

E216 : Economics of MONEY AND BANKING

Second grade

First term

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Chapter 16

Determinants of the supply process



Learning outcome

1. Money supply process
2. Simple deposit multiplier model
3. Money Multiplier
4. Factors that Determine the Money Multiplier
 - **Changes in the Required Reserve Ratio,**
 - **Changes in the Currency Ratio and**
 - **Changes in the Excess Reserves Ratio**



1. The money supply process

the money supply process: is the mechanism that determines the level of the money supply.

- deposits at banks are the largest component of the money supply.
- understanding how these deposits are created is the first step in understanding the money supply process
- how the banking system creates deposits, and describes the basic principles of the money supply?

1. The money supply process

Four Players in the Money Supply Process

- **Central bank (Federal Reserve System):** the government agency that oversees the banking system and is responsible for the conduct of monetary policy
- **Banks (depository institutions; financial intermediaries):** the financial intermediaries that accept deposits from individuals and institutions and make loans
- **Depositors :** individuals and institutions that hold deposits in banks
- **Borrowers from banks:** individuals and institutions that borrow from the depository institutions and institutions that issue bonds that are purchased by the depository institutions

2. Simple deposit multiplier model

Table 1 Creation of Deposits (assuming 10% reserve requirement and a \$100 increase in reserves)

| Bank | Increase in Deposits (\$) | Increase in Loans (\$) | Increase in Reserves (\$) |
|---------------------|---------------------------|------------------------|---------------------------|
| First National | 0.00 | 100.00 | 0.00 |
| A | 100.00 | 90.00 | 10.00 |
| B | 90.00 | 81.00 | 9.00 |
| C | 81.00 | 72.90 | 8.10 |
| D | 72.90 | 65.61 | 7.29 |
| E | 65.61 | 59.05 | 6.56 |
| F | 59.05 | 53.14 | 5.91 |
| . | . | . | . |
| . | . | . | . |
| . | . | . | . |
| Total for all banks | 1,000.00 | 1,000.00 | 100.00 |

When the Fed supplies the banking system with an extra dollar of reserves, deposits _ increase by more than one dollar—a process called **multiple deposit creation**.

2. Simple deposit multiplier model

Assumptions of the Simple Model

- Public hold no cash
 - Currency holding = 0
- Banks use all of their excess reserves to make loans.
 - excess reserves = 0

$$\text{simple multiplier} = \frac{1}{r} \quad r \text{ is the required reserve ratio}$$

2. Simple deposit multiplier model

An example

r = required reserve ratio = 0.10

C = currency in circulation = \$400B

D = checkable deposits = \$800B

ER = excess reserves = \$0.8B

Compute the simple multiplier

Answer

$$\text{simple multiplier} = \frac{1}{r} = \frac{1}{0.1} = 10$$

it means that if the Fed supplies the banking system with an extra dollar of reserves, deposits and the money supply increase by 10 dollars

2. Simple deposit multiplier model

Assuming banks do not hold excess reserves

Required Reserves (RR) = Total Reserves (R)

RR = Required Reserve Ratio (r) times the total amount
of checkable deposits (D)

Substituting

$$r \times D = R$$

Dividing both sides by r

$$D = \frac{1}{r} \times R$$

Taking the change in both sides yields

$$\Delta D = \frac{1}{r} \times \Delta R$$

2. Simple deposit multiplier model

Critique of the Simple Model

- Holding cash stops the process
 - Currency has no multiple deposit expansion
- Banks may not use all of their excess reserves to buy securities or make loans.
- Depositors' decisions (how much currency to hold) and bank's decisions (amount of excess reserves to hold) also cause the money supply to change.

3. Money multiplier

- The ratio that relates the change in the money supply to a given change in the monetary base

$$MB = C + R \quad (1)$$

- Define money as currency plus deposits

$$M = C + D \quad (2)$$

- The money multiplier links the money supply (M) to the monetary base (MB). Given that m be the money multiplier, then

$$M = m \times MB \quad (3)$$

$$m = \frac{M}{MB} \quad (4)$$

3. Money multiplier

- Assume that the desired holdings of currency (C) and excess reserves (ER) grow proportionally with checkable deposits D .
- Then,

$c = \{C/D\}$ = currency ratio

$$C = c \times D$$

$e = \{ER/D\}$ = excess reserves ratio

$$ER = e \times D$$

The money multiplier can be computed as

$$m = \frac{1 + c}{c + r + e}$$

3. Money multiplier

An example

r = required reserve ratio = 0.10

C = currency in circulation = \$400B

D = checkable deposits = \$800B

ER = excess reserves = \$0.8B

Answer

$$c = \frac{\$400B}{\$800B} = 0.5$$

$$e = \frac{\$0.8B}{\$800B} = 0.001$$

$$m = \frac{1 + 0.5}{0.1 + 0.001 + 0.5} = \frac{1.5}{0.601} = 2.5$$

it means that that if the monetary base increases by \$1, this will lead leads to 2.5 dollars increase in the money supply.

4. Determinants of Money multiplier

- Changes in the required reserves ratio r
 - The money supply is negatively related to the required reserve ratio.
- Changes in currency holdings c
 - The money supply is negatively related to currency holdings.
- Changes in excess reserves e
 - The money supply is negatively related to the amount of excess reserves.

4. Determinants of Money multiplier

1. Changes in the Required Reserve Ratio r

- If r increases while all the other variables stay the same, more reserves are needed
- banks must contract their loans, causing a decline in deposits and hence in the money supply.
- The reduced money supply relative to the level of MB , which has remained unchanged, indicates that the money multiplier has declined as well.
- **If r increases from 10% to 15%**

$$m = \frac{1 + 0.5}{0.15 + 0.001 + 0.5} = \frac{1.5}{0.651} = 2.3$$

- **If r decreases to 5%**

$$m = \frac{1 + 0.5}{0.05 + 0.001 + 0.5} = \frac{1.5}{0.551} = 2.72$$

4. Determinants of Money multiplier

2. Changes in the Currency ratio c :

- An increase in c means that depositors are converting some of their checkable deposits into currency (prefer liquidity).
- checkable deposits induce multiple expansion while currency does not.
- when checkable deposits are being converted into currency, there is a switch from a component of the money supply that creates multiple expansion to one that does not.
- The overall level of multiple expansion declines, and so must the multiplier.
- **If c increases from 0.5 to 0.75**

$$m = \frac{1 + 0.75}{0.1 + 0.001 + 0.75} = \frac{1.75}{0.851} = 2.06$$

4. Determinants of Money multiplier

3. Changes in the excess reserve ratio e :

- When banks increase their holdings of excess reserves relative to checkable deposits, the banking system will have fewer reserves to support checkable deposits.
- Given the same level of MB , banks will contract their loans, causing a decline in the level of checkable deposits and a decline in the money supply, and the money multiplier will fall.
- **If e rises from 0.001 to 0.005.** The money multiplier declines from 2.5 to 2.48:

$$m = \frac{1 + 0.5}{0.1 + 0.005 + 0.5} = \frac{1.5}{0.605} = 2.48$$