Economics 302 (Sec. 001) Intermediate Macroeconomic Theory and Policy (Spring 2011) 3/2/2011

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4-2 Determination of the Interest Rate, I

Money, Bonds, and Other Assets

We have been looking at an economy with only two assets: money and bonds. This is obviously a much simplified version of actual economies, with their many financial assets and many financial markets.

There is one dimension, however, to which our model must be extended. We have assumed that all money in the economy consists of currency supplied by the central bank. In the real world, money includes not only currency but also checkable deposits.

4-3 The Determination of Interest Rate, II*

What Banks Do

Financial intermediaries are institutions that receive funds from people and firms, and use these funds to buy bonds or stocks, or to make loans to other people and firms.

- Banks receive funds from people and firms who either deposit funds directly or have funds sent to their checking accounts. The liabilities of the banks are therefore equal to the value of these *checkable deposits.*

- Banks keep as **reserves** some of the funds they receive.

4-3 The Determination of Interest Rate, II*

What Banks Do

Banks hold reserves for three reasons:

1. On any given day, some depositors withdraw cash from their checking accounts, while others deposit cash into their accounts.

2. In the same way, on any given day, people with accounts at the bank write checks to people with accounts at other banks, and people with accounts at other banks write checks to people with accounts at the bank.

3. Banks are subject to reserve requirements. The actual **reserve ratio** – the ratio of bank reserves to bank checkable deposits – is about 10% in the United States today.

4-3 The Determination of Interest Rate, II*

What Banks Do

- Loans represent roughly 70% of banks' non-reserve assets. Bonds count for the rest, 30%.

The assets of the central bank are the bonds it holds. The liabilities of the central bank are the money it has issued, **central bank money**. The new feature is that not all of central bank money is held as currency by the public. Some of it is held as reserves by banks.

TABLE 14.1 FINANCIAL RELATIONSHIPS (BALANCE SHEETS) BETWEEN THE BANKS, THE FED, THE GOVERNMENT, AND THE PRIVATE SECTOR

PRIVATE NONFINANCIAL		BANKS		FED		GOVERNMENT	
ASSETS	LIABILITIES	ASSETS	LIABILITIES	ASSETS	LIABILITIES	ASSETS	LIABILITIES
Currency (CU)					Currency (CU)		
Deposits (D)			Deposits (D)				
Bonds (B)		Bonds (B)		Bonds (B)			Bonds (B)
		Reserves (RE)			Reserves (RE)		
	Loans	Loans					

4-3 The Determination of Interest Rate, II*

The Supply and the Demand for Central Bank Money

Let's think in terms of the supply and the demand for *central bank money.*
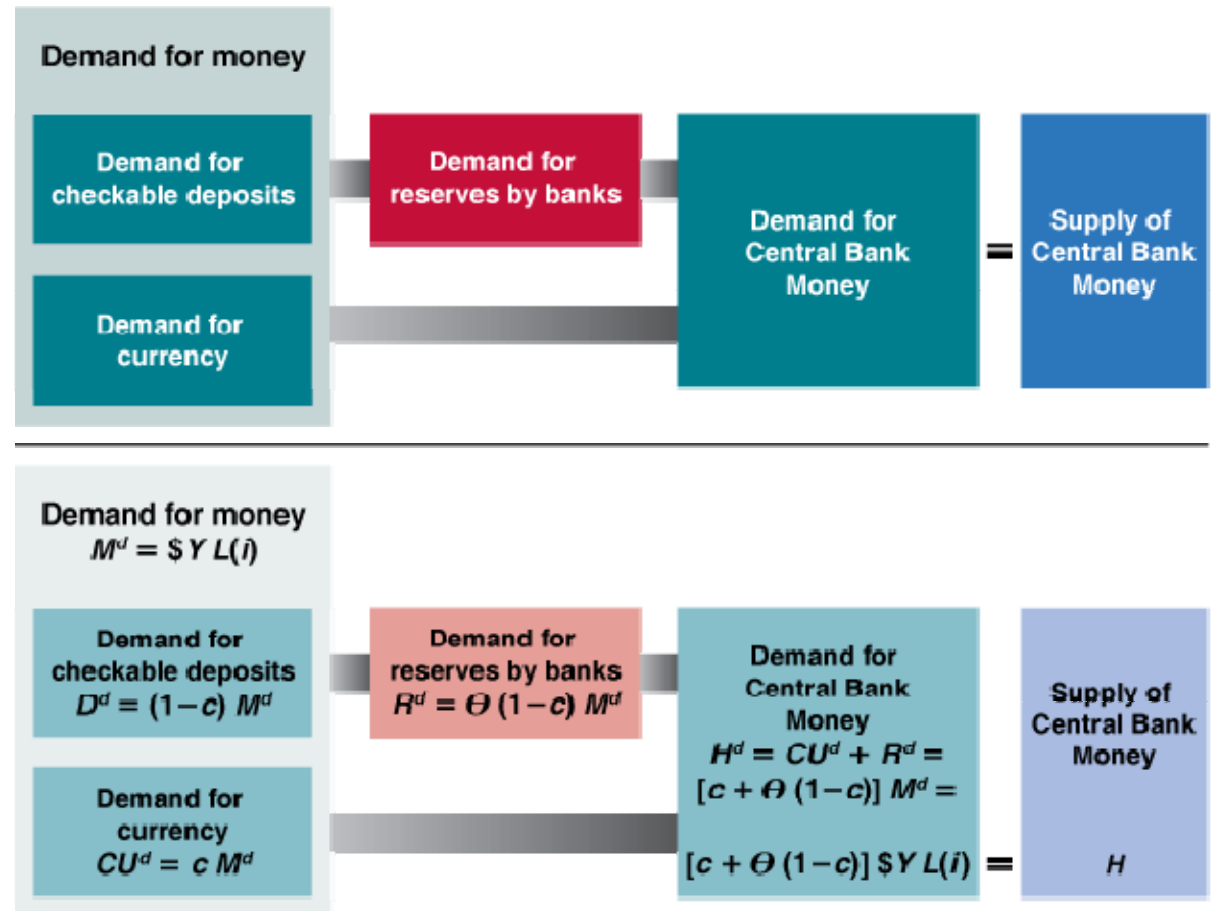
- The demand for central bank money is equal to the demand for currency by people plus the demand for reserves by banks.

- The supply of central bank money is under the direct control of the central bank.

- The equilibrium interest rate is such that the demand and the supply for central bank money are equal.

4-3 The Determination of Interest Rate, II*

The Supply and the Demand for Central Bank Money

Figure 4 - 7

Determinants of the Demand and the Supply of Central Bank Money

4-3 The Determination of Interest Rate, II*

The Supply and the Demand for Central Bank Money

The Demand for Money

When people can hold both currency and checkable deposits, the demand for money involves *two* decisions: (1) How much money, (2) currency vs. checkable deposits.

We can assume that overall money demand is given by the same equation as before:

$$M^d = \$Y \; L(i)$$
$$(-)$$

The demands for currency and checkable deposits are given by:

$$CU^d = c \, M^d$$
$$D^d = (1-c) \, M^d$$

4-3 The Determination of Interest Rate, II*

The Supply and the Demand for Central Bank Money

The Demand for Reserves

The larger the amount of checkable deposits, the larger the amount of reserves the banks must hold, for both precautionary and regulatory reasons.

The relation between reserves (R) and deposits (D):

$$R = \theta D$$

The demand for reserves by banks is given by:

$$R^d = \theta (1 - c) M^d$$

4-3 The Determination of Interest Rate, II*

The Supply and the Demand for Central Bank Money

The Demand for Central Bank Money

The demand for central bank money is equal to the sum of the demand for currency and the demand for reserves.

$$H^d = CU^d + R^d$$

Replace CU^d and R^d with their expressions from equations (4.4) and (4.7) to get:

$$H^d = cM^d + \theta(1-c)M^d = \left[c + \theta(1-c)\right]M^d$$

Finally, replace the overall demand for money, M^d, with its expression from equation (4.3) to get:

$$H^d = \left[c + \theta(1-c)\right] \$Y \, L(i)$$

4-3 The Determination of Interest Rate, II*

The Supply and the Demand for Central Bank Money

The Determination of the Interest Rate

- In equilibrium, the supply of central bank money (H) is equal to the demand for central bank money (H^d):

$$H = H^d$$

Or restated as:

$$H^d = \left[c + \theta(1 - c) \right] \$Y \, L(i)$$

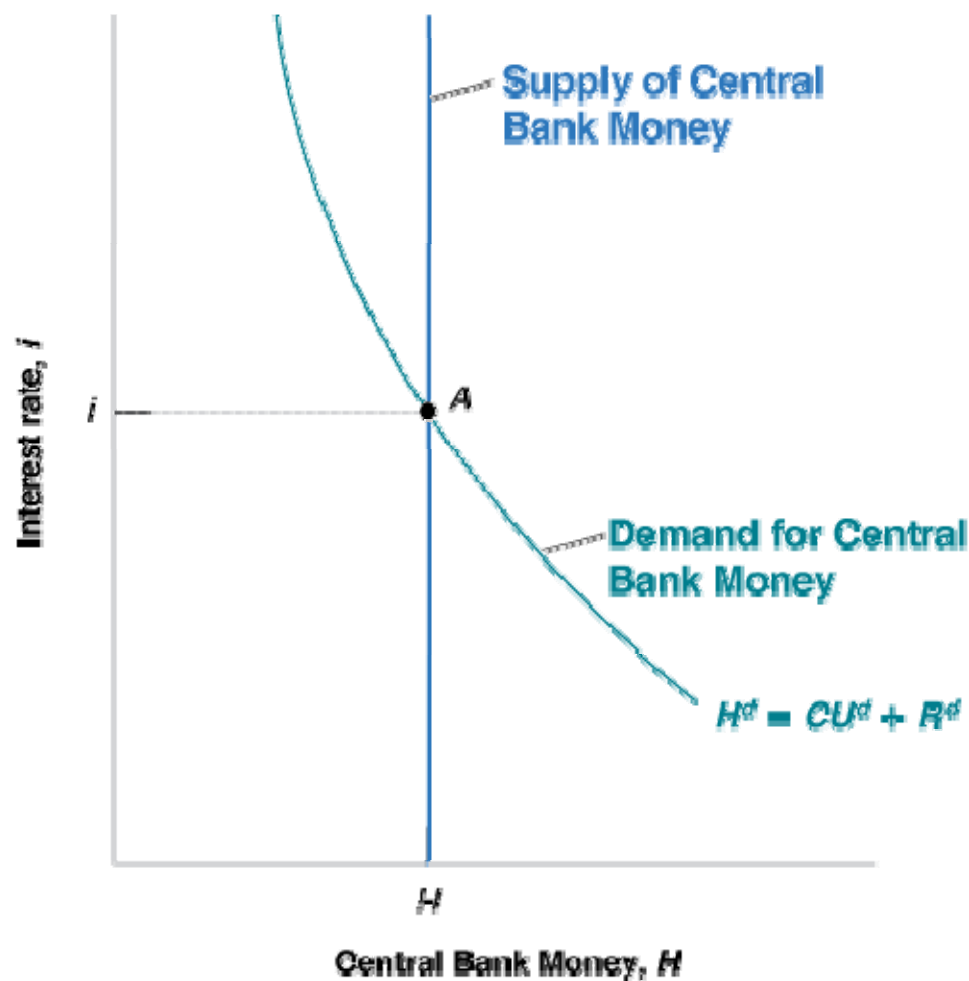# 4-3 The Determination of Interest Rate, II*

The Supply and the Demand for Central Bank Money

The Determination of the Interest Rate

■ **Figure 4 - 8**

Equilibrium in the Market for Central Bank Money and the Determination of the Interest Rate

The equilibrium interest rate is such that the supply of central bank money is equal to the demand for central bank money.

4-4 Two Alternative Ways of Looking at Eq'm*

The Federal Funds Market and the Federal Funds Rate

•The equilibrium condition that the supply and the demand for bank reserves be equal is given by:

$$H - CU^d = R^d$$

The **federal funds market** is a market for bank reserves. In equilibrium, demand (R^d) must equal supply ($H-CU^d$). The interest rate determined in the market is called the **federal funds rate**.

4-4 Two Alternative Ways of Looking at Eq'm*

The Supply of Money, the Demand for Money, and the Money Multiplier

$$\frac{1}{[c + \theta(1-c)]} H = \$Y \ L(i)$$

Supply of money = Demand for money

- The overall supply of money is equal to central bank money times the **money multiplier**:

$$1/\left(c + \theta(1-c)\right)$$

- **High-powered money** is the term used to reflect the fact that the overall supply of money depends in the end on the amount of central bank money (*H*), or **monetary base**.

4-4 Two Alternative Ways of Looking at Eq'm*

The Supply of Money, the Demand for Money, and the Money Multiplier

Understanding the Money Multiplier

- We can think of the ultimate increase in the money supply as the result of *successive rounds of purchases of bonds*—the first started by the Fed in its open market operation, the following rounds by banks.