The Multiple Expansion of Checkable Deposits

This activity is designed to illustrate how banks' lending of excess reserves can expand the nation's money supply and to explain how the Federal Reserve System can limit the growth of the money supply using the required reserve ratio.

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? $_____

   (B) how much will Bank 1 lend out? $_____

   (C) how much will be redeposited in Bank 2? $_____

   (D) how much will Bank 2 keep as required reserves? $_____

   (E) how much will Bank 2 lend out? $_____

   (F) how much will be redeposited in Bank 3? $_____

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		810.00
3		81.00	
4			656.10
5			
6		59.05	
7	531.44		478.30
All other banks combined			
Total for all banks	$10,000.00		$9,000.00

Adapted from Phillip Saunders, *Introduction to Macroeconomics: Student Workbook,* 18th ed. (Bloomington, Ind., 1998). Copyright Phillip Saunders. All rights reserved. Contributions made by Robert Wedge, Massachusetts Council on Economic Education, Waltham, Mass., and Lisa C. Herman-Ellison, Kokomo High School–South Campus, Kokomo, Ind.

3. In this example:

   (A) The original deposit of $1,000 increased total bank reserves by $_____. Eventually, this led to a total of $10,000 expansion of bank deposits, _____ of which was because of the original deposit, while _____ 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 check-able deposit described in Question 1 would be listed in a T-account.

Assets	Liabilities

Part B

The Federal Reserve sets the reserve requirements: the percentages of the bank's deposits that the bank must hold as reserves. Banks may not loan out these required reserves. As we said in Part A, this fractional reserve system actually allows banks to create money. The amount of reserves a bank holds is known as its *total reserves*. Total reserves are composed of *required reserves*, which the bank must keep, and *excess reserves*, which the bank can loan to other customers. The reserves held by the bank beyond those required by the Fed are *excess reserves.*

How much money would be created if the bank continued to loan out its excess reserves to the last penny? To find out, we must calculate the *deposit expansion multiplier*. The deposit expansion multiplier determines how much money can be created in the economy from an initial deposit. The formula for the deposit expansion multiplier is

$$\textbf{Deposit expansion multiplier} \ = \ \frac{1}{\textbf{reserve requirement}}$$

In the example in Part A, the Federal Reserve set the reserve requirement at 10 percent. So the deposit expansion multiplier would be

$$\textbf{Deposit expansion multiplier} \ = \frac{1}{0.10} \ = \ 10$$

To find the maximum amount of money that could be created, the formula is

Expansion of the money supply = deposit expansion multiplier x excess reserves

The multiplier is 10, and excess reserves from the initial bank deposit are $900. So the potential expansion of money (M1) would be

Expansion of the money supply   =   10 x $900 = $9,000

M1 now consists of the original $1,000 deposit plus the $9,000 created.

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						
Excess reserves						
Deposit expansion multiplier						
Maximum increase in the money supply						

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: $MV = PQ$.)

7. If the Federal Reserve wants to increase the money supply, should it raise or lower the reserve requirement? Why?

8. If the Federal Reserve increases the reserve requirement and velocity remains stable, what will happen to nominal GDP? Why?

9. What economic goal might the Federal Reserve try to meet by reducing the money supply?

10. Why might the money supply not expand by the amount predicted by the deposit expansion multiplier?