = Y/L(i, Y)$	8.28	8.38	8.16	8.26	8.37	8.20	8.30

Chapter 20

ANSWERS TO QUESTIONS

1. False. Stocks do not add directly to investment in a macroeconomic sense; since the buying and selling of stocks represents transfers of existing assets, it does not directly create new production. However, increases in the stock market are likely to coincide with increases in investment, since higher stock market prices may occur during periods of higher economic growth, which could cause firms to increase autonomous investment.
2. Since inventories of unsold goods are goods that have been produced, then in an accounting sense, they add to output and hence aggregate demand. However, since the final end user hasn't purchased them yet, they are counted as inventory until they are sold.
3. False. Although inventories are costly to hold, many firms prefer to have extra inventories of unsold goods on hand in the event that there is an unpredictable increase in demand for their goods, because this allows firms to satisfy customers' demands. As a result, planned inventory investment may very well be positive.
4. During the height of the crisis, financial frictions $\bar{f}$ increased dramatically, which effectively raised the real cost of investment. In addition, firms' planned autonomous investment $\bar{I}$ decreased dramatically as the prospects for economic growth and profits in the future weakened sharply. Both of these factors reduced planned investment, even though real interest rates may have decreased.
5. These shifts in "animal spirits," according to Keynes, could very well create a recession. If the beliefs are strong enough, this could significantly reduce autonomous consumption and autonomous planned investment to the point where equilibrium output decreases substantially, leading to a recession.
6. When the real interest rate increases, this increases the demand for domestic assets, resulting in an appreciation of the domestic currency. As a result, imported goods become cheaper domestically, and exported goods become more expensive to foreigners. This reduces net exports, implying an inverse relationship between the real interest rate and net exports.
7. When the mpc increases, this leads to a larger multiplier effect for any given change in spending, resulting in higher output. Put another way, when the mpc increases, this leads to a higher amount of consumption spending out of disposable income. This leads to more production, which leads to higher income, leading to further increases in spending.
8. Nothing. The \$100 billion increase in planned investment spending is exactly offset by the \$100 billion decline in autonomous consumer expenditure, and autonomous spending and aggregate output remain unchanged.
9. (a) When the real interest rate increases, this reduces planned investment spending and net exports, which reduces equilibrium output. (b) If the mpc declines, this decreases consumption, hence lowering equilibrium output. (c) If financial frictions increase, this increases the real cost of borrowing and reduces planned investment, decreasing equilibrium output. (d) A decrease in autonomous consumption lowers consumption, decreasing equilibrium output. (e) The decrease in taxes will increase consumption, which has the effect of increasing output. The decrease in government spending has the effect of reducing equilibrium output. However, the government spending effect dominates the tax effect. This

is because changes in taxes work through changes in disposable income to affect consumption, and

households do not spend all of a change in disposable income. On the other hand, changes in government spending are a direct change in spending. The net effect is a decrease in equilibrium output. (f) If x decreases, this will increase net exports at any given real interest rate, holding all other factors constant. This results in a higher equilibrium output. (g) This would have the effect of increasing autonomous investment, which increases planned investment and equilibrium output.

10. Rise. The fall in spending from an increase in taxes is always less than the change in taxes because the marginal propensity to consume is less than 1. By contrast, autonomous spending rises one-for-one with a change in autonomous consumer expenditure. If taxes and autonomous consumer expenditure rise by the same amount, autonomous spending must rise, and aggregate output also rises.
11. In this case, as interest rates fall, planned investment spending and net export do not change, so equilibrium output remains unchanged. This means that the IS curve is vertical.
12. Companies cut production when their unplanned inventory investment is greater than zero, because they are then producing more than they can sell. If they continue at current production, profits will suffer because they are building up unwanted inventory, which is costly to store and finance.
13. False. In this case, if actual investment is greater than planned investment, firms are adding to inventory, thus unplanned inventory investment is positive. This leads firms to reduce production in order to bring inventories to more desirable levels.
14. (a) This is a movement along the IS curve, and so does not shift the IS curve. (b) This results in a decrease in equilibrium output at any given interest rate, which shifts the IS curve to the left. (c) Equilibrium output decreases at any given interest rate, which shifts the IS curve to the left. (d) Equilibrium output decreases at any given interest rate, which shifts the IS curve to the left. (e) Equilibrium output decreases at any given interest rate, which shifts the IS curve to the left. (f) Equilibrium output increases at any given interest rate, which shifts the IS curve to the right. (g) Equilibrium output increases at any given interest rate, which shifts the IS curve to the right.
15. False. Although the IS curve shifted to the left during the period of the financial crisis, this is because of external factors which caused a sharp decline in consumption and investment, such as financial frictions, and sharp decreases in autonomous consumption and investment. If the stimulus package had not been in place, the IS curve would have shifted much farther to the left.
16. The IS curve is not affected at all, that is, it does not shift. Changes in the real interest rate represent movements along a given IS curve, and do not shift the curve.
17. (a) A more expensive dollar will result in fewer U.S. exports and more U.S. imports (everything else the same), therefore decreasing net exports. Graphically, this shifts the IS curve to the left, decreasing aggregate output at every interest rate. (b) Usually the increase in stock prices is interpreted as having a positive effect on autonomous planned investment, as investors become more confident about the future prospects of the economy. Therefore, we should expect autonomous planned investment to increase and the IS curve to shift to the right. (c) This is an example in which it is quite difficult to measure the net effect of these events. Depending on the relative magnitude of the shifts, the IS curve might end up shifting to the left, to the right, or not shifting at all. This problem arises because these events have opposite effects on the IS curve.

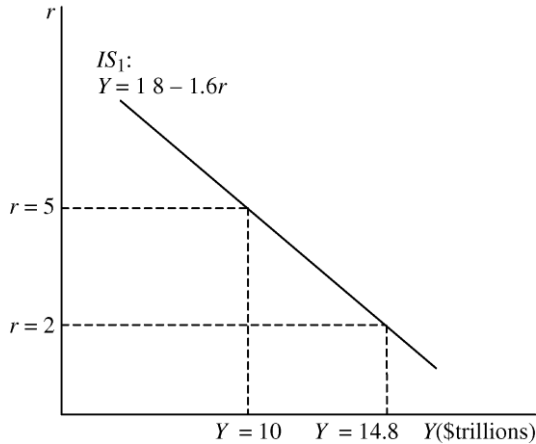
ANSWERS TO APPLIED PROBLEMS

18.

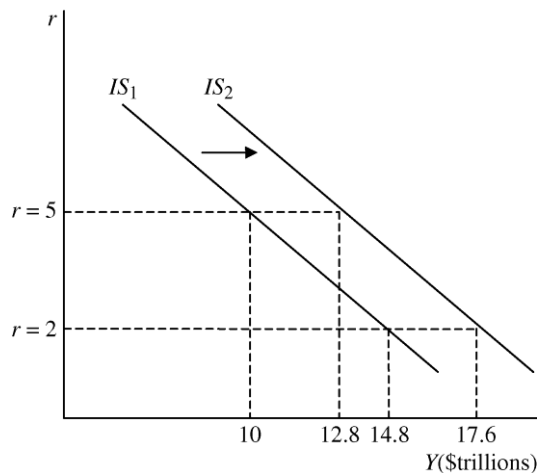
Income Y	Disposable Income Y_D	Consumption C
0	-200	120
100	-100	210
200	0	300
300	100	390
400	200	480
500	300	570
600	400	660

19. If an increase of \$1,000 in disposable income leads to an increase of \$750 in consumption expenditure, then $mpc = 0.75$. Using this implies that $C = 1,625 + 0.75 \times 11,500 = 10,250$. Consumption expenditure is therefore \$10,250 billion.
20. (a) Dell's inventory on December 31, 2012, is the market value of the 20,000 computers at its warehouses. Therefore, Dell's inventory equals $20,000 \times \$500 = \$10,000,000$ on December 31, 2012. (b) Dell's inventory spending is the change in the level of its inventory during the course of 2010. On December 31, 2013, Dell's inventory equals $25,000 \times \$450 = \$11,250,000$. Therefore, Dell's inventory spending in 2010 is $\$1,250,000 = \$11,250,000 - \$10,000,000$. (c) During the early stages of an economic recession, as soon as households' income starts to fall, firms realize that their sales drop. This results in fewer orders by their dealers and therefore an increase in the number of goods they stock at their warehouses (since they probably have already decided about production levels for that period). The consequence is that inventory spending will be positive for some time, but firms will quickly cut production and will try to sell their already manufactured goods before increasing production again.
21. Equilibrium output of 2,000 occurs when $Y = Y^{ad}$ and the aggregate demand function $Y^{ad} = C + I + G + NX = 500 + 0.75Y$. Solving for Y implies $0.25Y = 500$, or $Y = 2000$. If government spending rises by 100, equilibrium output will rise by 400 to 2,400.
22. The change in output ΔY is given as the change in spending ΔG , multiplied by $1/(1 - mpc)$. Thus $\$1000 = 4\Delta G$, implying government spending would have to increase by \$250 billion in order to increase equilibrium output by \$1000 billion. Alternatively, the change in output is given as the change in taxes ΔT , multiplied by $[-mpc]/(1 - mpc)$. Thus $\$1000 = -3\Delta T$, implying taxes would have to decrease by \$333.3 billion in order to increase equilibrium output by \$1000 billion.
23. Formally, the effects on output from a change in government spending and a change in taxes are given, respectively, as $\Delta Y_G = \Delta G/(1 - mpc)$ and $\Delta Y_T = -\Delta T \times mpc/(1 - mpc)$. If both taxes and spending increase by the same amount, then $\Delta G = \Delta T$ and the net effect on output is given as $\Delta Y = \Delta Y_G + \Delta Y_T = \Delta G/(1 - mpc) - \Delta T \times mpc/(1 - mpc) = \Delta G[1/(1 - mpc) - mpc/(1 - mpc)] = \Delta G$. Thus, if both taxes and government spending increase by the same amount, output will increase by exactly the amount of the increase in spending (or increase in taxes).

24. (a) $C = 3.25 + 0.75(Y - 3) = 1 + 0.75Y$. $I = 1.3 - 0.3(r + 1) = 1 - 0.3r$. $NX = -1 - 0.1r$. (b) The IS curve can be found by setting $Y = Y^{ad}$ and solving: $Y = 1 + 0.75Y + 1 - 0.3r + 3.5 - 1 - 0.1r$. This implies $0.25Y = 4.5 - 0.4r$, or $Y = 18 - 1.6r$. (c) At $r = 2$, equilibrium output is $Y = 18 - 1.6(2) = \$14.8$ trillion; At $r = 5$, equilibrium output is $Y = 18 - 1.6(5) = \$10$ trillion. (d)



- (e) An increase of government spending of \$0.7 trillion will lead to an $0.7/(1 - 0.75) = \$2.8$ trillion increase in equilibrium output at any given interest rate. Thus, the IS curve will shift horizontally to the right by \$2.8 trillion.



25. (a) Using equation (12) in the chapter, the IS curve is given as $Y = 35.5 - 2.5r$. (b) At an interest rate of $r = 4$, output is $Y = 35.5 - 2.5(4) = 25.5$. (c) The IS curve is now $Y = 30.25 - 2.5r$; at an interest rate of 4, equilibrium output is now $Y = 20.25$. In order to maintain the output level from part (b), the Federal Reserve would have to set the interest rates such that $25.5 = 30.25 - 2.5r$, implying the interest rate setting of $r = 1.9$ to offset the increase in $\bar{f}$ of 3. Thus, the Federal Reserve will reduce r from $r = 4$ to $r = 1.9$. (d) With the increase in $\bar{f}$ and the reduction in $\bar{I}$, the IS curve is now $Y = 28.25 - 2.5r$. At the current interest rate of $r = 1.9$, output is $Y = 28.25 - 2.5(1.9) = \$23.5$ trillion, which is less than the level of output before the crisis, which does not stabilize output. In order to keep output at \$25.5 trillion, monetary policymakers can set the interest rate such that $25.5 = 28.25 - 2.5r$, or $r = 1.1$. Alternatively, fiscal policymakers could increase government spending by \$0.4 trillion, or reduce taxes by \$0.5 trillion (while keeping the interest rate at $r = 1.9$). All three of these policies separately would maintain output at $Y = \$25.5$ trillion.

Chapter 21

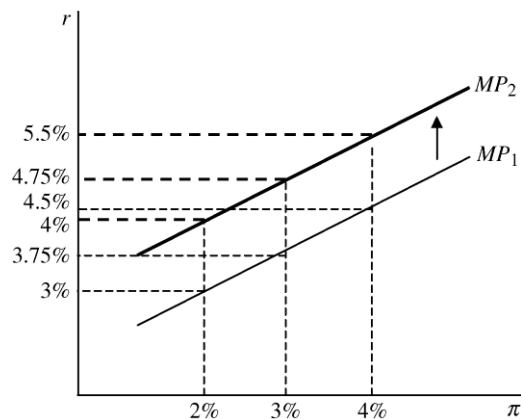
ANSWERS TO QUESTIONS

1. The Fed adjusts the fed funds rate up in response to higher inflation. This requires open market sales of bonds to remove reserves from the banking system, which results in the desired higher fed funds rate.
2. The Fed can control the (nominal) fed funds rate, but what matters for impacting economic activity are real interest rates. The underlying assumption is that inflation is relatively sticky in the short run, so that changes in the nominal interest rate also imply similar changes in the real interest rate.
3. The upward sloping *MP* curve implies that real interest rates rise, rather than fall, when inflation increases. This is necessary because otherwise a rise in inflation would lead to a fall in real interest rates, which would lead to an increase in output, a further increase in inflation, and a further fall in real interest rates which would lead to even higher inflation. In other words, the *MP* curve must be upward sloping in order to keep inflation from spinning out of control.
4. When $\lambda = 0$, this means that the real interest rate will stay constant at $\bar{r}$ even when inflation changes. The implication is that as inflation increases, the nominal interest rate will increase by exactly the same as the inflation rate, so that the real interest rate stays constant.
5. An autonomous tightening of policy results in $\bar{r}$ increasing, and the *MP* curve shifting upward; an autonomous easing of policy results in $\bar{r}$ decreasing, shifting the *MP* curve downward.
6. An autonomous tightening or easing of policy may occur if, holding the current inflation rate constant, there is a change in the expected future inflation rate, a projected weakening of economic activity, or some other change in the future outlook of the economy or financial markets that warrants a change in monetary policy stance independent of the current inflation rate.
7. In this case, the *MP* curve will shift down if there is an autonomous easing of monetary policy. In addition, if the Fed begins to pay less attention to the inflation rate, this would be equivalent to a reduction in λ , which would reduce the slope of the *MP* curve.
8. False. Even though current inflation was relatively high, the Fed's distaste for inflation (characterized by the parameter λ) did not change and remained positive. The Fed reduced the fed funds rate through an autonomous monetary policy easing due to the outlook for weakened economic activity going forward.
9. As equation (4) in the chapter indicates, the (inverse) slope of the aggregate demand curve is given as: $-\lambda(d + x)/(1 - mpc)$. Thus, an increase in λ , d , x , or mpc will all *decrease* the slope (make the slope of the *AD* curve flatter).
10. False. Since λ is independent of the autonomous component of monetary policy $\bar{r}$, any change in $\bar{r}$ will affect the real interest rate the same regardless of the value of λ . Thus, for a given IS curve, any change in autonomous monetary policy will have the same impact on output, independent of the value for λ .

11. Monetary policy would be less effective in changing output, since net exports represent a reinforcing channel, in addition to investment, through which interest rate changes can affect output.
12. When an autonomous tightening occurs, the aggregate demand curve shifts left, and when an autonomous easing occurs, the aggregate demand curve shifts right.
13. (a) The *IS* curve shifts to the right; the *MP* curve does not shift; the *AD* curve shifts to the right. (b) The increase in taxes shifts the *IS* curve to the left, and the easing of monetary policy moves the economy along the *IS* curve; the tax change does not affect the *MP* curve, but the monetary policy change shifts the *MP* curve down; the monetary policy easing shifts the *AD* curve to the right, while the tax increase shifts the *AD* curve to the left; the net effect on the *AD* curve cannot be determined without knowing the relative shifts due to the tax and monetary easing effects. (c) An increase in the current inflation rate represents a movement along the *MP* curve, which increases the real interest rate; the increase in the real interest rate due to the higher inflation represents a movement along the *IS* curve to lower output (but does not shift the *IS* curve); the increase in inflation represents a movement along the *AD* curve, reducing output and does not shift the *AD* curve. (d) A decrease in autonomous consumption shifts the *IS* curve to the left; the *MP* curve does not shift; the *AD* curve shifts to the left. (e) Autonomous investment increases, which shifts the *IS* curve to the right; the *MP* curve does not shift; the *AD* curve shifts to the right. (f) This represents an increase in λ , which does not affect the *IS* curve; the *MP* curve becomes steeper; the slope of the *AD* curve becomes flatter.
14. An increase in U.S. net exports directly affects the *IS* curve, since planned expenditure increases at every real interest rate. Assuming the goods market is in equilibrium, aggregate output increases, shifting the *IS* curve to the right. The monetary policy curve does not shift, since net exports are not a determinant of the monetary policy curve. The monetary policy curve represents the monetary authorities' willingness to set a given real interest rate in the short run according to current inflation rates. Given the same monetary policy curve and a new *IS* curve, the aggregate demand curve shifts to the right. This means that aggregate output increases at every inflation rate.
15. The aggregate demand curve shifts because a change in "animal spirits" causes autonomous consumer expenditure or planned investment spending to change, which then causes the quantity of aggregate output demanded to change at any given inflation rate.
16. The increase in government spending will shift the *IS* curve to the right more than the increase in taxes will shift the *IS* curve to the left. As a result, the net effect is for the *IS* curve and *AD* curve to shift to the right, that is, output increases at any given real interest rate and inflation rate.
17. The effect on the aggregate demand curve is uncertain because increased government spending would shift the *AD* curve to the right while the autonomous policy tightening shifts the *AD* curve to the left.
18. False. If the Fed changes interest rates by exactly the amount of the change in $\bar{f}$, this will mitigate the adverse effects of financial frictions on investment. However, the decrease in the real interest rate will increase net exports, so that aggregate output will increase. Thus, to offset the increase in financial frictions, the Fed would need to reduce the real interest rate by a little bit less than the change in $\bar{f}$ to keep output constant.

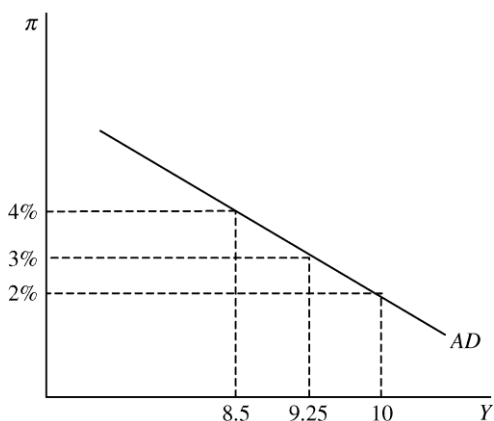
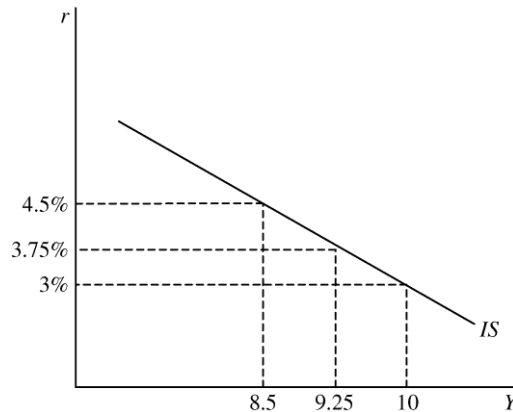
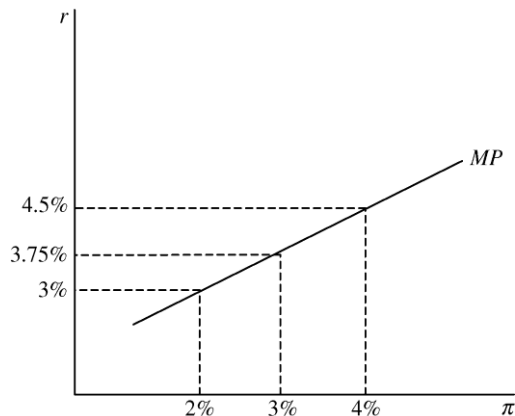
ANSWERS TO APPLIED PROBLEMS

19. (a) When the inflation rate is 2%, 3%, and 4%, the real interest rate is 3%, 3.75%, and 4.5%, respectively. (b) See graph in (d) below. (c) Since $\bar{r}$ increases, this represents an autonomous tightening of policy. (d) When the inflation rate is 2%, 3%, and 4%, the real interest rate is 4%, 4.75%, and 5.5%. The graph is below.

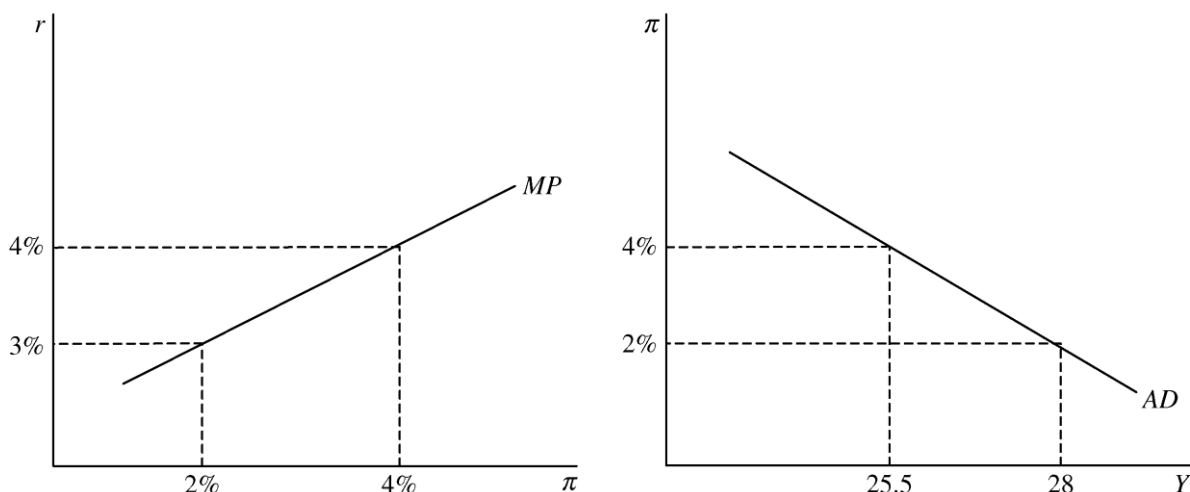


20. See Figure 4 in the textbook.

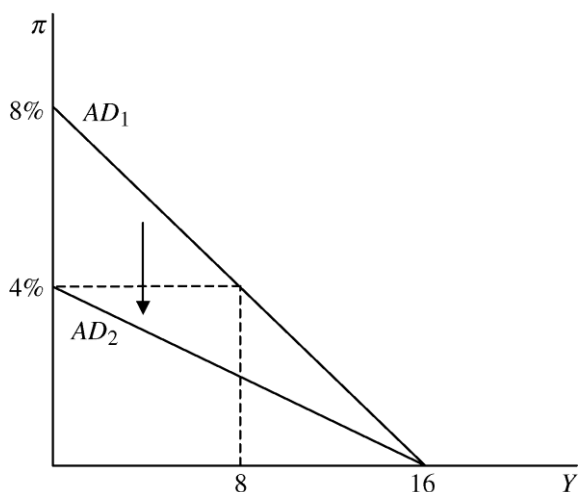
21. (a) $Y = 11.5 - 0.75\pi$. (b) When the inflation rate is 2%, 3%, and 4%, the real interest rate is 3%, 3.75%, and 4.5%, respectively. Aggregate output is 10, 9.25, and 8.5, respectively. (c) Graphs are below.



22. (a) The MP curve is given as $r = 2 + 0.5\pi$. The AD curve is given as $Y = 30.5 - 1.25\pi$. (b) When $\pi = 2$ and $\pi = 4$, the real interest rate is $r = 3\%$ and 4% . Aggregate output is 28 and 25.5, respectively. (c) Graphs are shown below.



23. (a) The MP curve is given as $r = 1 + \pi$. The AD curve is given as $Y = 16.4 - 1.6\pi$. (b) $r = 2$; $Y = 14.8$; $C = 12.1$; $I = 0.4$; $NX = -1.2$. (c) The real interest rate increases to $r = 3$. $Y = 13.2$; $C = 10.9$; $I = 0.1$; $NX = -1.3$. (d) The Fed may believe that the economy will strengthen in the future or there is a risk that inflation will rise in the future, so they increased $\bar{r}$.
24. The MP curve is given as $r = 1 + \pi$. The AD curve is given as $Y = 16.4 - 1.6\pi$. (b) $r = 3$; $Y = \$13.2$ trillion. (c) When government spending increases by $\$0.5$ trillion, output will increase by $\$2$ trillion to $Y = \$15.2$ trillion. (d) In order to keep output constant at $Y = \$13.2$ trillion, the Fed will have to increase the real interest rate to $r = 4.25$.
25. (a) $Y = 16 - 2\pi$. At $\pi = 0$, $\pi = 4$, and $\pi = 8$, output is given as $Y = 16$, $Y = 8$, and $Y = 0$, respectively. Graph is shown below. (b) $Y = 16 - 4\pi$. Graph is shown below, with graph from part (a). As the central bank cares more about inflation (i.e., has more distaste for inflation), λ increases and the slope of the AD curve becomes flatter.



Chapter 22

ANSWERS TO QUESTIONS

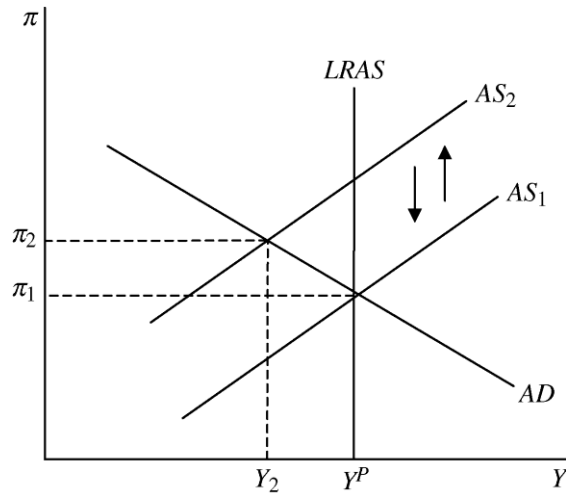
1. A rise in inflation causes monetary policymakers to raise the real interest rate. This reduces planned expenditures and lowers the level of output necessary for goods market equilibrium. The opposite occurs if inflation falls. Therefore, goods market equilibrium will occur at lower levels of output when the inflation rate rises and at higher levels of output when inflation falls. The downward slope of the aggregate demand curve reflects this. The short-run aggregate supply curve slopes upward to reflect the increase in the inflation rate that occurs when the economy's aggregate output of goods and services exceeds the potential output level in the short run and the decrease in inflation that occurs when output is below potential output.
2. The following changes shift the aggregate demand curve to the right: monetary policy easing, increase in government purchases, decrease in taxes, autonomous increase in consumption, autonomous increase in investment, autonomous increase in net exports, and a decrease in financial frictions. The opposite changes in these factors shift the aggregate demand curve to the left.
3. The statement is correct. A depreciation of the U.S. dollar makes U.S. exports cheaper for foreign consumers at the same time it makes imports into the U.S. more expensive. As a result, exports increase, imports decrease, and net exports increase. According to aggregate demand and supply analysis, the aggregate demand curve shifts upward and to the right. Note that the depreciation of the U.S. dollar might also affect the short-run aggregate supply curve if U.S. firms import many of their inputs. An increase in the price of inputs will shift the short-run aggregate supply curve up and to the left.
4. When output is at potential, this is considered the full employment level of output. The unemployment rate at potential output is not zero, since structural and frictional unemployment exist. Thus, the factors that determine structural and frictional unemployment determine the natural rate of unemployment, which is also the unemployment rate that occurs when the economy is at potential.
5. As labor productivity grows, the long-run aggregate supply curve shifts to the right. This is because the existing labor force, along with a given amount of capital and other resources, can produce more output, indicating a greater amount of potential output.
6. When inflation expectations rise, it shifts the short-run aggregate supply curve up, leading to higher actual inflation in the short run in addition to any inflationary effects that may occur, for instance through negative price shocks. This illustrates the danger when inflation expectations become "unanchored" from a low level, in that it is more difficult for the central bank to then stabilize inflation, particularly when a temporary inflation shock leads to higher expected inflation.
7. False. As prices and wages become more flexible, γ becomes larger, and the short-run aggregate supply curve becomes steeper. (In the limit, with perfect flexibility, γ approaches infinity.) Thus, for a given aggregate demand shock, as the short-run aggregate supply curve becomes steeper the effects on output are smaller.

8. Shifts in the short-run aggregate supply curve result from changes in expected inflation, price shocks, and persistent output gaps. None of these factors shift the long-run aggregate supply curve because price and wage flexibility ensures that in the long run the economy produces at its potential output level. Potential output depends not on actual or expected inflation but rather on the capital, labor, and technology available for producing goods and services. However, a change in potential output shifts the long-run aggregate supply curve and also the short-run aggregate supply curve because it changes the output gap at any given level of actual output.
9. The short-run aggregate supply curve will shift upward because wages and production costs rise, since workers and firms expect prices to be higher.
10. The Internet has reduced the amount of time and money spent looking for a job. It also has allowed for an increased flow of information between potential employees and employers (e.g., job descriptions, resumes, and other valuable information are usually available online). This has resulted in a decrease in the natural rate of unemployment, as unemployed workers are matched with employment opportunities quicker.
11. When output is less than potential output, unemployment is above the natural rate and labor market slack causes wages to rise less rapidly. As the Phillips curve suggests, this causes firms to raise their prices less rapidly and thus decreases the inflation rate. As a result, expected inflation will be lower in the following time period and the short-run aggregate supply curve will shift downward. This adjustment process in which inflation and expected inflation fall and the short-run aggregate supply curve shifts downward continues over time until output increases to the potential output level, the output gap increases to zero, and the economy reaches long-run equilibrium.
12. The inflation rate will be lower than it otherwise would be and aggregate output will be higher. The lower expected inflation will cause the short-run aggregate supply curve to shift down, so that the intersection of the short-run aggregate supply curve with the aggregate demand curve will be at a higher level of output and a lower inflation rate.
13. When the unemployment rate is above the natural rate of unemployment, there is slack in the labor market and output is below potential. This causes the short-run aggregate supply curve to shift downward, leading to lower inflation and higher output over time, until the economy reaches a long-run equilibrium.
14. An increase in government spending will lead to a rightward shift of the aggregate demand curve. In the short run, inflation and output will both rise. This leads to tightness in the labor market, which raises inflation expectations and shifts the short-run aggregate supply curve up; as this occurs, the economy moves to a new long-run equilibrium, output falls back to potential, and inflation increases.
15. Several factors led to an increase in potential output, which helped reduce the unemployment rate and inflation rate. These included increased efficiencies in the health care industry, an increased proliferation of computer technology which led to rapid increases in productivity, and favorable demographic factors, such as an increase in the average age of the workforce, which helped to reduce the natural rate of unemployment. All of these factors increased potential output and shifted the long-run aggregate supply curve to the right, with the effect of reducing the unemployment rate and inflation rate through the late 1990s.

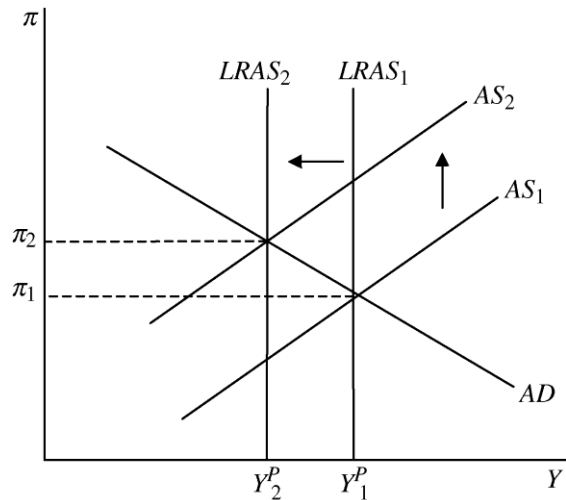
16. As the answer to question 15 suggests, any type of positive supply shocks (particularly permanent positive supply shocks) can be considered “good” since they help reduce both unemployment and inflation in the long run.
17. The Federal Reserve’s policies during that time were not intentionally recessionary, however they were necessary in order to re-anchor inflation (and inflation expectations) at a permanently lower level. The only way to achieve this, given that the Federal Reserve had very little credibility in fighting inflation at the time, was to pursue highly contractionary policies to bring the inflation rate down, a necessary side effect of which was a sharp decrease in aggregate demand.
18. The Volcker disinflation is considered a success in that the Chair of the Federal Reserve, Paul Volcker, was finally able to bring inflation down to a permanently lower, stable level after a decade of high and volatile inflation through most of the 1970s. Unfortunately, the policies to get the economy on a path of low, stable long-term inflation required significantly contractionary policies. These policies resulted in two recessions in the early 1980s, with unemployment rising above 12% at its peak. So although the policies to reduce inflation from the high levels of the 1970s achieved their purpose, they did not come without some costs.
19. Several factors played in favor of China which allowed them to weather the effects of the financial crisis better than the United States or the United Kingdom. The economies of the United States and the United Kingdom in general are more closely tied to the functioning of financial markets, so when financial markets deteriorated, it hurt the United States and United Kingdom more directly and significantly. When Lehman Brothers failed and the financial crisis was at its worst, global demand for goods and services contracted, which did hurt China’s export sector significantly. However, the biggest difference between the two cases is the policy responses. China pursued a massive fiscal stimulus, along with an autonomous easing of monetary policy, which together was much stronger and larger than in the United States or the United Kingdom. The difference in outcomes of the two cases is telling: Although China’s growth slowed, it did not stall. In the case of the United States and United Kingdom deep and prolonged recessions resulted.

ANSWERS TO APPLIED PROBLEMS

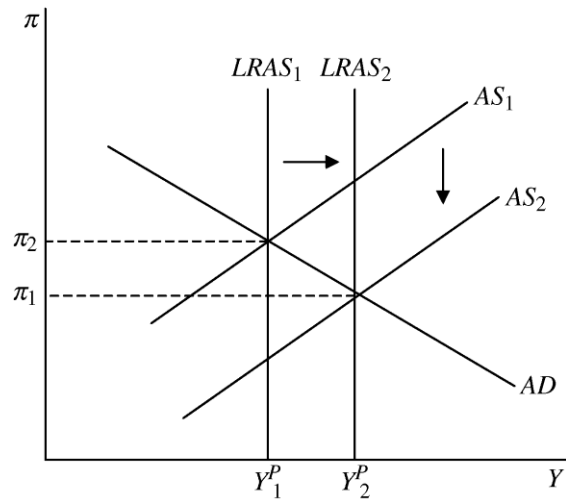
20. a. With a temporary negative supply shock, the short-run aggregate supply curve shifts up. In the short run, output falls and inflation rises. This creates slack in the labor market, which puts downward pressure on the inflation rate. As labor market slack continues and inflation expectations fall, the short-run aggregate supply curve shifts back down. Over time the inflation rate falls and output rises until the economy returns to the long-run equilibrium.



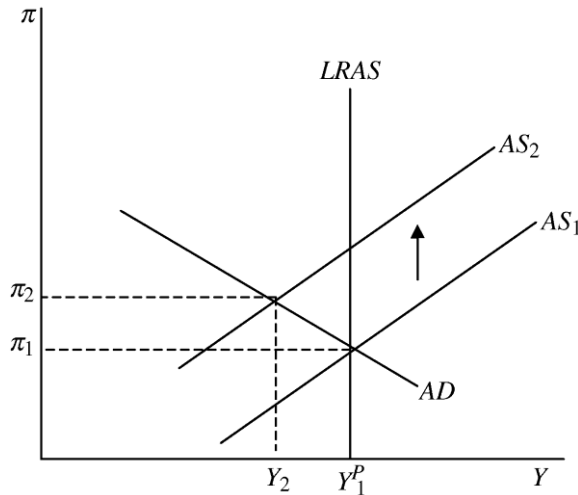
- b. With a permanent negative supply shock, the long-run aggregate supply curve shifts to the left. This creates a condition in which output is now above potential output, and the labor market tightens. As inflation and inflation expectations rise, the short-run aggregate supply curve shifts upward to the new long-run equilibrium. Eventually, output is lower and inflation is higher at the new long-run equilibrium.



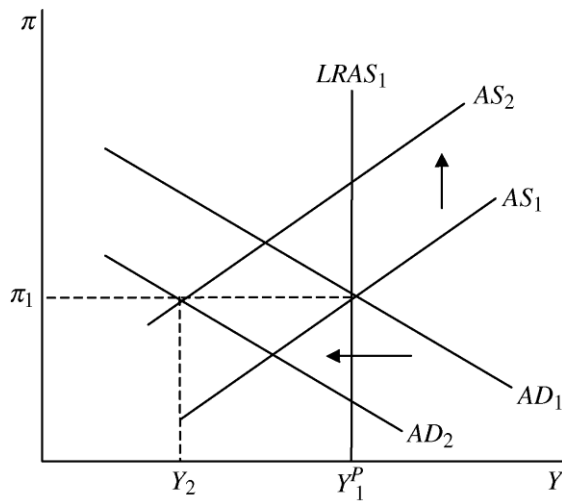
21. Technological change and infrastructure improvements affect the long-run aggregate supply curve. More fuel-efficient cars result in a decrease in the demand for gas at the same time that innovations in energy production make it possible to increase the supply of energy at any price level. Innovations in these fields result in a shift to the right in both the short- and long-run supply curves. Improvements in infrastructure make transportation of goods to market more efficient, and raise productivity in a variety of ways. In conclusion, inflation decreases and output increases in the long run.



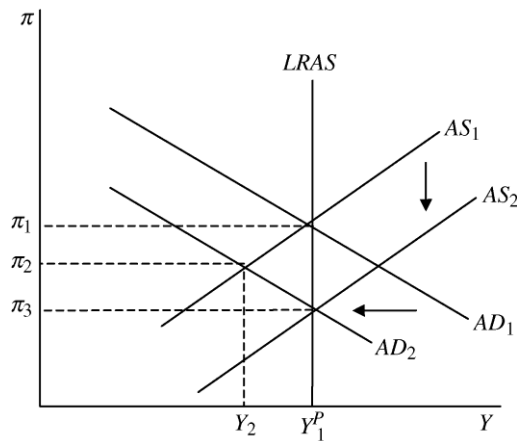
22. Because goods would cost more, the national sales tax would raise production costs, and the short-run aggregate supply curve would shift to the left. The intersection of the short-run aggregate supply curve with the aggregate demand curve would then be at a higher inflation rate and a lower level of aggregate output; aggregate output would fall, and the inflation rate would rise.



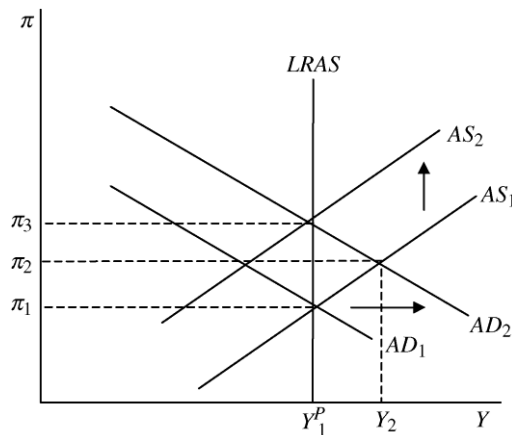
23. In order for the unemployment rate to rise and inflation to remain constant, both the aggregate supply and demand curves would have to shift to the left. If they shift horizontally to the left by the same amount, the result is inflation remaining the same, but output falling and the unemployment rising in the short run, as shown in the graph below.



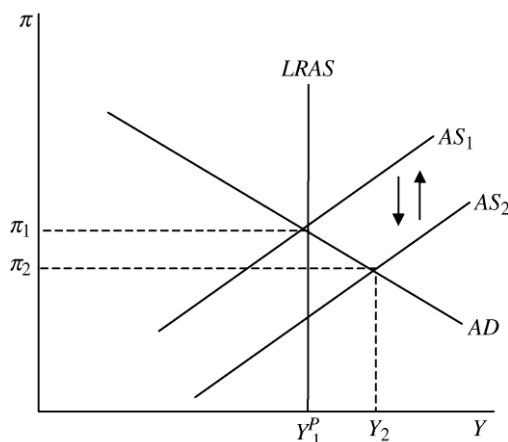
24. (a) Negative demand shock. An increase in financial frictions reduces aggregate demand. Output and inflation fall in the short run; in the long run, output rises back to potential, and inflation falls.



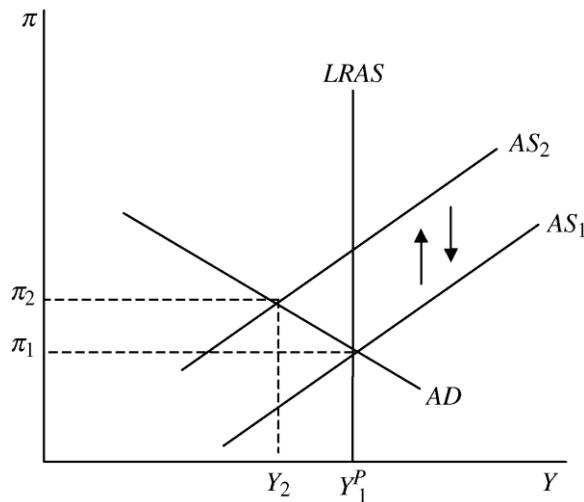
- (b) Positive demand shock. This increases autonomous consumption and investment, which increases aggregate demand. Output and inflation increase in the short run; in the long run, output falls back to potential, and inflation increases.



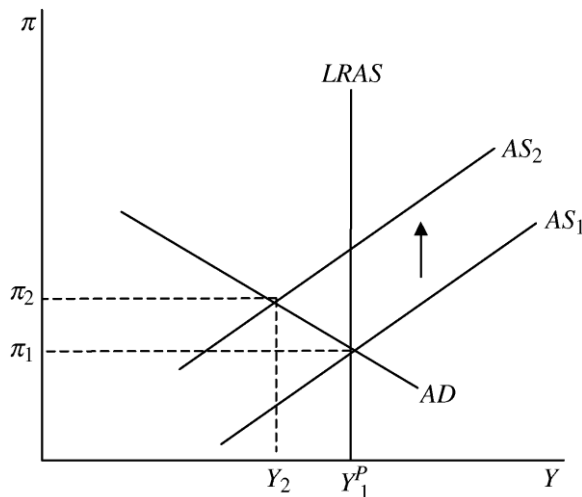
- (c) Positive (temporary) supply shock. This shifts the short-run aggregate supply curve to the right (down). Output increases and inflation decreases in the short run; in the long run, output falls back to potential, and inflation increases, returning to the original level.



- (d) Negative (temporary) supply shock. This shifts the short-run aggregate supply curve to the left (up). Output decreases and inflation increases in the short run; in the long run, output increases back to potential, and inflation decreases, returning to the original level.



25. If the public assumes that the current Fed officials are not that worried about inflation, expected inflation will increase, shifting the short-run aggregate supply curve upward and to the left (as shown in the graph below). During the spring of 2010 Fed officials were in the difficult position of worrying when they might have to increase interest rates to fight inflation as there were already some signs of a possible economic recovery taking place. Increasing interest rates too late would fuel expectations about inflation, while increasing interest rates too soon will slow down the recovery or even send the economy back into recession. It is quite difficult to make this decision, which is why most of the time the conduct of monetary policy is more an art than a science.



Chapter 23

ANSWERS TO QUESTIONS

1. When the inflation gap is negative, this means that the current inflation rate is less than the target inflation rate.
2. False. If the central bank pursues stabilization policy, it can stabilize both inflation and output simultaneously by an autonomous easing of policy. If it lowered its inflation target, this would stabilize inflation temporarily; however, output would still be below potential. In addition, as the economy recovered from the recession, inflation would naturally begin to fall more due to the self-correcting mechanism. Thus in order to allow the economy to move back to the potential level of output, the central bank would need to then continuously adjust its inflation target. Constant adjustment of the inflation target would be inefficient, and could send mixed signals to the public about what it is doing and why.
3. (a) A reduction in autonomous consumption reduces aggregate demand, so monetary policymakers would pursue an autonomous easing of monetary policy to stabilize economic activity. (b) A reduction in financial frictions increases aggregate demand, so monetary policymakers would pursue an autonomous tightening of monetary policy to stabilize economic activity. (c) An increase in government spending increases aggregate demand, so monetary policymakers would pursue an autonomous tightening of monetary policy to stabilize economic activity. (d) An increase in taxes reduces aggregate demand, so monetary policymakers would pursue an autonomous easing of monetary policy to stabilize economic activity. (e) An appreciation of the domestic currency leads to lower exports and higher imports, which reduces net exports and aggregate demand, so monetary policymakers would pursue an autonomous easing of monetary policy to stabilize economic activity.
4. The Fed lowered the fed funds rate to zero during the crisis to offset falling aggregate demand; however, this was insufficient to stabilize aggregate demand and output. As a result, the Fed resorted to nonconventional monetary policy to help offset the financial frictions. This involved liquidity provision and asset purchases, which helped to lower medium and longer-term interest rates, and helped to increase aggregate demand, despite having reached the zero lower bound on the federal funds rate. However, due to the severity of the crisis, these policies were insufficient to fully stabilize economic activity and bring output to potential.
5. The divine coincidence exists when policies that are appropriate to achieve price stability also stabilize economic activity. In this case, policymakers have easier jobs because there is no tradeoff between policy objectives and they do not have to choose between them. They can, in other words, have their cake and eat it, too. The divine coincidence occurs when the economy is beset with aggregate demand shocks or permanent supply shocks, but not when it experiences temporary supply shocks. When faced with either of the first two shocks, policymakers can stabilize both inflation and economic activity by enacting policies to shift the economy's aggregate demand curve and return to long-run equilibrium at potential output. In the case of a temporary supply shock, however, policies that shift the aggregate demand curve to achieve inflation stability will move the economy further away from potential output and those aimed at stabilizing economic activity at potential output will cause the inflation rate to move further away from the target rate.

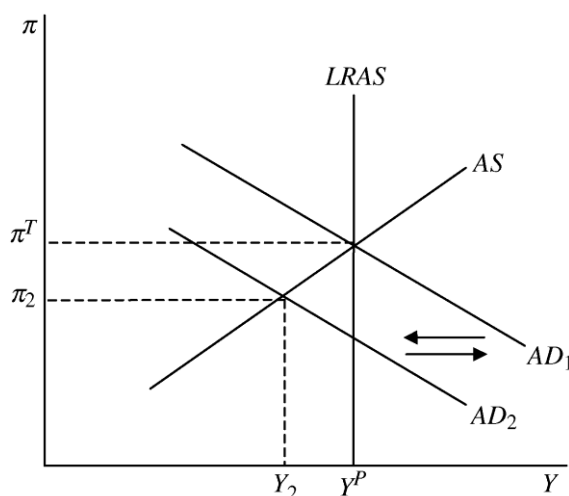
6. With negative supply shocks, both inflation and the unemployment rate increase. In order to reduce the unemployment rate, an expansionary policy must be pursued, which further increases inflation. On the other hand, pursuing a policy to reduce the inflation rate requires a contractionary policy, which further increases the unemployment rate. Thus, with negative supply shocks stabilization policy requires a tradeoff between achieving the objectives of inflation stabilization and stabilization of real economic activity.
7. In both cases inflation rises and output falls; however, in the case of a permanent negative supply shock, the long-run effects on these variables are permanent. With a temporary negative supply shock, inflation will increase and output fall, but eventually as the shock wears off and the self-correcting mechanism moves the economy back to the long-run equilibrium, both output and inflation will return back to their previous levels. In other words, the adverse effects are only temporary in the latter case, but permanent in the former case.
8. In country A, policymakers chose a policy to stabilize output. In country B, policymakers chose a policy to stabilize inflation. In country C, policymakers chose no policy response, i.e., left autonomous monetary policy unchanged.
9. Uncertain. A temporary positive supply shock has the dual benefits of increasing output and also reducing inflation, so in some sense policymakers get the best of both worlds by *not* pursuing any type of stabilization policy. However, if the supply shock is large enough, it could reduce inflation and/or increase output enough such that it could create more variability and hence uncertainty in inflation, which could actually be destabilizing. In this case, it may be in the best interest of policymakers to pursue a policy that stabilizes the inflation rate in the short run, until the supply shock wears off (this would have the added benefit of temporarily increasing output more than if policymakers did nothing).
10. This demonstrates the problem of effectiveness lags in the implementation of monetary policy. Changes in monetary policy impact interest rates, which affect the cost of investment in new plant and equipment. Since it can be many months before new plant and equipment is purchased and put into use, the interest rate effects of monetary policy occur with a lag.
11. This refers to the legislative lag (of fiscal policy).
12. Stabilization policy is conducted more frequently using monetary policy rather than fiscal policy because implementing fiscal policy requires making changes in taxes and government spending that take longer to deliberate and enact than monetary policy decisions do.
13. True. If the first parts of the statement could be achieved, the objection to activist policy would no longer be as serious. For instance, in response to aggregate demand shocks, the aggregate demand curve could be more quickly shifted to potential output, resulting in less variation in both inflation and output, and making an activist policy more desirable.
14. Activists argue that wages are inflexible, and in particular that they are not likely to fall as would be needed for the self-correcting mechanism to adjust to long-run equilibrium if the economy suffers from low output and high unemployment. Wages and prices may be prevented from changing by existing contractual agreements, for example, between employers and workers. Expected inflation may be slow to adjust, which will delay the upward or downward shifts of the short-run aggregate supply curve that are part of the self-correcting mechanism.

15. Not necessarily, because an activist policy to eliminate unemployment could lead to the demand-pull and cost-push inflations depicted in Figure 9 and Figure 10 in the chapter. In addition, the activist policy might lead to a higher probability that workers will push up their wages, which results in episodes of high unemployment.
16. Evidence showing that the welfare gains from stabilizing output and unemployment are relatively small supports the nonactivist case. This is actually a major topic in macroeconomics, which was addressed by the Nobel Prize-winning economist Robert Lucas. Lucas developed a theoretical model meant to represent the U.S. economy after World War II and used to measure how well off the average individual would be if the government followed a stabilization policy agenda. He concluded that there is only a tiny increase in the well-being of the average individual resulting from stabilization policy. On the contrary, monetary and fiscal policies focused on the long run resulted in much bigger welfare gains for the average individual, making them a better option over stabilization policy.
17. When the short-run aggregate supply curve has a steeper slope, wages and prices in general are more flexible (i.e., changes in output result in larger changes in the inflation rate). This situation constitutes a stronger argument in favor of nonactivist policy, since changes in the aggregate demand curve will result in smaller changes in output and unemployment when the short-run aggregate supply curve is steeper. Alternatively, one might think that further efforts in terms of activist monetary or fiscal policy are needed to affect output if prices and wages are less flexible (which is the case when the short-run aggregate supply curve is flatter).
18. False. Even though policymakers do not want inflation, if they pursue goals such as high employment or choose to run high budget deficits, inflationary monetary policy and inflation can result through the mechanisms discussed in this chapter.
19. Monetary policymakers can target any inflation rate they want to simply by implementing autonomous monetary policy easing (to target a higher inflation rate) or tightening (to target a lower one). However, although they can exert this control over inflation in the long run, they have no control over real interest rates or potential output in the long run, so the classical dichotomy and monetary neutrality hold just as they do in the classical framework.
20. If policymakers believe that the natural rate of unemployment is 7% when it is actually 5%, then once the unemployment rate begins to drop below 7%, they are likely to pursue contractionary policy to avoid a perceived potential demand-pull inflation problem. In actuality, this would represent a situation where policymakers are contracting the economy when it is already in recession. The result of these policies is that this could create a downward spiral in inflation, which could lead to deflation and a severe economic downturn.
21. When inflation increases due to demand-side conditions, this could prompt workers to demand higher wages (which are greater than the growth in labor productivity) in anticipation of future higher inflation. This results in the aggregate supply curve shifting upward, and creating cost-push inflation (which was initiated by a demand-pull inflation source).

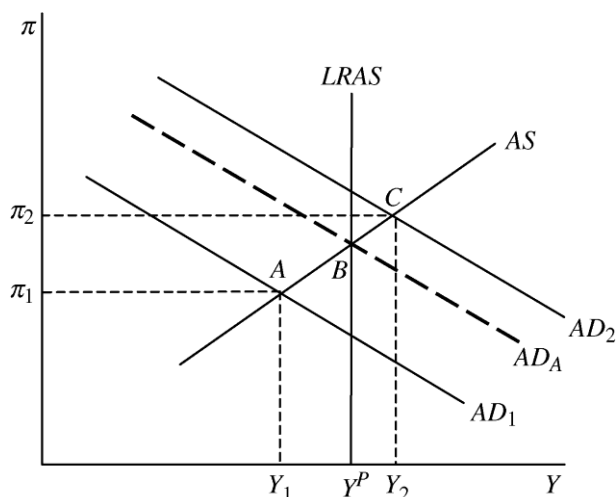
ANSWERS TO APPLIED PROBLEMS

22. (a) According to aggregate demand and supply analysis, the decrease in government expenditures results in a shift to the left in the aggregate demand curve, as aggregate expenditures decrease at every inflation rate. As a result, the new intersection point with the short-run aggregate supply curve determines a lower inflation rate and output level than before, as shown below. At this point, output

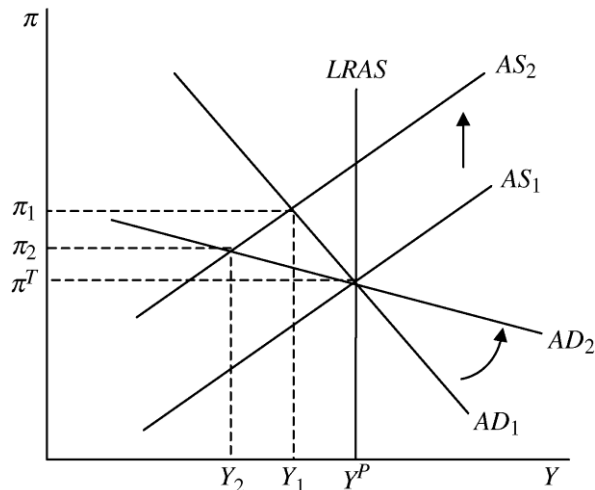
is below potential output and inflation is below its target. (b) If the Federal Reserve decides to use its monetary policy tools to stabilize inflation, it will effectively decrease the real interest rate at every inflation rate, thereby shifting the MP curve downward. This action will shift the AD curve to the right and restore the economy to its long-run equilibrium, where the inflation rate returns to its target π^T and output is at potential output again. The only long-run effect of this policy is to affect the real interest rate, which is now set at a lower level than the previous long-run equilibrium.



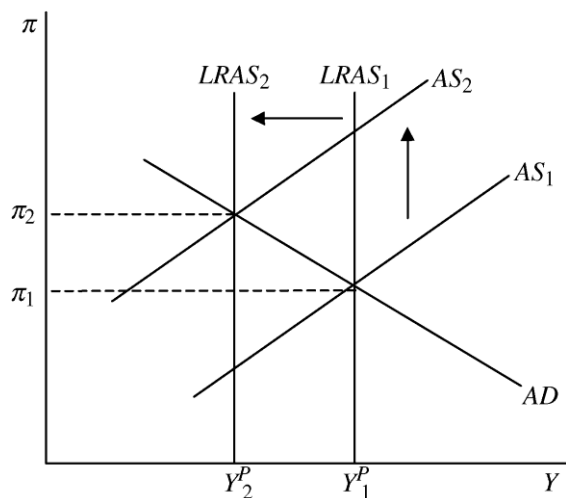
23. Suppose the economy is currently in recession at point A in the graph, and policymakers wish to stabilize output. Given current assumptions about the state of the economy, policymakers may devise a policy which they anticipate will shift aggregate demand out to AD_A and stabilize the economy. However, because of lags in the policy process (which were presumably unaccounted for or unknown), it may take some time before the policy changes actually take effect. If the economy begins to recover and demand begins to expand independent of the policy effects, then once the policy actually takes hold, it could expand aggregate demand beyond potential output, to a point such as point C. In this case, output overshoots potential and inflation is higher than anticipated, which can lead to further increases in inflation as inflation expectations adjust upward. Moreover, once at point C, policymakers may try to correct the overshoot, which could lead to aggregate demand shifting back below AD_A and lead to further volatility in both inflation and output.



24. As seen in the graph below, when the aggregate demand curve becomes flatter, then for a given negative aggregate supply shock this implies that the increase in inflation is smaller, and the reduction in output is larger. Thus, as the aggregate demand curve becomes flatter, inflation is kept closer to the original level; however, the output effects are more pronounced.



25. Graft and corruption result in significant inefficiencies in markets, and particularly in the way that goods and services are provided to consumers and other firms. As a result, this has the effect of reducing the long-run productive capacity of the economy, and acts like a permanent negative supply shock, as the graph below shows. This leads to higher inflation and reductions in the potential level of output, which is reflected in the low or even negative growth that these countries can exhibit.



Chapter 24

ANSWERS TO QUESTIONS

1. The Lucas critique says that policymakers' priors about the effects of a given policy will generally be wrong, since it is difficult for policymakers to accurately take into account the reaction by people to changes in policies. This points out the limitation to our understanding of how the economy works in that current research cannot fully explain and model accurately the behavior of individuals, and therefore policymakers have to rely on fundamentally flawed models to estimate the effects of policies on the economy.
2. True, because the Lucas critique indicates that the effect of policy on inflation and output depends on the public's expectations about the policy. The outcome of a particular policy is therefore less certain in Lucas's view than if expectations about it do not matter, and it is harder to design a beneficial activist stabilization policy.
3. (a) According to the rational expectation theory, individuals might interpret this increase in the federal funds rate target as a signal that the Fed will commit to fight inflation. The increase in the federal funds rate determines an increase in real interest rates in the short run and results in a higher user cost of capital. Although this might reduce investment, it is possible that individuals recognize the Fed's intentions and therefore decide to increase investment in anticipation of a low inflation economic environment that encourages investment. (b) Lucas's critique will point out the fact that the model was probably constructed by using past data in which domestic investment decreased after interest rates increased. But that model does not take into consideration that individuals might revise their expectations quite quickly and might decide to alter the way in which they respond to changes in economic variables, like the interest rate.
4. Long-term interest rates will fall. Theories of the term structure suggest that long-term interest rates are related to the expected average of future short-term interest rates. When the public expects the Fed to raise short-term interest rates permanently, they raise their expectations of future short-term rates and long rates are higher. Then, when the Fed does not go through with the expected policy of raising short-term rates, the public will realize that their expectations were mistaken and will revise their expectations of short-term rates downward. The result is that the Fed's decision not to go through with the policy change causes long-term interest rates to fall.
5. When central banks are more independent, there is less formal accountability by them to pursue stable inflation policies. In this sense, it is easier for central banks to give the appearance of desiring to pursue low inflation policies, while in actuality pursuing more expansionary policies to lower the unemployment rate and increase output. However, even with greater central bank independence, the time inconsistency problem can be somewhat alleviated through greater transparency and communication, which means that there is less ability for the public to be fooled into false expectations, and therefore less ability for the central bank to pursue overly inflationary policies to increase output and lower unemployment in the short-run.
6. Advocates of rules argue that they solve the time-inconsistency problem so that policymakers will achieve good long-run economic outcomes, that they will prevent repeating serious policy mistakes that have been made in the past, and that they will avoid political business cycles that might result if policymakers were free to adopt expansionary policies before an election followed by contractionary policies afterwards. Opponents argue that rules are too rigid and deny policymakers the flexibility they need to deal with unforeseeable problems, that they do not allow any role for judgment in policy making,

that they may be based on incorrect models of the economy, and that they will lead to bad economic outcomes if the economy undergoes structural changes.

7. The rise in expected inflation as a result of the election would shift the short-run aggregate supply curve upward, which would lead to a rise in inflation and a fall in output.
8. Yes, if budget deficits are expected to lead to an inflationary monetary policy and expectations about monetary policy affect the short-run aggregate supply curve. In this case, a large budget deficit would cause the short-run aggregate supply curve to shift upward because expected inflation would be higher. The result is that the increase in the current inflation rate would be higher.
9. When a president has the authority to nominate or lay off the head of the central bank, it is quite plausible that the conduct of monetary policy would be discretionary. Adherence to monetary policy rules involves imposing some hardship on the economy sometimes. If the president can pressure the head of the central bank, then most likely monetary policy will be discretionary and follow the dictates of the president or his/her political party. This is actually what happened in many South American countries in the 1970s and 1980s. Not surprisingly, most of these countries could not reach long-run goals such as price stability during this period. Also, frequent changes in monetary policy (and fiscal policy) resulted in increased output volatility and low growth. Although most central banks are still subject to pressure from politicians, it is widely understood that some independence is desirable.
10. (a) The benefit of sticking to a set of rules when following a diet include reaching a given goal, probably defined in terms of a desired weight. The costs can be measured in terms of the lost opportunities to savor tasty food or desserts. In this case costs are short lived, although it is quite easy to succumb to such temptations. This could be compared to a central bank pursuing overly expansionary policy to surprise market participants and temporarily decrease unemployment. Even if that pays off in the short run, it will most likely reduce the central bank's credibility and make it more difficult to attain the long-run goal.
 (b) The benefit of sticking to a set of rules in this case might be considered a little more controversial. Giving children a clear set of rules and making every possible effort to enforce them seems to have positive effects in the long run. However, this might be quite difficult, as many parents can confirm. Also, it might not be that clear that excessive rules have a positive effect on children. In any event, parents who decide to set up rules will eventually face the problem that giving in will decrease their reputation and compromise the credibility of future rules. The cost of following rules when raising children is that one cannot possibly think of all the situations that might arise in a child's life, and it is therefore impossible to set a rule for everything. On top of that, enforcing every rule might create severe problems in the short run, as the lack of discretion might hurt the economy if fiscal policy is designed to follow strict rules (e.g., like forcing governments to balance their budget every year).
11. Switzerland established a formal monetary aggregate targeting rule as a basis for monetary policy operations in the 1970s. Problems with this targeting approach began in the late 1980s when a series of changes in the banking system altered the connection between the monetary base target and economic activity. In particular, the previous monetary base target meant that, with the structural changes to the economy, monetary policy was far too expansionary which created undesirably high inflation pressure. This example highlights one of the main problems with policy rules in that it is difficult to design policy rules that can appropriately account for structural changes in the economy. In this sense, some amount of discretion in the policy process can help address structural changes in the economy.
12. Constrained discretion is a more transparent and disciplined type of discretion in which the general objectives and tactics of the policymaker are committed to in advance. This allows for some flexibility in policy actions (as in a purely discretionary regime), but somewhat limits the ability of policymakers to pursue overly expansionary policies as long as they are committed to the general objectives and tactics

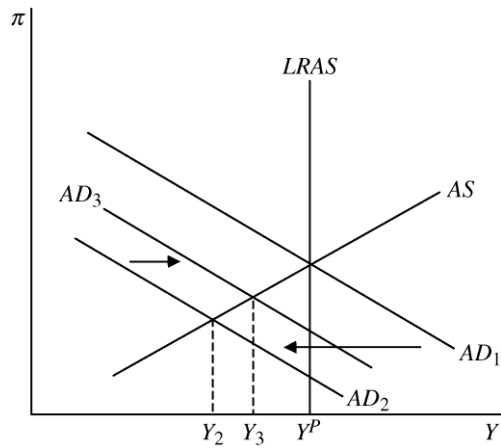
laid out. The difference in outcomes is that under constrained discretion, since policymakers are likely to have more credibility through commitment and transparency, inflation and inflation expectations are likely to be lower than under pure discretion, without giving up much flexibility to address changes in the real economy.

13. In general, when central banks lack credibility, there is little faith by the public that the central bank will pursue policies that will result in low, stable inflation. As a result, inflation expectations are likely to be higher, leading to an upward shift in the short-run aggregate supply curve. This results in higher actual inflation and lower output, which is obviously less desirable an outcome than if the central bank were to have full credibility.
14. This is a clear sign that the Fed enjoys a high level of credibility. This credibility was probably earned through the last two decades. Although the Fed never explicitly stated an inflation target, many people believe that Fed officials had an inflation target in their minds during this period. Even though it was not announced, this target was assumed to be above zero, and (here is where opinions differ) around 1.5% to 2.5% annual inflation rate. Even if the Fed has not announced an inflation target, and can therefore not be held accountable for missing it, it is quite clear that individuals believe that the Fed is and has been concerned about keeping inflation at low and stable levels. Finally, even more impressive is the fact that the monetary base increased significantly as a consequence of the Fed's actions to support the U.S. financial system, but this did not result in high expected inflation, either.
15. True, if expectations about policy affect the wage- and price-setting process. In models in which expectations about policy are relevant, a credible anti-inflation policy reduces inflation faster and at lower output costs than an anti-inflation policy that is not believed (and hence not expected) by the public.
16. As Figure 3 in the chapter demonstrates, the oil price shocks in the 1970s resulted in significantly higher inflation and unemployment as compared to the shock which affected the economy beginning in 2007. The main distinction between the two episodes is the role of policy credibility. In the case of the 1970s, the Federal Reserve's commitment to keeping inflation low was weak, so the oil price shocks shifted the aggregate supply curve upward not only due to the shock itself, but also due to higher inflation expectations as a result of weak Fed credibility. In contrast, the Federal Reserve's commitment to keep inflation low and stable in the last couple of decades has created strong Fed credibility. This kept inflation expectations from rising very much as a result of the 2007 shock, so the effects on actual inflation and the unemployment were more subdued than in the 1970s episodes.
17. Announcements about the inflation targets and potential punishments for central bank officials are crucial for inflation targeting. It is very important for the public to be able to check whether the target has been reached or not. When central bank officials know that the public can easily check their performance, they have an extra incentive to do everything in their power to attain their goals, as their reputation is at stake. Even if their reputation is not that important to them, they have an incentive to do their job, since they might be fired otherwise. When the central bank officials and the general public know "the rules of the game," there is a higher probability that monetary policy will be more credible. In conclusion, transparency could be a good ingredient in the conduct of any specific type of monetary policy. This was recognized by the Federal Reserve some time ago. Even if the Fed is not engaged in inflation targeting (or any monetary policy with an explicit nominal anchor), it recognized the need to communicate with the public its decisions about the federal funds rate target some years ago.

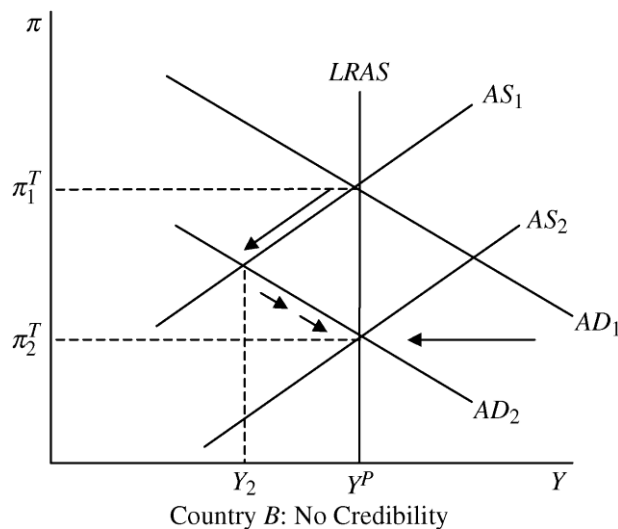
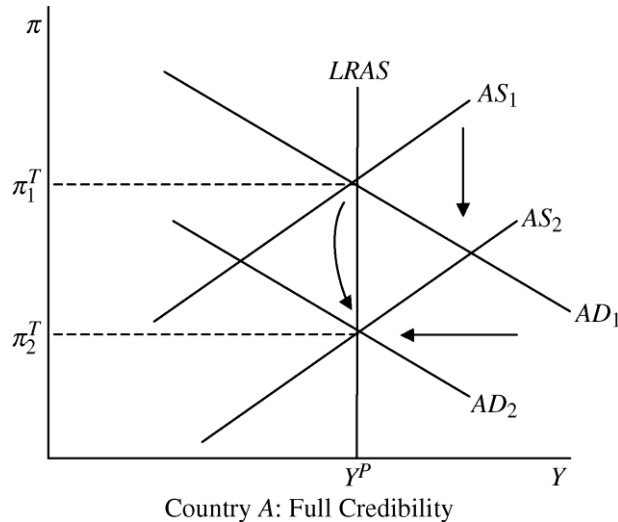
18. The statistical office's mistake will obviously hurt the central bank's credibility and will mean that the inflation target was missed. Depending on the set of rules governing the central bank, some officers might be dismissed. When pursuing an inflation target, accurate inflation measurement is critical. It could technically happen that a couple of prices might artificially pull up the price index, therefore increasing inflation measures more than necessary. This is true for some important prices, like the price of oil and gas, in most industrialized countries. To avoid this problem, other price indices, which do not consider the price of oil and gas, are constructed. When evaluating the performance of the central bank engaged in inflation targeting, more than one price index is analyzed. In addition, effective and clear communication with the public and government authorities is crucial for everyone to understand the limits of these measures and the limits to the central bank's actions. If this limitation is not properly understood, the central bank's credibility will be hard to earn and maintain.
19. Inflation targeting has two basic purposes, to keep inflation under control and to increase the credibility of monetary policymakers' commitment to price stability. These are achieved by announcing a numerical target for inflation and a commitment to price stability as the primary long-run goal of monetary policy, increasing communications with the public and financial market participants about the goals and processes of monetary policy making, and holding policymakers accountable for achieving the inflation target that has been set.
20. Tying its domestic currency to another country's currency is an easy way for a country with a poor inflation record to establish credibility. This is because a formal exchange rate target provides a simple and clear rule for monetary policymakers to follow, which is easily verifiable. Thus, commitment to the exchange rate target significantly reduces the time-inconsistency problem by limiting discretionary policy. Moreover, committing to an exchange rate target with a country that has a good record of low, stable inflation means that the domestic economy will import that low inflation environment, as long as it maintains its commitment to the target.
21. A conservative central banker is one who has a strong and notable dislike for inflation. In other words, a conservative central banker would be appointed to project a strong aversion to inflation and be committed to keeping inflation low and stable.

ANSWERS TO APPLIED PROBLEMS

22. A severe downturn would result in the aggregate demand curve shifting sharply to the left to AD_2 below. With a strict constant money growth rule, this would result in a limited expansionary effect on aggregate demand, shifting aggregate demand back to AD_3 . However, this would be inadequate to fully stabilize output, and a recessionary condition would still persist. This could reflect poorly on the central bank in the sense that, by failing to stabilize output, it may be viewed by the public as not doing its job. The central bank could abandon the constant money growth rule and expand aggregate demand enough to move the economy back to potential output (at AD_1), however this would be moving away from a rules-based policy, which helps keep credibility high and inflation expectations low, to a more discretionary framework in which credibility would be lower and inflation expectations higher.

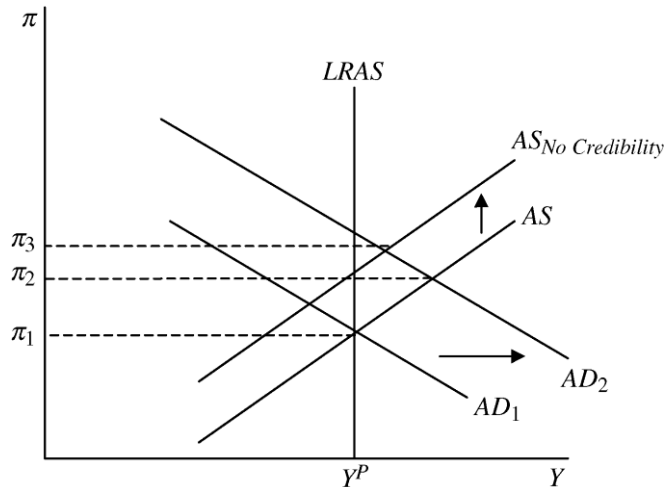


23. In country A, the public is more likely to believe announcements about future policy changes, and therefore adjust inflation expectations in anticipation of changes in future policy. As a result, aggregate supply will adjust more quickly to policy announcements compared to country B in which the central bank has no credibility. If the central banks both announce an autonomous tightening policy to reduce the target inflation rate, the aggregate supply curve will shift down much quicker in country A than country B. With no credibility, country B would likely have to contract aggregate demand first and let expectations adjust after the policy is implemented to achieve the same lower long-term inflation rate as country A. The implication is that output will be more stable in country A than in country B, and the adjustment process is faster in country A than country B.

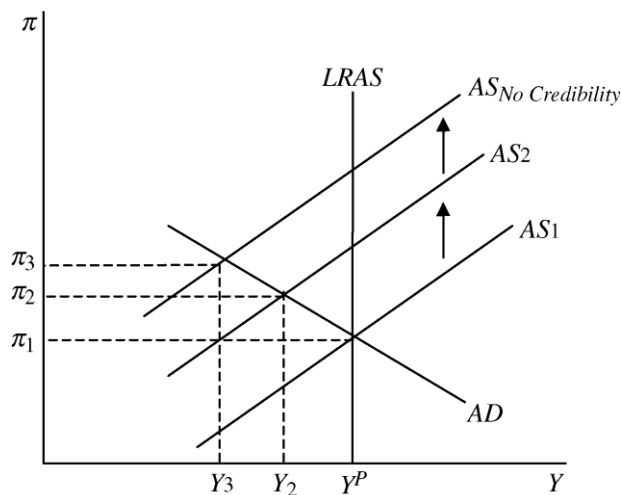


24. Since the aggregate demand curve, potential output, the parameter γ , and the price shock are identical in both countries, the only factor that can explain the difference in inflation between the two countries is expected inflation. Country B's inflation rate jumps much higher and stays elevated for much longer than country A's inflation rate, which must be reflective of higher inflation expectations in country B. The implication is that the central bank in country B has less credibility at maintaining low, stable inflation than country A, thus as a result of the negative supply shock, households and firms raised inflation expectations more as a result of the weak commitment by the central bank in country B.

25. Positive aggregate demand shocks shift the aggregate demand curve to the right, causing both inflation and output to rise. Without a credible nominal anchor, the increase in inflation causes expected inflation to rise, which shifts the short-run aggregate supply curve upward and causes the inflation rate to increase further to π_3 . With a credible nominal anchor, however, expected inflation does not change, so there is no upward shift in the short-run aggregate supply curve. Thus, with a credible nominal anchor, inflation is more stable following the demand shock.



The outcome is similar when a negative aggregate supply shock occurs. Inflation increases and output falls as the short-run aggregate supply curve shifts upward, but with a credible nominal anchor, expected inflation does not increase. As a result, no further upward shifts of the short-run aggregate supply curve occur and the increase in inflation and decrease in output are not as great as they otherwise would be. Thus the credible nominal anchor brings about better outcomes for both inflation and output when a negative supply shock occurs, as shown in the graph below.



Chapter 25

ANSWERS TO QUESTIONS

1. Despite very low interest rates as a result of monetary easing, expenditures on consumer durables were weak at this period of time, indicating that the interest rate channel, as it affected consumer durables, was not very healthy. As a result, the government instituted such programs in order to more directly stimulate spending in these areas.
2. Uncertain. Although consumption is the largest part of overall U.S. GDP, and there is no doubt that these channels can be important to monetary policy effectiveness, some may disagree with this statement. For instance, even though investment is closer to 15% of U.S. GDP, investment fluctuations are much more pronounced over the business cycle than changes in consumption, leading to the possibility that interest rate effects on investment could be potentially more important. In addition, proponents of the credit view believe that credit market effects are much more important than interest rate effects, and since the credit view primarily impacts investment, credit effects on investment could be potentially more powerful than consumption effects from monetary policy changes.
3. If the central bank commits to a higher inflation policy while maintaining low nominal interest rates, this will raise inflation expectations and therefore lower real interest rates, even if the nominal interest rate is zero. In addition, the central bank can commit to keeping short-term interest rates low for a long time, which can have the effect of lowering longer-term nominal interest rates, which also reduces real longer-term interest rates.
4. Part of the problem with deflation is that lower (negative) inflation raises the real interest rate, which raises the cost of capital and lowers investment and consumption through the interest-rate channel, creating further deflationary pressure. In addition, short-term nominal interest rates reach the zero lower bound, meaning traditional monetary policy is rendered ineffective. Thus, by being “responsibly irresponsible,” central banks can commit to creating strong but temporary inflationary policies that are designed to raise inflation expectations (and hence lower real interest rates) enough to create stimulus through the interest-rate channel and expand aggregate demand safely and surely to get out of a deflationary spiral.
5. An advantage to monetary policy having so many channels through which it can impact the economy is that if policy is rendered ineffective through any one particular channel, it doesn’t mean the policy is entirely ineffective, as there are other channels and other sectors of the economy in which the same policy can still impact the economy. On the other hand, having so many different channels through which monetary policy operates can increase uncertainty over the effects of any given policy.
6. True. When countries fix their exchange rate, they must use monetary policy to affect the interest rate in order to maintain the exchange rate. In other words, the central bank must change the real interest rate to maintain the exchange rate, which means net exports and aggregate demand will be unaffected as long as the exchange rate peg is maintained.
7. There are four main mechanisms through which the decline in stock prices could have reduced aggregate demand and contributed to the severity of the recession. First, the decline in stock prices lowered Tobin’s q and might have reduced investment spending. Second, the decline in financial wealth, as a result of the stock price decline, could have caused a drop in consumption because consumers’ lifetime resources were reduced. Third, the decline in stock prices lowered the value of financial assets, which increased the public’s probability of financial distress, and so they cut back on their purchases

of consumer durables and housing. Fourth, the decline in stock prices lowers the net worth of business firms, which increases adverse selection and moral hazard problems in lending and might have resulted in a reduction in lending and less investment spending.

8. False. Monetary policy can affect stock prices, which affect Tobin's q and adverse selection and moral hazard problems in lending, thereby affecting investment spending. In addition, monetary policy can affect loan availability, which may influence investment spending.
9. Stock prices will rise. The monetary easing lowers interest rates, so the yields on alternative assets to stocks, such as bonds, fall. This makes stocks more attractive, increases their demand, and hence raises their price.
10. The lower real interest rates would stimulate investment spending because the cost of financing investments would fall. However, the stock market decline would cause the market value of firms to fall and so Tobin's q to fall. The decline in Tobin's q would then lead to a decline in investment spending. Because the stock market and the Tobin's q decline was so large, investment spending actually fell dramatically during this period.
11. There are three mechanisms involving consumer expenditure. First, an expansionary monetary policy lowers interest rates and reduces the cost of financing purchases of consumer durables, and consumer durable expenditure rises. Second, an expansionary monetary policy causes stock prices and wealth to rise, leading to greater lifetime resources for consumers and causing them to increase their consumption. Third, an expansionary monetary policy that causes stock prices and the value of financial assets to rise also lowers people's probability of financial distress, so they spend more on consumer durables.
12. This situation is consistent with Tobin's q and the wealth effects of expansionary monetary policy. With lower interest rates, stock prices rise. Tobin's q predicts that investment will increase, stimulating aggregate demand. In addition, with the higher stock prices, this will raise wealth, and lead to higher consumption and increased aggregate demand.
13. The wealth channel suggests that this type of monetary policy would raise stock prices and increase house prices, which would raise homeowners' equity, and hence wealth through housing and stock markets. However, even though real interest rates were low, stock values and housing wealth declined sharply, which ultimately decreased consumption and aggregate demand, suggesting monetary policy effects through the wealth channel were ineffective during the global financial crisis.
14. With an increase in bank reserves, the bank lending channel predicts that deposits and loans will increase, leading to higher investment. However, the increased amount of reserves did not translate to higher lending due to perceived credit risks by lending banks. As a result, banks chose to simply hold the increased amount of reserves as excess reserves rather than loan them out, indicating that the bank lending channel of monetary policy was not operating effectively during the global financial crisis.
15. Since small businesses are more dependent on bank loans than large firms, monetary policy changes that impact the availability of credit will disproportionately affect small businesses more than large firms.
16. There are a couple reasons why this might be true. First, bank regulations in the United States have eased, making it easier for banks to raise funds through various sources which were cumbersome under Regulation Q. The implication is that the Fed has less control over the behavior of banks in response

to policy changes because of the change in regulations. In addition, there has been a worldwide decline in the traditional bank lending business, meaning the sheer size of bank lending is lower, making this channel less potent.

17. This would lower the net worth of firms, and lead to increased adverse selection and moral hazard, ultimately resulting in lower investment. This is precisely what happened as a result of the global financial crisis.
18. It would make it more difficult for the central bank to stimulate the economy. The credit view indicates that adverse selection and moral hazard play an important part in affecting investment behavior and ultimately the economy. However, during downturns, asymmetric information problems increase, meaning that monetary policy must be more powerful to offset the contractionary effects of increases in adverse selection and moral hazard.
19. During the Great Depression, the fall in the price level led to a significant decrease in consumer wealth and a sharp decline in consumption. The decline in prices led to an increase in real debt of more than 20%, and overall, the effect on consumers was to reduce expenditure more than 50%, and housing expenditures fell 80%.
20. The two channels are similar in that increases in real interest rates lead to lower asset prices, which lead to lower spending on consumption and housing. The difference is in how changes in asset prices lead to lower spending. Under the wealth effect, people are simply less willing to spend when wealth is lower (due to lower overall lifetime resources), leading to a reduction in spending. The household liquidity effect instead indicates a substitution effect between more liquid assets (such as cash or stocks) and less liquid assets (such as consumer durables or housing). Thus, with lower asset values, households use their resources to purchase safer, more liquid assets rather than consumption or housing, leading to lower aggregate demand.
21. (a) Lower mortgage rates should lead to higher housing prices, and raise the value of housing wealth. This should lead to a lower probability of financial distress, and raise consumer durable and housing expenditure. (b) Even though interest rates were extremely low, if nobody could qualify for the low mortgage rates it would not have an appreciable effect on raising the value of household's financial assets (i.e housing wealth). Thus, the likelihood of financial distress would remain elevated, and not improve consumer durable and housing expenditure.
22. There are three main reasons why the credit view may prevail. First, there is evidence to indicate that financial frictions do significantly affect employment and spending decisions. Second, there is evidence that small firms are hurt more by tight monetary policy than large firms, which are unlikely to be credit-constrained. Finally, asymmetric information, which is at the heart of the credit view, has wide applicability in explaining many other behavioral and economic-related concepts, so it is likely to play an important role in financial markets and monetary policy.
23. False. A monetary easing is associated with falling real interest rates. Even if nominal interest rates are falling, it could be the case that expected inflation decreases more, leading to an increase in real interest rates and a tighter monetary policy stance.

24. The experience of Japan directly supports the four lessons of monetary policy discussed in the chapter. First, short-term interest rates in Japan were near zero; however, due to deflation, real interest rates remained elevated, suggesting a contractionary monetary policy stance. Secondly, if Japanese policymakers would have paid more attention to the collapse of stock and housing markets, this could have led to earlier and swifter action to shore up the economy. Thirdly, Japan took no steps to stimulate the economy other than pushing short-term rates to zero. However, they could have done more to push longer-term rates down through asset purchases and raising inflation expectations. Finally, Japan allowed the economy to go into a deflationary period, leading to unanticipated and undesirable fluctuations in the price level.

ANSWERS TO APPLIED PROBLEMS

25. When the transmission mechanisms are functioning normally (and predictably), policymakers can ease monetary policy with reasonable precision, so that the aggregate demand curve shifts to the right from AD_1 to AD_3 and eliminates the output gap. Under periods in which the monetary transmission mechanisms are not functioning normally, such as during a financial crisis, some channels may not work as effectively, or at all. As a result, for a given monetary policy prescription, the effects on aggregate demand may be muted or nonexistent. In this case, aggregate demand may only shift to the right to AD_2 and an output gap may still remain at Y_2 . This illustrates the limitations of monetary policy to stabilize the output gap in such situations.

