Answers to Text Questions and Problems in Chapter 13

Answers to Review Questions

1. Money refers to any asset that can be used in making purchases, such as cash and chequing account balances. People hold money despite its lower return precisely because of its usefulness in transactions; a person who held no money and wanted to make a purchase would either have to resort to time-consuming barter or else incur the costs of selling other assets to obtain money.

2. If the public reduces its currency holdings by, say, $1 million, and the central bank takes no action, banks will have an extra million dollars in reserves. They will lend out these reserves, initiating a many-round process of lending and re-deposit in the banking system. Ultimately bank deposits will grow by much more than a million dollars. (Remember that bank deposits equal bank reserves divided by the reserve/deposit ratio; if the reserve/deposit ratio is less than one, bank deposits will be larger than bank reserves.) The increase in deposits will outweigh the decline in currency held by the public, leading to an overall increase in the national money supply.

3. M2 is the most commonly-used measure of money supply in Canada. It includes currency outside banks, personal deposits, and non-personal demand and notice deposits.

4. There are three ways that central banks can change commercial bank reserves. The first is through changing reserve requirements; an increase in the required reserve ratio raises bank reserves. The second technique is open-market operations, when the central bank buys or sells financial assets; open-market sales reduce bank reserves, while open-market purchases raise reserves. The third technique is government deposit shifting; shifting deposits to private banks raises reserves, and shifting deposits from private banks lowers reserves.

5. The quantity equation states that money times velocity equals the price level times real GDP, or \( M \times V = P \times Y \). In a hyperinflation, if we assume that the velocity of money and real GDP are constant, this equation implies that any percentage increase in the money supply translates into the same percentage increase in the price level. So, the rate of growth of the money supply equals the rate of inflation.

Answers to Problems

1a. Cigarettes were passed hand to hand in exchange for goods and services, hence they were a medium of exchange. Prices were quoted in terms of cigarettes, so they were a unit of account. Finally, as prisoners held hoards of cigarettes for future use, they functioned as a store of value.

b. Cigarettes are relatively durable (chocolate melts) and low enough in value to be useful in small transactions (with highly valuable boots, there is no way to purchase a small item or “make change”). Other advantages of cigarettes include their portability and their relative uniformity in value (one pair of boots might be worth much more than another pair).

c. Yes, because he could trade them for something else that he wanted. In the same way, we have no direct use for twenty-dollar bills (they are not very good wallpaper, for example), but we accept them because we can trade them for things that we do want.

2a. Deposits equal bank reserves/(desired reserve/deposit ratio) = 100/0.25 = 400. The money supply equals currency held by the public + deposits = 200 + 400 = 600.

b. Let \( X \) = currency held by the public = bank reserves. Then the money supply equals \( X + X/(\text{reserve/deposit ratio}) \), or 500 = \( X + X/0.25 = 5X \), so that \( X = 100 \). So currency and bank reserves both equal 100.
c. As the money supply is 1250 and the public holds 250 in currency, bank deposits must equal 1000. If bank reserves are 100, the desired reserve/deposit ratio equals 100/1000 = 0.10.

3a. In a fractional-reserve banking system (where the reserve/deposit ratio is less than one), banks loan out part of their deposits. The process of banks making loans and the public redepositing their funds in banks increases deposits and the money supply, until the point that the banking system has reached its desired ratio of reserves to deposits. Because each dollar of reserves ultimately "supports" several dollars of deposits, one extra dollar of bank reserves results in an increase in the money supply of several dollars (the money multiplier is greater than one). The money multiplier equals one only in the case of 100% reserve banking. In that case reserves are equal to deposits, so that an extra dollar of bank reserves increases deposits and the money supply by only one dollar.

b. Initially the money supply is $1000 and currency held by the public is $500, hence deposits are $500. As the desired ratio of reserves to deposits is 0.2, initial bank reserves must be $100. An increase of $1 in bank reserves expands deposits from $500 to $101/0.2 = $505, increasing deposits and the money supply by $5. Similarly, an increase of $5 in reserves increases deposits and the money supply by $5/0.2 = $25, and an increase of $10 raises deposits and the money supply by $10/0.2 = $50. As the money supply rises by 5 times the increase in bank reserves, the money multiplier in this economy is 5.

c. As the example in part b illustrates, in general the increase in deposits and the money supply equals the change in bank reserves \times \frac{1}{\text{desired reserve/deposit ratio}}. Hence the money multiplier equals \frac{1}{\text{desired reserve/deposit ratio}}. In the example of this problem the money multiplier equals 1/0.2 = 5.

d. Calculating a money multiplier for the Canadian economy would be difficult because there are so many different definitions of money, and over time some rise while others fall. Such a multiplier would therefore not stay constant from year to year.

4. In December 1930, the money supply was $44.1 billion. In December 1932, it was $34.0 billion. Assuming no change in currency holdings by the public, the Fed would have had to increase deposits by $44.1 – $34.0 = $10.1 billion in 1932 to have stabilized the money supply. The reserve/deposit ratio in 1932 was 0.109. So to increase deposits by $10.1 billion, the Fed would have had to increase bank reserves by (0.109)($10.1 billion) = $1.101 billion. Similarly, to raise the December 1933 money supply ($30.8 billion) to the level of December 1930 ($44.1 billion), the Fed would have needed to induce an increase in deposits of $13.3 billion. As the reserve/deposit ratio in 1933 was 0.133, this would have required an increase in bank reserves of (0.133)($13.3 billion) = $1.7689 billion.

5a. Changes in the money supply likely underlie this inflation rate. The quantity equation theory states that, holding constant the velocity of money and real GDP, a given percentage increase in the money supply leads to approximately the same percentage increase in the price level.

b. The Fisher equation states that the real interest rate equals the nominal interest rate minus inflation. Nominal interest rates are therefore likely to be over 1000 percent in Zimbabwe.

c. The purchasing power parity theory predicts that a country with high inflation will tend to experience a depreciation in its exchange rate compared to a country with low or moderate inflation. Zimbabwe’s exchange rate is therefore likely to depreciate.
Sample Homework Assignment

1. The central bank of the country Eta raises bank reserves by $100. What effect will the increase in bank reserves have on the money supply in each of the following situations? Explain in each case.
   a. The banking system is a 100% reserve banking system.
   b. The banking system is a fractional-reserve banking system with a desired reserve-deposit ratio of 0.25.
   c. The banking system is a fractional-reserve banking system with a desired reserve-deposit ratio of 0.1.

2a. What are the three tools that central banks can use to change the money supply?
   b. What would a central bank do with each tool if it wanted to increase the money supply?

Multiple Choice Quiz

1. Money refers to
   a. dollars and coins.
   b. currency and cheques.
   c. any asset that can be used to make purchases.
   d. currency, cheques, and stocks.
   e. any asset or liability.

2. When you use money as a basic yardstick for measuring economic value, it is serving which function?
   a. Barter.
   b. Medium of exchange.
   c. Store of value.
   d. Unit of account.
   e. Financial intermediary.

3. If currency = $80 million, personal deposits = $820 million, non-personal notice deposits = $100 million, non-personal demand deposits = $140 million, and non-personal term deposits plus foreign currency deposits = $600 million, how much is M2?
   a. $80 million.
   b. $900 million.
   c. $1140 million.
   d. $1740 million.
   e. $1 billion.

4. If the reserve-deposit ratio is 5% and currency equals 500, all held in reserves, how much is the money supply?
   a. 500.
   b. 1000.
   c. 2500.
   d. 10,000.
   e. 50,000.
5. What must be true about the reserve-deposit ratio in a fractional-reserve banking system?
   a. The reserve-deposit ratio is greater than one.
   b. The reserve-deposit ratio is equal to one.
   c. The reserve-deposit ratio is between zero and one.
   d. The reserve-deposit ratio is equal to zero.
   e. The reserve-deposit ratio is less than zero.

6. Cash or similar assets held by banks for the purpose of meeting depositors’ withdrawals and payments are known as
   a. bank reserves.
   b. fractional reserves.
   c. deposit reserves.
   d. the reserve/deposit ratio.
   e. excess reserves.

7. Which of the following is not a part of the board of directors of the Bank of Canada?
   a. The prime minister.
   b. The deputy minister of finance.
   c. Twelve outside directors.
   d. The governor.
   e. The senior deputy governor.

8. Which of the following is not a tool that central banks can use to control the money supply?
   a. Shifting government deposits.
   b. Changing reserve requirements.
   c. Open market purchases.
   d. Open market sales.
   e. Changing tax rates.

9. An episode in which depositors rush to withdraw their deposits from the banking system is called a banking
   a. hysteria.
   b. attack.
   c. collapse.
   d. panic.
   e. charge.

10. Which of the following statements is true about the U.S. monetary system between 1929 and 1933?
    a. Currency held by the public fell continuously.
    b. The reserve-deposit ratio fell continuously.
    c. Bank reserves fell continuously.
    d. The money supply fell continuously.
    e. The money supply rose continuously.

Problems/Short Answer

1. The central bank of the country Eta raises bank reserves by $100. What effect will the increase in bank reserves have on the money supply if the banking system is a fractional-reserve banking system with a desired reserve-deposit ratio of 0.4?
2a. Suppose that bank reserves are 150, currency held by the public is 300, and the desired reserve-deposit ratio is 0.15. What is the level of deposits? What is the money supply?

b. Suppose that the money supply is 350, of which 250 is currency held by the public, and bank reserves are 25. What is the desired reserve-deposit ratio?

Answer Key to Extra Questions in Instructor’s Manual

Sample Homework Assignment

1a. The money supply will increase by only the $100, since banks cannot lend out from deposits (they must keep 100% of the deposits on reserve).

b. The money multiplier is $1/0.25 = 4$, so the $100 increase in reserves increases the money supply by $100 \times 4$ or $400$.

c. The money multiplier is $1/0.1 = 10$, so the $100 increase in reserves increases the money supply by $100 \times 10$ or $1000$.

2a. Changing reserve requirements, open market operations, and government deposit shifting.

b. Lower reserve requirements, make open market purchases, and shift deposits to private banks.

Multiple Choice

1. c
2. d
3. c
4. d
5. c
6. a
7. a
8. e
9. d
10. d

Problems/Short Answer

1. The money multiplier equals $1/0.4 = 2.5$, so an increase in reserves of $100 will increase the money supply by $100 \times 2.5$ or $250$.

2a. Deposits are bank reserves/reserve-deposit ratio, or $150/0.15 = 1000$. The money supply is currency plus deposits, or $300 + 1000 = 1300$.

b. Deposits are $350 - 250 = 100$, so the desired reserve-deposit ratio is $25/100 = 0.25$. 