Deposit Expansion and Multiplier

Creating Money

- Assume a student deposits $1000 from their piggy bank into a bank and receives a new checking account.

Changing Composition

- When someone deposits cash or coins in a bank, they are changing the composition of the money supply, not its size.

Again Composition Not Size!

- The deposit of funds into a bank does not change the size of the money supply.
- It changes the composition of the money supply (transfers from cash to Checkable deposits).

- **Effect on the Money Supply of a Deposit at First Street Bank -** Initial Effect Before Bank Makes New Loans

Assets		Liabilities	
Loans		Deposits	+$1,000
Reserves	+ $1,000		

- **Effect on the Money Supply of a Deposit at First Street Bank -** Effect After Bank Makes New Loans
  - Be careful No change means $1000 in checkable Deposit

Assets		Liabilities
Loans	+ $900	No change
Reserves	– $900	

How Banks Create Money

	Currency in circulation	Bank deposits	Money supply
First stage (Silas keeps his money under the bed)	$1,000	0	$1,000
Second stage (Silas deposits cash in First Street Bank, which lends out $900 to Mary)	900	1,000	1,900
Third stage (Ann Acme deposits loan of $900 in Second Street Bank, which lends out $810)	810	1,900	2,710

Money Creation

University Bank

Assets	Liabilities
+$100.00 in coins	+$100.00 in deposits

Money Supply

Cash held by the public	−$100
Transactions deposits at bank	+$100
Change in M	0

Money Creation

University Bank

Assets	Liabilities
+$100.00 in coins	+$100.00 in your account
+$100 in loans	+$100.00 in borrower's account

Money Supply

Cash held by the public	no change
Transactions deposits at bank	+$100
Change in M	+$100

Required Reserves

- *Required reserves* are the minimum amount of reserves a bank is required to hold by government regulation; Equal to required reserve ratio times transactions deposits.

Required reserves = minimum reserve ratio X total deposits

How can they?

The ability of banks to make loans depends on access to excess reserves.

For Example

- Example: If a bank is required to hold $20 in reserves but has $100 currently, it can lend out the $80 excess.

Excess Reserves

- **Excess reserves** are bank reserves in excess of required reserves.

  Excess reserves = Total reserves – Required reserves

Excess Reserves

- So long as a bank has **excess reserves**, it can make loans.
- Excess reserves are reserves a bank is <u>not</u> required to hold.

New Loans = Creating Money

- The creation of checkable deposits via new loans is the same thing as creating money.

More Deposit Creation

- As the excess reserves are loaned out again, more deposits are created and thus more money is created.

Deposit Creation

University Bank		Eternal Savings	
Assets	**Liabilities**	**Assets**	**Liabilities**
Required Reserves $20 Excess Reserves $80	Your account $100		
Total Assets $100	Total Liabilities $100	Total Assets	Total Liabilities

Deposit Creation

University Bank		Eternal Savings	
Assets	**Liabilities**	**Assets**	**Liabilities**
Required Reserves $36 Excess Reserves $64 Loans $80	Your account $100 Campus Radio account $ 80		
Total Assets $180	Total Liabilities $180	Total Assets	Total Liabilities

Deposit Creation

University Bank

Assets	Liabilities
Required Reserves $20	Your account $100
Excess Reserves $ 0	Campus Radio
Loans $80	account $ 0
Total Assets $100	Total Liabilities $100

Eternal Savings

Assets	Liabilities
Required Reserves $16	Atlas Antenna account $80
Required Reserves $64	
Total Assets $80	Total Liabilities $80

Deposit Creation

University Bank

Assets	Liabilities
Required Reserves $20	Your account $100
Excess Reserves $ 0	Campus Radio
Loans $80	account $ 0
Total Assets $100	Total Liabilities $100

Eternal Savings

Assets	Liabilities
Required Reserves $29	Atlas Antenna account $80
Required Reserves $51	Herman's Hardware
Loans $64	account $64
Total Assets $144	Total Liabilities $144

The Money Multiplier

- Deposits created by one bank invariably end up as reserves in another bank.

The Money Multiplier

- This process can theoretically continue until all banks have zero excess reserves (no more loans can be made).

The Money Multiplier

- The *money multiplier* is the number of deposit (loan) dollars that the banking system can create from $1 of excess reserves.

$$Money\ multiplier = \frac{1}{Required\ reserve\ requirement}$$

Excess Reserves as Lending Power

- Each bank may lend an amount equal to its excess reserves and no more.

Excess Reserves as Lending Power

• The entire banking system can increase the volume of loans by the amount of excess reserves multiplied by the money multiplier.

The Money Multiplier at Work

Original deposit	= $ 100.00
Bank A loans:	= $ 80.00 [=0.8 x $100.00]
Bank B loans	= $ 64.00 [=0.8 x $80.00]
Bank C loans	= $ 51.20 [=0.8 x $64.00]
Total money supply	= $ 500.00

Reserves, Bank Deposits, and the Money Multiplier

Excess reserves are bank reserves over and above its required reserves.

Increase in bank deposits from $1,000 in excess reserves =

$1,000 + $1,000 × (1 − *rr*) + $1,000 × (1 − *rr*)2 + $1,000 × (1 − *rr*)3 + . . .

this can be simplified to: Increase in bank deposits from $1,000 in excess reserves = **$1,000/rr**

Did you get confused here is another Way

• To find the total amount of deposits that will eventually be created, multiply the original deposited amount by 1/*rr*, where *rr* is the reserve ratio.

Multiply by the Multiplier

• If the original deposit is $100 and the reserve ratio is 10 percent, then:

$$\frac{1}{r} = \frac{1}{10} = 10$$

$$10 \ X \ \$100 = \$1,000$$

Calculating the Money Multiplier

• The *simple money multiplier* is the measure of the amount of money ultimately created per dollar deposited in the banking system.
• It equals 1/*rr* when people hold no currency.

Calculating the Money Multiplier

- The higher the reserve ratio, the smaller the money multiplier, and the less money will be created.

An Example of the Creation of Money

- The first 7 rounds of the money creation process is illustrated on the following table.
- Assume a deposit of $10,000 and a reserve ratio of 20 percent.

An Example of the Creation of Money

Bank Gets	Bank Keeps (reserve ratio: 20%)	Bank Loans (80%) = Person Borrows
$10,000	$ 2,000	$ 8,000
8,000	1,600	6,400
6,400	1,280	5,120
5,120	1,024	4,096
4,096	819	3,277
3,277	656	2,621
2,621	524	2,097
2,097	419	1,678
1,678	336	1,342
1,342	268	1,074
$44,631 (total deposits)	$ 8,926 +	$35,705

Total money existing (after 10 rounds) = $44,631
Eventual total money creation (after infinite rounds)

$50,000 (total deposits)	$10,000 +	$40,000

The Real Multiplier is Smaller

- A dollar of currency in circulation does not support multiple dollars of Money supply
- In a checkable deposit only system will have a simple multiplier

The Money Multiplier in Reality

- The **monetary base** is the sum of currency in circulation and bank reserves.
- The **money multiplier** is the ratio of the money supply to the monetary base.

What about the cash under my mattress?

- The approximate real-world money multiplier in the economy is:

$$\frac{1}{r+c}$$

  r = the percentage of deposits banks hold in reserve

  c = the ratio of money people hold in cash to the money they hold as deposits

Real Multiplier

- If banks keep 10 percent in reserve and the ratio of individuals' cash holdings to their deposits is 25 percent, the real-world money multiplier is:

$$\frac{1}{0.1+0.25} = \frac{1}{0.35} = 2.9$$

Economics in Action

- If the public lose their confidence and decide to hold cash the multiplier will shrink.
- Also the money multiplier decreases if banks keep excess reserves for safety reasons.