

## **SOLUTIONS TO TEXT PROBLEMS:**

### **Quick Quizzes**

1. The three functions of money are: (1) medium of exchange; (2) unit of account; and (3) store of value. Money is used as a medium of exchange because money is the item people use to purchase goods and services. Money is used as a unit of account because it is the yardstick people use to post prices and record debts. Money is used as a store of value because it is an item people use to transfer purchasing power from the present to the future.
2. The primary responsibilities of the Federal Reserve are to regulate banks, ensuring the health of the banking system, and to control the quantity of money that is made available in the economy. If the Fed wants to increase the supply of money, it usually does so by creating dollars and using them to purchase government bonds from the public in the nation's bond markets.
3. Banks create money when they make loans and hold a fraction of the amount of the loans in reserves, resulting in an expansion of both money and credit in the economy. If the Fed wanted to use all three of its tools to decrease the money supply, it would: (1) sell government bonds from its portfolio in the open market to reduce the number of dollars in circulation; (2) increase reserve requirements to reduce the money created by banks; and (3) increase the discount rate to discourage banks from borrowing reserves from the Fed.

### **Questions for Review**

1. Money is different from other assets in the economy because it is the most liquid asset available. Other assets vary widely in their liquidity.
2. Commodity money is money with intrinsic value, like gold, which can be used for purposes other than as a medium of exchange. Fiat money is money without intrinsic value; it has no value other than its use as a medium of exchange. Our economy today uses fiat money.
3. Demand deposits are balances in bank accounts that depositors can access on demand simply by writing a check. They should be included in the stock of money because they can be as a medium of exchange.
4. The Federal Open Market Committee (FOMC) is responsible for setting monetary policy in the United States. The FOMC consists of the seven members of the Federal Reserve Board of Governors and five of the 12 presidents of Federal Reserve Banks. Members of the Board of Governors are appointed by the president of the United States and confirmed by the U.S. Senate. The presidents of the Federal Reserve Banks are chosen by each bank's board of directors.
5. If the Fed wants to increase the supply of money with open-market operations, it purchases U.S. government bonds from the public on the open market. The purchase increases the number of dollars in the hands of the public, thus raising the money supply.
6. Banks do not hold 100 percent reserves because it is more profitable to use the reserves to make loans, which earn interest, instead of leaving the money as reserves, which earn no interest. The amount of reserves banks hold is related to the amount of money the banking system creates through the money multiplier. The smaller the fraction of reserves banks hold, the larger the money multiplier, since each dollar of reserves is used to create more money.

7. The discount rate is the interest rate on loans that the Federal Reserve makes to banks. If the Fed raises the discount rate, fewer banks will borrow from the Fed, so banks' reserves will be lower, and thus the money supply will be lower.
8. Reserve requirements are regulations on the minimum amount of reserves that banks must hold against deposits. An increase in reserve requirements raises the reserve ratio, lowers the money multiplier, and decreases the money supply.
9. The Fed cannot control the money supply perfectly because: (1) the Fed does not control the amount of money that households choose to hold as deposits in banks; and (2) the Fed does not control the amount that bankers choose to lend. The actions of households and banks affect the money supply in ways the Fed cannot perfectly control or predict.

### Problems and Applications

1.
  - a. A U.S. penny is money in the U.S. economy because it is used as a medium of exchange to buy goods or services, it serves as a unit of account because prices in stores are listed in terms of dollars and cents, and it serves as a store of value for anyone who holds it over time.
  - b. A Mexican peso is not money in the U.S. economy, because it is not used as a medium of exchange, and prices are not given in terms of pesos, so it is not a unit of account. It could serve as a store of value, though.
  - c. A Picasso painting is not money, because you cannot exchange it for goods or services, and prices are not given in terms of Picasso paintings. It does, however, serve as a store of value.
  - d. A plastic credit card is similar to money, but represents deferred payment, rather than immediate payment. So credit cards do not fully represent the medium of exchange function of money, nor are they really stores of value, since they represent short-term loans rather than being an asset like currency.
2.
  - a. It would be difficult to run the economy using the "Swopper's Column" instead of money because it requires finding a double coincidence of wants. Money works efficiently because it requires satisfying people's needs on just one side of each transaction; you buy something for money and sell something else for money. With money, you do not have to buy something from someone who wants an item you're selling.
  - b. The "Swopper's Column" probably exists so that people can avoid paying taxes on things they buy and sell.
3. For an asset to be useful as a medium of exchange, it must be widely accepted (so all transactions can be made in terms of it), recognized easily as money (so people can perform transactions easily and quickly), divisible (so people can provide change), and difficult to counterfeit (so people will not print their own money). That is why nearly all countries use paper money with fancy designs for larger denominations and coins for smaller denominations.

For an asset to be useful as a store of value, it must be something that maintains its value over time and something that can be used directly to buy goods and services or sold when money is needed. In addition to currency, financial assets (like stocks and bonds) and physical assets (like real estate and art) make good stores of value.

4. a. If there were an easy way to make limestone wheels, the people on Yap would make additional wheels as long as the monetary value of the wheels was greater than the cost of producing the wheels. The result would be that people would make their own money, so there would be too much money produced. Most likely, people would stop accepting the wheels as money and switch to some other asset as a medium of exchange.
- b. If someone in the United States discovered an easy way to counterfeit hundred-dollar bills, they could flood the country with counterfeit currency, thus reducing its value. The result might be a switch to a different type of currency.
5. Many answers are possible.

6. When your uncle repays a \$100 loan from Tenth National Bank (TNB) by writing a check from his TNB checking account, the result is a change in the assets and liabilities of both your uncle and TNB, as shown in these T-accounts:

Your Uncle			
Assets		Liabilities	
Before:			
Checking Account	\$100	Loans	\$100
After:			
Checking Account	\$0	Loans	\$0

Tenth National Bank			
Assets		Liabilities	
Before:			
Loans	\$100	Deposits	\$100
After:			
Loans	\$0	Deposits	\$0

By paying off the loan, your uncle simply eliminated the outstanding loan using the assets in his checking account. Your uncle's wealth has not changed; he simply has fewer assets and fewer liabilities.

7. a. Here is BSB's T-account:

Beleaguered State Bank			
Assets		Liabilities	
Reserves	\$25 million	Deposits	\$250 million
Loans	\$225 million		

- b. When BSB's largest depositor withdraws \$10 million in cash and BSB reduces its loans outstanding to maintain the same reserve ratio, its T-account is now:

<b>Beleaguered State Bank</b>			
<b>Assets</b>		<b>Liabilities</b>	
Reserves	\$24 million	Deposits	\$240 million
Loans	\$216 million		

- c. Since BSB is cutting back on its loans, other banks will find themselves short of reserves and they may also cut back on their loans as well.
- d. BSB may find it difficult to cut back on its loans immediately, since it cannot force people to pay off loans. Instead, it can stop making new loans. But for a time it might find itself with more loans than it wants. It could try to attract additional deposits to get additional reserves, or borrow from another bank or from the Fed.
8. If you take \$100 that you held as currency and put it into the banking system, then the total amount of deposits in the banking system increases by \$1,000, since a reserve ratio of 10 percent means the money multiplier is  $1/.10 = 10$ . Thus the money supply increases by \$900, since deposits increase by \$1,000 but currency declines by \$100.
9. With a required reserve ratio of 10 percent, the money multiplier could be as high as  $1/.10 = 10$ , if banks hold no excess reserves and people do not keep some additional currency. So the maximum increase in the money supply from a \$10 million open-market purchase is \$100 million. The smallest possible increase is \$10 million if all of the money is held by banks as excess reserves.
10. a. If the required reserve ratio is 5 percent, then First National Bank's required reserves are  $\$500,000 \times .05 = \$25,000$ . Since the bank's total reserves are \$100,000, it has excess reserves of \$75,000.
- b. With a required reserve ratio of 5 percent, the money multiplier is  $1/.05 = 20$ . If First National lends out its excess reserves of \$75,000, the money supply will eventually increase by  $\$75,000 \times 20 = \$1,500,000$ .
11. a. With a required reserve ratio of 10 percent and no excess reserves, the money multiplier is  $1/.10 = 10$ . If the Fed sells \$1 million of bonds, reserves will decline by \$1 million and the money supply will contract by  $10 \times \$1 \text{ million} = \$10 \text{ million}$ .
- b. Banks might wish to hold excess reserves if they need to hold the reserves for their day-to-day operations, such as paying other banks for customers' transactions, making change, cashing paychecks, and so on. If banks increase excess reserves such that there is no overall change in the total reserve ratio, then the money multiplier does not change and there is no effect on the money stock.
12. a. With banks holding only required reserves of 10 percent, the money multiplier is  $1/.10 = 10$ . Since reserves are \$100 billion, the money stock is  $10 \times \$100 \text{ billion} = \$1,000 \text{ billion}$ .
- b. If the required reserve ratio is raised to 20 percent, the money multiplier declines to  $1/.20 = 5$ . With reserves of \$100 billion, the money stock would decline to \$500 billion, a decline of \$500 billion. Reserves would be unchanged.

13. a. If people hold all money as currency, the quantity of money is \$2,000.
- b. If people hold all money as demand deposits at banks with 100 percent reserves, the quantity of money is \$2,000.
- c. If people have \$1,000 in currency and \$1,000 in demand deposits, the quantity of money is \$2,000.
- d. If banks have a reserve ratio of 10 percent, the money multiplier is  $1/.10 = 10$ . So if people hold all money as demand deposits, the quantity of money is  $10 \times \$2,000 = \$20,000$ .
- e. If people hold equal amounts of currency (C) and demand deposits (D) and the money multiplier for reserves is 10, then two equations must be satisfied: (1)  $C = D$ , so that people have equal amounts of currency and demand deposits; and (2)  $10 \times (\$2,000 - C) = D$ , so that the money multiplier (10) times the number of dollar bills that are not being held by people ( $\$2,000 - C$ ) equals the amount of demand deposits (D). Using the first equation in the second gives  $10 \times (\$2,000 - D) = D$ , or  $\$20,000 - 10D = D$ , or  $\$20,000 = 11D$ , so  $D = \$1,818.18$ . Then  $C = \$1,818.18$ . The quantity of money is  $C + D = \$3,636.36$ .