Money Supply and Money Demand

Intermediate Macroeconomic Theory
Macroeconomic Analysis

University of North Texas
Outline

1. Money Supply
2. A Model of the Money Supply
3. Three Instruments of Monetary Policy
4. Money Demand
1. Money Supply
2. A Model of the Money Supply
3. Three Instruments of Monetary Policy
4. Money Demand
The money supply equals currency plus demand (checking account) deposits: $M = C + D$

Since the money supply includes demand deposits, the banking system plays an important role.

Reserves ($R$): the portion of deposits that banks have not lent

Banking System

- 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
The money supply equals currency plus demand (checking account) deposits: \[ M = C + D \]

Since the money supply includes demand deposits, the banking system plays an important role.

- **Reserves** \( (R) \): the portion of deposits that banks have not lent.

**Banking System**

- 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.
The money supply equals currency plus demand (checking account) deposits: \( M = C + D \)

Since the money supply includes demand deposits, the banking system plays an important role.

Reserves \((R)\): the portion of deposits that banks have not lent

Banking System

- 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
The money supply equals currency plus demand (checking account) deposits: \( M = C + D \)

Since the money supply includes demand deposits, the banking system plays an important role.

Reserves \((R)\): the portion of deposits that banks have not lent

Banking System

1. 100-percent-reserve banking: a system in which banks hold all deposits as reserves

2. Fractional-reserve banking: a system in which banks hold a fraction of their deposits as reserves
The money supply equals currency plus demand (checking account) deposits: \( M = C + D \)

Since the money supply includes demand deposits, the banking system plays an important role.

**Reserves (\( R \)):** the portion of deposits that banks have not lent

**Banking System**

1. **100-percent-reserve banking:** a system in which banks hold all deposits as reserves

2. **Fractional-reserve banking:** a system in which banks hold a fraction of their deposits as reserves
The money supply equals currency plus demand (checking account) deposits: \( M = C + D \)

Since the money supply includes demand deposits, the banking system plays an important role.

**Reserves \((R)\):** the portion of deposits that banks have not lent

**Banking System**

1. **100-percent-reserve banking:** a system in which banks hold all deposits as reserves
   - All deposits are held as reserves
   - Banks accept deposits, place the money in reserve, and leave the money there until the depositor makes a withdrawal

2. **Fractional-reserve banking:** a system in which banks hold a fraction of their deposits as reserves
The money supply equals currency plus demand (checking account) deposits: \( M = C + D \)

Since the money supply includes demand deposits, the banking system plays an important role.

Reserves \((R)\): the portion of deposits that banks have not lent.

Banking System

1. **100-percent-reserve banking**: a system in which banks hold all deposits as reserves.
2. **Fractional-reserve banking**: a system in which banks hold a fraction of their deposits as reserves.
Fractional-reserve banking: banks use some of their deposits to make loans (banks can charge interest on the loans)

A fractional reserve banking system creates money

The process of money creation

Banks are the only financial institutions that directly influence the money supply
Fractional-reserve banking: banks use some of their deposits to make loans (banks can charge interest on the loans)

A fractional reserve banking system creates money

The process of money creation

Banks are the only financial institutions that directly influence the money supply
Fractional-reserve banking: banks use some of their deposits to make loans (banks can charge interest on the loans)

A fractional reserve banking system creates money

The process of money creation

Banks are the only financial institutions that directly influence the money supply
Fractional-reserve banking: banks use some of their deposits to make loans (banks can charge interest on the loans)

A fractional reserve banking system creates money

The process of money creation

- Assuming that the reserve-deposit ratio \((rr)\) is constant
- Each $1 of reserves generate $1/rr$ of money

Banks are the only financial institutions that directly influence the money supply
Fractional-reserve banking: banks use some of their deposits to make loans (banks can charge interest on the loans)

A fractional reserve banking system creates money

The process of money creation

Banks are the only financial institutions that directly influence the money supply
1. Money Supply

2. A Model of the Money Supply

3. Three Instruments of Monetary Policy

4. Money Demand
Exogenous variables

1. Monetary base: $B = C + R$
2. Reserve-deposit ratio: $rr = R/D$
3. Currency-deposit ratio: $cr = C/D$

The model

$M = m \times B$, where $m = \frac{cr+1}{cr+rr}$
Exogenous variables

1. **Monetary base**: \( B = C + R \)
2. **Reserve-deposit ratio**: \( rr = \frac{R}{D} \)
3. **Currency-deposit ratio**: \( cr = \frac{C}{D} \)

The model

\[ M = m \times B, \text{ where } m = \frac{cr + 1}{cr + rr} \]
Exogenous variables

1. **Monetary base**: \( B = C + R \)
   - Controlled by the central bank
2. **Reserve-deposit ratio**: \( rr = R/D \)
3. **Currency-deposit ratio**: \( cr = C/D \)

The model

\[ \Rightarrow M = m \times B, \text{ where } m = \frac{cr + 1}{cr + rr} \]
Exogenous variables

1. Monetary base: \( B = C + R \)
2. Reserve-deposit ratio: \( rr = \frac{R}{D} \)
3. Currency-deposit ratio: \( cr = \frac{C}{D} \)

The model

\[ \Rightarrow M = m \times B, \text{ where } m = \frac{cr+1}{cr+rr} \]
Exogenous variables

1. Monetary base: \( B = C + R \)
2. Reserve-deposit ratio: \( rr = R/D \)
   - Depends on regulations and bank policies
3. Currency-deposit ratio: \( cr = C/D \)

The model

\[ M = m \times B, \text{ where } m = \frac{cr+1}{cr+rr} \]
A Model of the Money Supply

- Exogenous variables
  1. Monetary base: \( B = C + R \)
  2. Reserve-deposit ratio: \( rr = \frac{R}{D} \)
  3. Currency-deposit ratio: \( cr = \frac{C}{D} \)

- The model
  \[ M = m \times B, \text{ where } m = \frac{cr + 1}{cr + rr} \]
Exogenous variables

1. Monetary base: \( B = C + R \)
2. Reserve-deposit ratio: \( rr = R/D \)
3. Currency-deposit ratio: \( cr = C/D \)

- Depends on households’ preferences

The model

\[ M = m \times B, \quad \text{where} \quad m = \frac{cr+1}{cr+rr} \]
Exogenous variables

1. Monetary base: $B = C + R$
2. Reserve-deposit ratio: $rr = R/D$
3. Currency-deposit ratio: $cr = C/D$

The model

$\Rightarrow M = m \times B$, where $m = \frac{cr + 1}{cr + rr}$
Exogenous variables

1. Monetary base: \( B = C + R \)
2. Reserve-deposit ratio: \( rr = R/D \)
3. Currency-deposit ratio: \( cr = C/D \)

The model

\[ \Rightarrow M = m \times B, \text{ where } m = \frac{cr+1}{cr+rr} \]
Exogenous variables

1. Monetary base: \( B = C + R \)
2. Reserve-deposit ratio: \( rr = R/D \)
3. Currency-deposit ratio: \( cr = C/D \)

The model

\[ \Rightarrow M = m \times B, \text{ where } m = \frac{cr+1}{cr+rr} \]

(i) The money supply is proportional to \( B \)
Exogenous variables

1. Monetary base: \( B = C + R \)
2. Reserve-deposit ratio: \( rr = R/D \)
3. Currency-deposit ratio: \( cr = C/D \)

The model

\[ M = m \times B, \quad \text{where} \quad m = \frac{cr + 1}{cr + rr} \]

(ii) The lower Reserve-deposit ratio \( (rr) \), the more loans banks make, and the more money banks create from every dollar of reserve
A Model of the Money Supply

Exogenous variables

1. Monetary base: \( B = C + R \)
2. Reserve-deposit ratio: \( rr = R/D \)
3. Currency-deposit ratio: \( cr = C/D \)

The model

\[ M = m \times B, \text{ where } m = \frac{cr + 1}{cr + rr} \]

(iii) The lower currency-deposit ratio (\( cr \)), the fewer dollars of the monetary base the public holds as currency, the more base dollars banks hold as reserves, and the more money banks can create
Outline

1. Money Supply
2. A Model of the Money Supply
3. Three Instruments of Monetary Policy
4. Money Demand
Three Instruments of Monetary Policy

1. **Open-market operations**: the purchase or sale of government bonds by the Federal Reserve

2. **Reserve requirements**: Fed regulations that require banks to hold a minimum reserve-deposit ratio

3. **The discount rate**: The interest rate that the Fed charges on loans it makes to banks

⇒ Open-market operations is used most frequently and reserve requirements is least frequently used
Three Instruments of Monetary Policy

1. **Open-market operations:** the purchase or sale of government bonds by the Federal Reserve
   - If Fed buys bonds from the public, it pays with new dollars, increasing $B$ and therefore $M$

2. **Reserve requirements:** Fed regulations that require banks to hold a minimum reserve-deposit ratio

3. **The discount rate:** The interest rate that the Fed charges on loans it makes to banks
   ⇒ Open-market operations is used most frequently used and reserve requirements is least frequently used
Three Instruments of Monetary Policy

1. **Open-market operations**: the purchase or sale of government bonds by the Federal Reserve

2. **Reserve requirements**: Fed regulations that require banks to hold a minimum reserve-deposit ratio

3. **The discount rate**: The interest rate that the Fed charges on loans it makes to banks

⇒ Open-market operations is used most frequently and reserve requirements is least frequently used.
Three Instruments of Monetary Policy

1. **Open-market operations**: the purchase or sale of government bonds by the Federal Reserve

2. **Reserve requirements**: Fed regulations that require banks to hold a minimum reserve-deposit ratio
   - Reserve requirements affect \( rr \)
   - If Fed reduces reserve requirements, then banks can make more loans and “create” more money from each deposit

3. **The discount rate**: The interest rate that the Fed charges on loans it makes to banks

⇒ Open-market operations is used most frequently and reserve requirements is least frequently used
Three Instruments of Monetary Policy

1. **Open-market operations**: the purchase or sale of government bonds by the Federal Reserve

2. **Reserve requirements**: Fed regulations that require banks to hold a minimum reserve-deposit ratio

3. **The discount rate**: The interest rate that the Fed charges on loans it makes to banks

⇒ Open-market operations is used most frequently used and reserve requirements is least frequently used
Three Instruments of Monetary Policy

1. **Open-market operations**: the purchase or sale of government bonds by the Federal Reserve

2. **Reserve requirements**: Fed regulations that require banks to hold a minimum reserve-deposit ratio

3. **The discount rate**: The interest rate that the Fed charges on loans it makes to banks
   - When banks borrow from the Fed, their reserves increase, allowing them to make more loans and “create” more money
   - The Fed can increase $B$ by lowering the discount rate to induce banks to borrow more reserves from the Fed

⇒ Open-market operations is used most frequently used and reserve requirements is least frequently used
Three Instruments of Monetary Policy

1. **Open-market operations**: the purchase or sale of government bonds by the Federal Reserve

2. **Reserve requirements**: Fed regulations that require banks to hold a minimum reserve-deposit ratio

3. **The discount rate**: The interest rate that the Fed charges on loans it makes to banks

⇒ Open-market operations is used most frequently used and reserve requirements is least frequently used
1. Money Supply
2. A Model of the Money Supply
3. Three Instruments of Monetary Policy
4. Money Demand
Two types of theories

1. Portfolio theories:
   - Emphasize "store of value" function
   - Relevant for $M_2, M_3$

2. Transactions theories:
   - Emphasize "medium of exchange" function
   - Relevant for $M_1$
Two types of theories

1. Portfolio theories:
   - Emphasize “store of value” function
   - Relevant for $M_2$, $M_3$

2. Transactions theories:
   - Emphasize “medium of exchange” function
   - Relevant for $M_1$
Two types of theories

1. Portfolio theories:
   - Emphasize “store of value” function
   - Relevant for \( M2, M3 \)

2. Transactions theories:
   - Emphasize “medium of exchange” function
   - Relevant for \( M1 \)
Two types of theories

1. Portfolio theories:
   - Emphasize “store of value” function
   - Relevant for $M_2, M_3$

2. Transactions theories:
   - Emphasize “medium of exchange” function
   - Relevant for $M_1$
Two types of theories

1. **Portfolio theories:**
   - Emphasize “store of value” function
   - Relevant for $M_2$, $M_3$

2. **Transactions theories:**
   - Emphasize “medium of exchange” function
   - Relevant for M1
Two types of theories

1. **Portfolio theories:**
   - Emphasize “store of value” function
   - Relevant for $M_2$, $M_3$

2. **Transactions theories:**
   - Emphasize “medium of exchange” function
   - Relevant for M1
Two types of theories

1. Portfolio theories:
   - Emphasize “store of value” function
   - Relevant for \( M_2, M_3 \)

2. Transactions theories:
   - Emphasize “medium of exchange” function
   - Relevant for M1
People hold money as part of their portfolio of assets.

Money offers a safe return (no risk), whereas the prices of stock and bonds may rise or fall (risky).

Money demand function: \( \frac{M}{P} = L(r_s, r_b, \pi^e, W) \)

- \( r_s \): expected real return on stock
- \( r_b \): expected real return on bond
- \( \pi^e \): expected inflation rate
- \( W \): real wealth
People hold money as part of their portfolio of assets.

Money offers a safe return (no risk), whereas the prices of stock and bonds may rise or fall (risky).

Money demand function: \( \frac{M}{P} = L(r_s, r_b, \pi^e, W) \)

- \( r_s \): expected real return on stock
- \( r_b \): expected real return on bond
- \( \pi^e \): expected inflation rate
- \( W \): real wealth
People hold money as part of their portfolio of assets.

Money offers a safe return (no risk), whereas the prices of stock and bonds may rise or fall (risky).

Money demand function: $\left( \frac{M}{P} \right)^d = L(r_s, r_b, \pi^e, W)$

1. $r_s$: expected real return on stock
2. $r_b$: expected real return on bond
3. $\pi^e$: expected inflation rate
4. $W$: real wealth
People hold money as part of their portfolio of assets.

Money offers a safe return (no risk), whereas the prices of stock and bonds may rise or fall (risky).

Money demand function: \( \frac{M}{P} = L(r_s, r_b, \pi^e, W) \)

1. \( r_s \): expected real return on stock
2. \( r_b \): expected real return on bond
3. \( \pi^e \): expected inflation rate
4. \( W \): real wealth
People hold money as part of their portfolio of asset.

Money offers a safe return (no risk), whereas the prices of stock and bonds may rise or fall (risky).

Money demand function: \( (M/P)^d = L(r_s, r_b, \pi^e, W) \)

1. \( r_s \): expected real return on stock
2. \( r_b \): expected real return on bond
3. \( \pi^e \): expected inflation rate
4. \( W \): real wealth
People hold money as part of their portfolio of assets.

Money offers a safe return (no risk), whereas the prices of stock and bonds may rise or fall (risky).

Money demand function: \((M/P)^d = L(r_s, r_b, \pi^e, W)\)

1. \(r_s\): expected real return on stock
2. \(r_b\): expected real return on bond
3. \(\pi^e\): expected inflation rate
4. \(W\): real wealth
People hold money as part of their portfolio of assets.

Money offers a safe return (no risk), whereas the prices of stock and bonds may rise or fall (risky).

Money demand function: \[(M/P)^d = L(r_s, r_b, \pi^e, W)\]

1. \(r_s\): expected real return on stock
2. \(r_b\): expected real return on bond
3. \(\pi^e\): expected inflation rate
4. \(W\): real wealth
Money is a dominated asset because people hold money, unlike other assets, to make purchase.

Money has the cost of earning a low rate of return and the benefit of making transactions more convenient.

Baumol-Tobin model of cash management:

- The benefit of holding money: convenience
- The cost of holding money: the foregone interest they would have received

$\Rightarrow$ money demand depends positively on expenditure (income) and negatively on the interest rate.
Money is a dominated asset because people hold money, unlike other assets, to make purchase.

Money has the cost of earning a low rate of return and the benefit of making transactions more convenient.

Baumol-Tobin model of cash management:

1. The benefit of holding money: convenience
2. The cost of holding money: the foregone interest they would have received

\[ \Rightarrow \text{money demand depends positively on expenditure (income) and negatively on the interest rate} \]
Money is a dominated asset because people hold money, unlike other assets, to make purchase.

Money has the cost of earning a low rate of return and the benefit of making transactions more convenient.

⇒ People decide how much money to hold by trading off these costs and benefits.

 Baumol-Tobin model of cash management:

1. The benefit of holding money: convenience
2. The cost of holding money: the foregone interest they would have received

⇒ money demand depends positively on expenditure (income) and negatively on the interest rate.
Money is a dominated asset because people hold money, unlike other assets, to make purchase.

Money has the cost of earning a low rate of return and the benefit of making transactions more convenient.

Baumol-Tobin model of cash management:

1. The benefit of holding money: convenience
2. The cost of holding money: the foregone interest they would have received

\[ \Rightarrow \text{money demand depends positively on expenditure (income) and negatively on the interest rate} \]
Money is a dominated asset because people hold money, unlike other assets, to make purchase.

Money has the cost of earning a low rate of return and the benefit of making transactions more convenient.

Baumol-Tobin model of cash management:

1. The benefit of holding money: convenience
2. The cost of holding money: the foregone interest they would have received

⇒ money demand depends positively on expenditure (income) and negatively on the interest rate.
Money is a dominated asset because people hold money, unlike other assets, to make purchase.

Money has the cost of earning a low rate of return and the benefit of making transactions more convenient.

**Baumol-Tobin model of cash management:**

1. The benefit of holding money: convenience
2. The cost of holding money: the foregone interest they would have received

$\Rightarrow$ money demand depends positively on expenditure (income) and negatively on the interest rate.
Money is a dominated asset because people hold money, unlike other assets, to make purchase.

Money has the cost of earning a low rate of return and the benefit of making transactions more convenient.

**Baumol-Tobin model of cash management:**

1. The benefit of holding money: convenience
2. The cost of holding money: the foregone interest they would have received

⇒ money demand depends positively on expenditure (income) and negatively on the interest rate.