Chapter 17 Practice Problems

1. Follow the impact of a $100 cash withdrawal through the entire banking system, assuming that the reserve requirement is 10 percent and that banks have no desire to hold excess reserves.

Deposits fall by $100 and reserves fall by $100. The bank (Bank A) needs to increase its reserves by $90 in order to meet the required reserve ratio. To raise the $90, Bank A will sell $90 of securities to someone. The deposit account of the person who purchased the securities will fall by $90, as will the reserve balance of his bank, Bank B. Bank B now needs to increase its reserves by $81 in order to meet the reserve requirements so it will sell $81 of securities. This continues until deposits contract by $100/0.1 = $1000.

2. Compute the impact on the money multiplier of an increase in desired currency holdings from 10 percent to 15 percent of deposits when the reserve requirement is 10 percent of deposits, and banks’ desired excess reserves are 3 percent of deposits.

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m = \frac{1 + 0.1}{0.1 + 1 + 0.03} = 4.78
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When desired currency holdings = 10% of deposits,

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m = \frac{1 + 0.15}{0.15 + 0.1 + 0.03} = 4.11
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3. Consider an open market purchase by the Fed of $3 billion of Treasury bonds. Show the impact of the purchase on the bank from which the Fed bought the securities. Then, using the assumptions in problem 2, compute the impact on M1.

The bank’s securities fall by $3 billion and reserves rise by $3 billion. Assuming that the required reserve ratio is 10 percent, the bank does not want to hold extra reserves, and the public does not wish to hold currency, the value of deposits will rise by $30 billion. If desired currency holdings are 10% of deposits and excess reserves are 3% of deposits, then the $3 billion open market purchase will generate 3×1.71 = $5.13 billion of new M1.

4. Why is currency circulating in the hands of the nonbank public considered a liability of the central bank?

Currency issued by the central bank is effectively an IOU to the holder of the currency. The central bank is obliged to pay back the holder of the currency. If the currency is backed by gold, for example, the central bank is obliged to exchange gold for currency. With fiat money, however, the central bank is obliged only to exchange currency for more currency.

5. The U.S. Treasury maintains accounts at commercial banks. What would be the consequences if the Treasury shifted funds from one of those banks to the Fed?

The balance sheet for the bank would reflect a decrease in reserves and a decrease in deposits. The decrease in reserves would also appear on the Fed’s balance sheet; however, it would be balanced by an increase in the government’s account. The consequences would be a decline in the quantity of money.
6. Suppose the Fed buys $1 billion in Japanese yen, paying in dollars. What is the impact on the monetary base? What would the Fed need to do to keep the monetary base from changing following the purchase?

On the Fed’s balance sheet, currency and foreign reserves would both rise by $1 billion; the monetary base would increase by $1 billion. If the Fed wished to keep its balance sheet from changing (performing what is called a “sterilized intervention”) it could then sell $1 billion in securities.

7. List the factors that you suspect may have caused the Federal Reserve to lose control of the quantity of money in the economy. Explain your reasoning.

Financial and technological innovations have had an impact on the various components of the money multiplier. The increasing variability and unpredictability of the money multiplier has weakened the link between the monetary base and the money supply. Some factors that have contributed to the changing value of the money multiplier include the introduction of ATM machines, rising use of credit cards, and increased availability of relatively liquid financial instruments, such as money market mutual funds; all of these have reduced the currency-to-deposit ratio. The practice of “sweeping” balances from checking accounts into savings accounts each weekend has rendered the reserve requirement irrelevant.

8. Suppose you examine the central bank’s balance sheet and observe that since the previous day, reserves had fallen by $100 million. In addition, on the asset side of the central bank’s balance sheet, securities had fallen by $100 million. What activity might the central bank have carried out earlier in the day to lead to these changes in the balance sheet?

The central bank may have conducted an open market sale of $100 million with a commercial bank. The sale of the securities would involve $100 of securities being removed from the central bank’s balance sheet. The commercial bank would have paid for the securities from its reserve account, thus leading to a fall of $100 in reserves on the central bank balance sheet.

9. In carrying out open market operations, the Federal Reserve buys and sells U.S. Treasury securities. Suppose the U.S. government paid off all its debt. Could the Federal Reserve continue to carry out open market operations?

In theory, yes. In the absence of Treasury securities, the Federal Reserve would have to switch to other assets to carry out its open market operations. These alternative assets would have to be traded in deep, highly active markets to avoid the Federal Reserve’s actions causing distortions.

10. In which of the following cases will the size of the central bank’s balance sheet change?

a. The Federal Reserve conducts an open market purchase of $100 million US treasury securities
b. A commercial bank borrows $100 million from the Federal Reserve
c. The amount of cash in the vaults of commercial banks falls by $100 due to withdrawals by the public.

The size of the central bank’s balance sheet will rise in cases a. and b. On the asset side in both these cases, reserves rise by $100 million. On the liabilities side, securities rise by $100 million in case a) while loans rise by $100 in case b). In case c), the composition of liabilities changes, with a shift from reserves to currency but the overall size of the balance sheet remains unchanged.
11. You are an economic adviser to a country whose central bank has recently been granted the power to conduct monetary policy. The central bank is considering increasing reserve requirements in an effort to ensure the stability of the banking system and seeks your advice. What factors would you recommend the central bank take into account when trying to predict the impact of such a policy?
One factor to consider is whether or not current reserve requirements are binding. This will have an influence on how the increase in reserve requirements is likely to affect the money supply. If current reserve requirements were binding, an increase in the required reserve-to-deposit ratio would reduce the money multiplier and thus reduce the stock of money for a given monetary base. Another factor to consider is whether interest is paid on required reserves. If interest were not paid, increasing reserve requirements would increase the cost these requirements impose on the private sector.

12. You pick up the morning newspaper and note a headline reporting a major scandal about the Federal Deposit Insurance Corporation that is likely to undermine the public’s confidence in the banking system. What impact, if any, do you think this scandal might have on the relationship between the monetary base and the money supply?
The scandal is likely to increase the public’s desire to hold currency as the safety of their deposits come into question and so the currency-to-deposit ratio is likely to rise. In addition, banks are likely to hold a higher level of excess reserves in anticipation of the public’s reaction, thus increasing the excess reserve-to-deposit ratio. The changes in both these ratios would reduce the money multiplier, thus reducing the stock of money for a given monetary base.

13. Suppose someone keeps $100 in cash under her pillow. One day she takes it out and deposits it in a checking account. Does this action immediately affect the money base or the M1 money supply? Does this action eventually lead to a change in the money base or the M1 money supply?
Immediately, all that happens when a cash deposit is made into a checking account is that the components of M1 changes. Immediately, there are $100 of reserves created (representing $100 of deposits made) and there is $100 less currency held. Since the money base is currency plus reserves, there is no change in the money base. Since M1 is currency plus deposits, there is also no immediate change in M1. However, as the bank lends the excess reserves created by the $100 deposit, M1 does increase by the amount of the loan. The money base remains the same.

14. Suppose the Fed wants to reduce the M1 money supply by $100. Should it buy or sell government bonds? How much should it buy or sell?
The Fed should sell $100/m worth of bonds where m is the M1 money multiplier.

15. “If reserve requirements on checkable deposits were set at zero, the amount of multiple deposit expansion would go on indefinitely.” Is this statement true, false, or uncertain?
This statement is false. Commercial banks would continue to hold reserves to preserve their liquidity. Indeed, since banks continue to hold some amount of excess reserves when the required reserve ratio is 10%, banks would likely not change their behavior at all since it appears that they are comfortable with an amount of reserves on hand greater than 10%.