

EC132.02

Principles of Macroeconomics

Boston College

Tuesday, April 9

Announcements and Reminders

Aplia homework on the first two parts of Ch 29, The Monetary System, due this Friday, April 12, at 9am.

Second midterm exam, this Thursday, April 11, 10:30 – 11:45am.

Last names beginning with:

A or B: Higgins 263

C through S: Devlin 008

T through Z: Lyons 202

Announcements and Reminders

Second midterm exam: this Thursday, April 11,
10:30 – 11:45am.

Closed book exam, between 6 and 12 questions
(short-answer, with multiple parts) covering:

Ch 26 – Saving, Investment, and the Financial System

Ch 28 – Unemployment

Ch 29 – The Monetary System (but only the first two
parts, on The Meaning of Money and The Federal
Reserve System)

BLS Report on the Employment Situation – March 2013

Establishment survey showed a gain of only 88,000 jobs.

Household survey showed a decline in the unemployment rate from 7.7% to 7.6% and a decline in the labor force participation rate from 63.5% to 63.3%.

Ch 29 The Monetary System

1. The Meaning of Money
 2. The Federal Reserve System
 3. Banks and the Money Supply
 4. The Fed's Tools of Monetary Control
 5. The Federal Funds Rate
 6. Banking and Financial Crises
- Covered on
Second Midterm
- Today
- Next Week

Banks and the Money Supply

Because even the narrowest measure of money, M1, includes both currency and bank deposits, banks play a key role together with the Fed in the money supply process.

But exactly how do banks participate in this process?

100 Percent Reserve Banking

Start by considering an economy without banks.

The entire money supply consists of currency.

Suppose that the total quantity of currency in circulation is \$100.

Now imagine that a bank – The First National Bank – opens up.

100 Percent Reserve Banking

But suppose at first that all the bank does is to safeguard people's money: it accepts \$100 in deposits but does not make loans.

Funds that the bank receives in deposits but does not lend out are called **reserves**.

So this type of banking is called **100 percent reserve banking**.

100 Percent Reserve Banking

A **T-account** (simplified balance sheet) summarizes the bank's activities:

First National Bank	
Assets	Liabilities
Reserves \$100	Deposits \$100

For an accountant:

Liabilities = sources of funds

Assets = uses of funds.

100 Percent Reserve Banking

First National Bank	
Assets	Liabilities
Reserves \$100	Deposits \$100

What happens to the total money supply (currency plus deposits) because of this transaction?

Currency in circulation declines by \$100.
But deposits rise by \$100.

With 100 percent reserves, banks affect the composition, but not the overall level, of the money supply.

Fractional Reserve Banking

In the US today,

1. Banks can hold reserves as **vault cash**.
2. But dollar bills held in bank vaults don't pay interest.
3. Banks can also hold reserves as **deposits at the Fed**.
4. The Fed pays interest on those deposits, but at a rate that is generally below the rate that banks can earn by lending the funds out to households or businesses.

Fractional Reserve Banking

So suppose that the managers of the First National Bank, noticing that not all of the bank's customers come in to ask for their money back on any given day, decide to take some the reserves and lend them out at higher interest rates.

This type of banking is called **fractional reserve banking**.

Fractional Reserve Banking

The **reserve ratio** is the fraction of deposits that banks hold as reserves.

Although banks want to lend funds out to earn more income, they will always hold at least some reserves:

1. Because they are required to by law. The Fed as a bank regulator sets a minimum reserve ratio that each bank must maintain. Reserves held to satisfy this legal requirement are called **required reserves**.
2. But most banks will hold **excess reserves** above what is legally required to cope with possible **deposit outflows**.

Fractional Reserve Banking

Suppose the First National Bank chooses a 10 percent reserve ratio:

First National Bank	
Assets	Liabilities
Reserves \$10	Deposits \$100
Loans \$90	

Fractional Reserve Banking

First National Bank	
Assets	Liabilities
Reserves \$10	Deposits \$100
Loans \$90	

Because of these transactions:

Depositors hold \$100 in deposits.

But the recipients of the loan now have \$90 in currency.

The total money supply has increased to $\$100 + \$90 = \$190$.

With a fractional reserve banking system, banks affect the level as well as the composition of the money supply.

Fractional Reserve Banking

While the money supply has gone up because of banking activities, people aren't really wealthier:

- Depositors have \$100 in deposits, just like before.
- Borrowers have \$90 in currency, but now they owe \$90 to the bank.

People aren't **wealthier**, but they are more **liquid**.

The Money Multiplier

But why did the First National Bank's borrower ask for a loan in the first place?

Probably to buy something: a new car or a new home or, in the case of a business, a new investment good.

So suppose that the borrower makes his or her purchase.

Then the seller of the good gets the \$90 and deposits it in his or her bank: The Second National Bank.

The Money Multiplier

Suppose the Second National Bank also chooses a 10 percent reserve ratio:

Second National Bank	
Assets	Liabilities
Reserves \$9	Deposits \$90
Loans \$81	

The Money Multiplier

Second National Bank	
Assets	Liabilities
Reserves \$9	Deposits \$90
Loans \$81	

The First National Bank's customers have \$100 in deposits.

The Second National Bank's customers have \$90 in deposits.

The Second National Bank's borrowers have \$81 in currency.

The money supply is now $\$100 + \$90 + \$81 = \271 .

The Money Multiplier

The process continues:

- The Second National Bank's borrower uses the \$81 to buy something.
- The seller takes the \$81 and deposits it in his or her account at the Third National Bank.

The Money Multiplier

Suppose the Third National Bank also chooses a 10 percent reserve ratio:

Third National Bank	
Assets	Liabilities
Reserves \$8.10	Deposits \$81
Loans \$72.90	

The Money Multiplier

Third National Bank	
Assets	Liabilities
Reserves \$8.10	Deposits \$81
Loans \$72.90	

The First National Bank's customers have \$100 in deposits.

The Second National Bank's customers have \$90 in deposits.

The Third National Bank's customers have \$81 in deposits.

The Third National Bank's borrowers have \$72.90 in currency.

The money supply is now $\$100 + \$90 + \$81 + \$72.90 = \$343.90$.

The Money Multiplier

The First National Bank's customers have \$100 in deposits.

The Second National Bank's customers have \$90 in deposits.

The Third National Bank's customers have \$81 in deposits.

The Third National Bank's borrowers have \$72.90 in currency.

The money supply is now $\$100 + \$90 + \$81 + \$72.90 = \$343.90$.

We could continue this process forever.

But notice that at each step, the additions to the money supply get smaller and smaller.

This is because at each step along the way, a bank holds at least some funds in the form of reserves.

The Money Multiplier

Use a calculator or a spreadsheet to repeat the process ... in the end, when all of the original \$100 is held as reserves, the money supply equals \$1000.

In this case, the **money multiplier** – the amount of money that the banking system generates per dollar of reserves – is $\$1000/\$100 = 10$.

The Money Multiplier

Is it an accident or coincidence that in this example:

- All banks choose a reserve ratio of 10 percent, or $1/10$.
- The money multiplier turns out to be 10 .

No!

And we can prove it.

The Money Multiplier

Let

R = the reserve ratio

Then for each bank,

$R = \text{Reserves/Deposits}$

The Money Multiplier

But if

$$R = \text{Reserves/Deposits}$$

Then

$$\text{Deposits} = (1/R) \times \text{Reserves}$$

The Money Multiplier

$$\text{Deposits} = (1/R) \times \text{Reserves}$$

And if, as in our example, bank customers always deposit all their money

$$\text{Money Supply} = \text{Deposits} = (1/R) \times \text{Reserves}$$

$$\text{Money Multiplier} = \text{Money Supply}/\text{Reserves} = 1/R$$

The Money Multiplier

$$\text{Money Multiplier} = \text{Money Supply} / \text{Reserves} = 1/R$$

So in our example, the reserve ratio is $R = 1/10$.

And the money multiplier is given by the **reciprocal formula** $1/R = 10$.

The Money Multiplier

Two important assumptions built into our example are:

1. All banks choose the same reserve ratio R .
2. All bank customers hold all of their money as deposits.

The Money Multiplier

1. All banks choose the same reserve ratio R .
2. All bank customers hold all of their money as deposits.

What if assumption 1 is violated, say because some banks hold more reserves?

- If those banks hold more reserves, they must make fewer loans.
- The process of monetary expansion is curtailed.
- The money multiplier is smaller than what is suggested by the simple reciprocal formula.

The Money Multiplier

1. All banks choose the same reserve ratio R .
2. All bank customers hold all of their money as deposits.

What if assumption 2 is violated, because some customers hold at least some currency?

- If some people hold some currency, they must make smaller deposits.
- With smaller deposits, banks must make fewer loans.
- The process of monetary expansion is curtailed.
- The money multiplier is smaller than what is suggested by the simple reciprocal formula.

The Fed's Tools of Monetary Control

So long as banks don't hold all of their deposits as reserves ...

... and so long as people don't hold all of their money as currency ...

... a fractional banking system will affect the level as well as the composition of the money supply ...

... and the Fed must take this fact into account when making its monetary policy decisions.

But the Fed can still manage the money supply using open market operations.

Open Market Operations

An **open market operation** occurs when the Fed buys or sells US government bonds from or to private investors.

When the Fed buys US Government bonds:

- Each newly-printed dollar bill that gets held as currency increases the money supply by \$1.
- But each newly-printed dollar bill that gets deposited in a bank increases the money supply by even more.

And when the Fed sells US Government bonds:

- If the buyer of the bond pays with currency, each dollar in bonds sold by the Fed reduces the money supply by \$1.
- But if the buyer of the bond pays by check, each dollar in bonds sold by the Fed decreases the money supply by even more.

Open Market Operations

Open market operations are easy to execute.

The “trading desk” at the NY Fed is linked directly to the US Government bond market.

The Fed can buy or sell US Government bonds anytime the market is open, in large or small quantities.

Because of these advantages, open market operations are the Fed’s most frequently-used policy tool.