

Econ 302 Intermediate Macro Handout 2

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Chapter 4 Monetary System

What is Money?

Functions

- Medium of exchange: we use it to buy stuff
- Store of value: transfer purchasing power from the present to the future
- unit of account: the common unit by which everyone measures prices and values

Types

- Fiat Money: it has no intrinsic value, for example the paper currency we use
- Commodity money: it has intrinsic value, for example gold coins

The Money supply and Monetary Policy Definitions

- The money supply is the quantity of money available in the economy.
- Monetary policy is the control over the money supply

The Central Bank and Monetary Control

- Monetary policy is conducted by a country's central bank
- The U.S.'s central bank is called the Federal Reserve
- To control the money supply, the Fed uses open market operation, the purchase and sale of government bonds.

Money Supply Measure

- $C = \text{currency}$
- $M1 = C + \text{demand deposits, travelers' checks, other checkable deposits}$
- $M2 = M1 + \text{small time deposits, savings deposits, money market mutual funds, money market deposit accounts}$

Banks' Role in the Monetary System

A Few Preliminaries

- Reserve(R): the portion of deposits that banks have not lent.
- A bank's liabilities include deposits; assets include reserves and outstanding loans.
- 100-percent-reserve banking: a system in which banks hold all deposits as reserves.
- Fractional-reserve banking: a system in which banks hold a fraction of their deposits as reserves.

To understand the role of banks, we will consider three scenarios:

- No banks: $D = 0, M = C$
- 100-percent-reserve banking (banks hold all deposits as reserves) : initially, $D = 0$, and $C = M$, after the deposit, $C = 0, D = M$. Lesson: 100-percent-reserve banking has no impact on size of money supply.
- Fractional-reserve banking (banks hold a fraction of deposits as reserves, use the rest to make loans): $C = 0, M = \frac{D}{rr}$, where rr is ratio of reserve to deposits. Lesson: a fraction-reserve banking system creates money, but it does not create wealth, that is, bank loans give borrowers some new money and an equal amount of new debt.

More concepts

- Bank's balance sheet: assets (reserves, loans and securities, etc.), liabilities (deposits, debt, capital)
- Bank capital (equity of the bank's owners)
- Leverage, leverage ratio= bank's total assets to bank capital
- Insolvent: assets fall below its liabilities

How Central Banks Influence the Money Supply

A model of money supply

- Monetary base: $B = C + R$, controlled by the central bank
 - Reserve-deposit ratio: $rr = \frac{R}{D}$, depends on regulation and bank policies
- Currency-deposit ratio: $cr = \frac{C}{D}$, depends on households' preferences

Solving for the money supply

- $M = C + D = \frac{C+D}{B} * B = m * B$, where $m = \frac{C+D}{B} = \frac{C+D}{C+R} = \frac{cr+1}{cr+rr}$

The money multiplier

$$M = m * B, \text{ where } m = \frac{cr+1}{cr+rr}$$

- If $rr < 1$, then $m > 1$
- If monetary base changes by ΔB , then $\Delta M = m * \Delta B$
- m is the money multiplier, the increase in the money supply resulting from a one-dollar increase in the monetary base.

The instruments of monetary policy

- The Fed can change the monetary base using
 - open market operations (the Fed's preferred method of monetary control): to increase the base, the Fed could buy government bonds, paying with new dollars.
 - the discount rate: the interest rate the Fed charges on loans to banks: to increase the base, the Fed could lower the discount rate, encouraging banks to borrow more reserves.
- The Fed can change the reserve-deposit ratio using
 - reserve requirements: Fed regulations that impose a minimum reserve-deposit ratio: to reduce the reserve-deposit ratio, the Fed could reduce reserve requirements
 - interest on reserves: the Fed pays interest on bank reserves deposited with the Fed: to reduce the reserve-deposit ratio, the Fed could pay a lower interest rate on reserves.

Why the Fed cannot precisely control M ?

$$M = m * B, \text{ where } m = \frac{cr+1}{cr+rr}$$

- Households can change cr , causing m and M to change.
- Banks often hold excess reserves(reserves above the reserve requirement).
If banks change their excess reserves, then rr , m and M change.

Exercise

Mankiw 4.3 An Economy has monetary base of 1,000 \$1 bills. Calculate the money supply in senarios (a)-(d) and then answer part (e).

- All money is held as currency.
 - All money is held as demand deposits. Banks hold 100 percent of depoists as reserves.
 - All money held as demand deposits. Bankds hold 20 percent of deposits as reserves.
 - People hold equal amounts of currency and demand deposits. Banks hold 20 percent of deposits as reserves.
 - The central bank decides to increase the money supply by 10 percent.
- In each of the above four senarios, how much should it increase the monetary base?

Mankiw 4.6 As a case Study in the chapter discusses, the money supply fell from 1929 to 1933 because both the currency-deposit ratio and the reserve-deposit ratio increased. Use the model of the money supply and the data in Table 4-2 to answer the following hypothetical questions about this episode.

	August 1929	March 1933
money supply	26.50	19.00
monetary base	7.10	8.40
money multiplier	3.70	2.30
reserve-deposit ratio	0.14	0.21
currency-deposit ratio	0.17	0.41

- What would have happened to the money supply if the currency-deposit ratio has risen but the reserve-deposit ratio had remained the same?
- What would have happend to the money supply if the reserve-deposit ratio had risen but the currency-deposit ratio had remained the same?
- Which of the two changes was more responsible for the fall in the money supply?

Mankiw 4.9 Jimmy Paul Miller starts his own bank, called JPM. as owner, Jimmy puts in \$2,000 of his own money. JPM then borrows \$4,000 in a long-term loan from Jimmy's uncle, accepts \$14,000 in demand deposits from his neighbors, buys \$7,000 of U.S. Treasury bonds, lends \$10,000 to local businesses to finance new investments, and keeps the remainder of the bank's assets as reserves at the Fed.

- a. Show JPM's balance sheet. What is JPM's leverage ratio?
- b. An economic downturn causes 5 percent of the local businesses to declare bankruptcy and default on their loans. Show JPM's new balance sheet. By what percentage does the value of JPM's assets fall? By what percentage does JPM's capital fall?