

## The Multiple Expansion of Checkable Deposits

### Part A

Assume that

- the required reserve ratio is 10 percent of checkable deposits and banks lend out the other 90 percent of their deposits (banks wish to hold no excess reserves) and
- all money lent out by one bank is redeposited in another bank.

1. Under these assumptions, if a new checkable deposit of \$1,000 is made in Bank 1,
  - (A) how much will Bank 1 keep as required reserves? \$ 100
  - (B) how much will Bank 1 lend out? \$ 900
  - (C) how much will be redeposited in Bank 2? \$ 900
  - (D) how much will Bank 2 keep as required reserves? \$ 90
  - (E) how much will Bank 2 lend out? \$ 810
  - (F) how much will be redeposited in Bank 3? \$ 810
  
2. Use your answers to Question 1 to help you complete the table in Figure 37.1. Fill in the blanks in the table, rounding numbers to the second decimal (for example, \$59.049 = \$59.05). After you have completed the table, answer the questions that follow by filling in the blanks or underlining the correct answer in parentheses so each statement is true.



Figure 37.1

### Checkable Deposits, Reserves and Loans in Seven Banks

| Bank No.                 | New Checkable Deposits | 10% Fractional Reserves | Loans      |
|--------------------------|------------------------|-------------------------|------------|
| 1                        | \$1,000.00             | \$100.00                | \$900.00   |
| 2                        | 900.00                 | 90.00                   | 810.00     |
| 3                        | 810.00                 | 81.00                   | 729.00     |
| 4                        | 729.00                 | 72.90                   | 656.10     |
| 5                        | 656.10                 | 65.61                   | 590.49     |
| 6                        | 590.49                 | 59.05                   | 531.44     |
| 7                        | 531.44                 | 53.14                   | 478.30     |
| All other banks combined | 4,782.98               | 478.29                  | 4,304.67   |
| Total for all banks      | \$10,000.00            | \$1,000.00              | \$9,000.00 |

3. In this example:

- (A) The original deposit of \$1,000 increased total bank reserves by \$1,000. Eventually, this led to a total of \$10,000 expansion of bank deposits, \$1,000 of which was because of the original deposit, while \$9,000 was because of bank lending activities.
- (B) Therefore, if the fractional reserve had been 15 percent instead of 10 percent, the amount of deposit expansion would have been (*more / less*) than in this example.
- (C) Therefore, if the fractional reserve had been 5 percent instead of 10 percent, the amount of deposit expansion would have been (*more / less*) than in this example.
- (D) If banks had not loaned out all of their excess reserves, the amount of deposit expansion would have been (*more / less*) than in this example.
- (E) If all loans had not been redeposited in the banking system, the amount of deposit expansion would have been (*more / less*) than in this example.

4. Another way to represent the multiple expansion of deposits is through *T-accounts*. In short, a T-account is an accounting relationship that looks at changes in balance sheet items. Since balance sheets must balance, so, too, must T-accounts. T-account entries on the asset side must be balanced by an offsetting asset or an offsetting liability. A sample T-account is provided below. For the bank, *assets* include accounts at the Federal Reserve District Bank, Treasury securities and loans; *liabilities* are deposits and *net worth* is assets minus liabilities. Show how the \$1,000 checkable deposit described in Question 1 would be listed in a T-account.

| Assets          |       | Liabilities     |         |
|-----------------|-------|-----------------|---------|
| <i>Loans</i>    | \$900 | <i>Deposits</i> | \$1,000 |
| <i>Reserves</i> | \$100 |                 |         |

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## Part B

5. Assume that \$1,000 is deposited in the bank, and that each bank loans out all of its excess reserves. For each of the following required reserve ratios, calculate the amount that the bank must hold in required reserves, the amount that will be excess reserves, the deposit expansion multiplier and the maximum amount that the money supply could increase.

|                                      | Required Reserve Ratio |          |         |         |            |         |
|--------------------------------------|------------------------|----------|---------|---------|------------|---------|
|                                      | 1%                     | 5%       | 10%     | 12.5%   | 15%        | 25%     |
| Required reserves                    | \$10                   | \$50     | \$100   | \$125   | \$150      | \$250   |
| Excess reserves                      | \$990                  | \$950    | \$900   | \$875   | \$850      | \$750   |
| Deposit expansion multiplier         | 100                    | 20       | 10      | 8       | 6.67       | 4       |
| Maximum increase in the money supply | \$99,000               | \$19,000 | \$9,000 | \$7,000 | \$5,669.50 | \$3,000 |

6. If the required reserve ratio were 0 percent, then money supply expansion would be infinite. Why don't we want an infinite growth of the money supply? (Hint: remember the equation of exchange:  $MV = PQ$ .) *Based on the equation of exchange and assuming a constant velocity of money, an infinite increase in the money supply would translate into an infinite increase in nominal GDP. We know that real output cannot increase that rapidly; therefore the increase must be caused by increases in prices. Thus, we would have hyperinflation.*
7. If the Federal Reserve wants to increase the money supply, should it raise or lower the reserve requirement? Why? *The Federal Reserve should lower the required reserve ratio. Banks would have more excess reserves to lend out and, thus, the money supply could increase.*
8. If the Federal Reserve increases the reserve requirement and velocity remains stable, what will happen to nominal GDP? Why? *If the Federal Reserve increases reserve requirements, the money supply will decrease. Nominal GDP will decrease based on the equation of exchange ( $MV = PQ = \text{nominal GDP}$ ): If  $M$  decreases,  $V$  stays constant and then  $PQ$  (nominal GDP) must decrease.*
9. What economic goal might the Federal Reserve try to meet by reducing the money supply?  
*Price stability*
10. Why might the money supply not expand by the amount predicted by the deposit expansion multiplier? *Several reasons: All money may not be deposited into the banking system; the banks may not be able to lend out all excess reserves because people do not want to borrow; banks may want to keep excess reserves as a precaution.*