

Chapter 17

The Central Bank Balance Sheet and the Money Supply Process

McGraw-Hill/Irwin

Copyright © 2006 by The McGraw-Hill Companies, Inc. All rights reserved.

The Central Bank's Balance Sheet

Figure 17.1 The Central Bank's Balance Sheet

Assets		Liabilities
Government's Bank	Securities Foreign exchange reserves	Currency Government's account
Bankers' Bank	Loans	Accounts of the commercial banks (reserves)

[Web Link](#)

17-2

The Central Bank's Balance Sheet

Assets

- Securities (biggest, most important asset)
 - Fed holds only U.S. Treasury securities
 - controlled through purchases and sales known as "open market operations."
- Foreign Exchange Reserves
 - bonds issued by foreign governments (report: Treasury and Federal Reserve Foreign Exchange Operations)
- Loans (to banks)
 - Discount Loans (short-term liquidity)
 - Float (credit happens before the debit – it is a loan)

17-3



The Central Bank's Balance Sheet

Liabilities

- Currency (90 percent of liabilities)
 - Held by non-bank public
- Government Accounts
- Reserves (bank accounts)
 - Commercial Bank's Checking Accounts
 - = deposits at Fed + Cash in own vault

17-4



The Monetary Base

Monetary Base (or High-Powered Money)

- Currency held by the public + reserves in the banking system
- Bank Reserves = Vault Cash + Deposits at the Fed.
- The central bank can control the size of the monetary base (in August 2004, \$757 billion) and consequently the quantity of money ($M1 = \$1.3$ trillion) in the economy.

17-5



Four Types of Transactions

that influences the Fed and the banks balance sheet size and composition

1. Open Market Operation (size)
2. Foreign Exchange Intervention (size)
3. Discount Loan (size)
4. Individual Withdraw Cash from the bank (shift components of the monetary base: composition)

17-6



Changing Size and Composition of the Balance Sheet

Open Market Operations

- The Federal Reserve buys or sells securities in financial markets.

Figure 17.2 Change in the Federal Reserve System's Balance Sheet following Purchase of a U.S. Treasury Bond

Assets		Liabilities	
Securities (U.S. Treasury bond)	+ \$1 billion	Reserves	+ \$1 billion

17-7



Changing Size and Composition of the Balance Sheet

Open Market Operations

Figure 17.3 Change in the Banking System's Balance Sheet following the Fed's Purchase of a U.S. Treasury Bond

Assets		Liabilities	
Reserves	+ \$1 billion		
Securities (U.S. Treasury bond)	- \$1 billion		

17-8



Changing Size and Composition of the Balance Sheet

Foreign Exchange Intervention

Figure 17.4 Change in the Federal Reserve System's Balance Sheet following Purchase of Euro-denominated German Government Bonds

Assets		Liabilities	
Foreign exchange reserves (German government bonds in euros)	+ \$1 billion	Reserves	+ \$1 billion

17-9



Changing Size and Composition of the Balance Sheet

Foreign Exchange Intervention

Figure 17.5 Change in the Banking System's Balance Sheet following the Fed's Purchase of Euro-denominated German Government Bonds

Assets		Liabilities	
Reserves	+\$1 billion		
Securities (German government bonds)	-\$1 billion		

17-10



Changing Size and Composition of the Balance Sheet

Discount Loans

Figure 17.6 Change in the Federal Reserve System's Balance Sheet following a Discount Loan

Assets		Liabilities	
Discount loans	+\$100 million	Reserves	+\$100 million

17-11



Changing Size and Composition of the Balance Sheet

Discount Loans

Figure 17.7 Change in the Banking System's Balance Sheet following a Discount Loan

Assets		Liabilities	
Reserves	+\$100 million	Discount loans	+\$100 million

17-12



Changing Size and Composition of the Balance Sheet

Cash Withdrawals

Figure 17.9 Change in the Banking System's Balance Sheet following a Cash Withdrawal

Assets		Liabilities	
Reserves	-\$100	Checkable deposits	-\$100

17-13



Changing Size and Composition of the Balance Sheet

Cash Withdrawals

Figure 17.10 Change in the Federal Reserve System's Balance Sheet following a Cash Withdrawal

Assets		Liabilities	
		Currency	+\$100
		Reserves	-\$100

17-14



Deposit Creation and the multiplier

17-15



Deposit Expansion Multiplier

Deposit Creation in a Single Bank

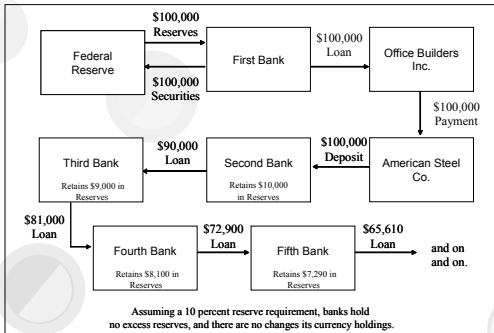
Types of Reserves

- Actual Reserves (R)
- Required Reserves ($RR=r_D D$)
- Excess Reserves (ER)



Deposit Expansion Multiplier

Figure 17.17: Multiple Deposit Creation





Deposit Expansion Multiplier

Table 17.2 Multiple Deposit Expansion following a \$100,000 Open Market Purchase Assuming a 10% Reserve Requirement

Bank	Increase in Deposits	Increase in Loans	Increase in Reserves
First Bank	\$ 0	\$100,000	\$ 0
Second Bank	\$100,000	\$90,000	\$10,000
Third Bank	\$90,000	\$81,000	\$9,000
Fourth Bank	\$81,000	\$72,900	\$8,100
Fifth Bank	\$72,900	\$65,610	\$7,290
Sixth Bank	\$65,610	\$59,049	\$6,561
.	.	.	.
.	.	.	.
.	.	.	.
The Banking System	\$1,000,000	\$1,000,000	\$100,000



Deposit Expansion Multiplier

Deposit creation by a system of banks

- $RR = r_D D$ or $\Delta RR = r_D \Delta D$
- So for every dollar increase in reserves, deposits increase by $\frac{1}{r_D}$

17-19



Deposit Expansion Multiplier

Deposit creation by a system of banks

- $R_D = 10\%$ (0.10), and $\Delta RR = \$100,000$
- $\Delta D = \frac{1}{.1} \$100,000$
- $\Delta D = \$1,000,000$

17-20



Deposit Expansion Multiplier

Deposit Expansion with Excess Reserves and Cash Withdrawals.

Assume:

- 5% withdraw of cash.
- Excess reserves of 5% of deposits

17-21



Deposit Expansion Multiplier

Deposit Expansion with Excess Reserves and Cash Withdraws.

Figure 17.18 Change in Second Bank's Balance Sheet following a Deposit and Extension of a Loan

Assuming excess reserves and cash holdings. Note: American Steel also has \$5,000 in cash.

Assets		Liabilities
Required reserves	+\$9,500	American Steel's checking account
Excess reserves	+\$4,750	+\$95,000
Loan	+\$80,750	

17-22



Deposit Expansion Multiplier

Deposit Expansion with Excess Reserves and Cash Withdraws.

- The desire of banks to hold excess reserves and the desire of account holders to withdraw cash both reduce the impact of a given change in reserves on the total deposits in the system. The more excess reserves banks desire to hold, and the more cash that is withdrawn, the smaller the impact.

17-23



The Multiplier

Money Multiplier (Money is M1)

$$M = m \times MB$$

m is function of Depositors, Banks and Reserve Requirements

$$m > 1 \text{ [multiplier]}$$

C is desired level of currency

$$\text{Let } c = C/D = \text{Currency ratio}$$

$$\text{Let } e = ER/D = \text{Excess reserve ratio}$$

17-24



Money Multiplier (Money is M1)

$$M = m \times MB$$

Deriving Money Multiplier

$$R = RR + ER$$

$$RR = r \times D$$

$$R = (r \times D) + ER$$

Adding C to both sides

$$R + C = MB = (r \times D) + ER + C$$

1. If it does not support D, it is not multiplied.
2. Tells us amount of MB needed support D, ER and C
3. \$1 of MB in ER, not support D or C

$$MB = (r \times D) + (e \times D) + (c \times D)$$

$$= (r + e + c) \times D$$

17-25



$$D = \frac{1}{r + e + c} \times MB$$

$$M = D + C = D + (c \times D) = (1 + c) \times D$$

$$M = \frac{1 + c}{r + e + c} \times MB$$

$$m = \frac{1 + c(-ve)}{r(-ve) + e(-ve) + c(-ve)}$$

17-26



Deposit Expansion Multiplier

The Quantity of Money (M) Depends on:

- The Monetary base (MB), Controlled by the Fed.
- Reserve Requirements
- Bank's desired to hold excess reserves.
- The public's demand for currency.

17-27



Deposit Expansion Multiplier

Table 17.3 Factors Affecting the Quantity of Money

Factor	Who Controls It	Change	Impact on M
Monetary base	Central bank	Increase	Increase
Required reserve-to-deposit ratio	Bank regulators	Increase	Decrease
Excess reserve-to-deposit ratio	Commercial banks	Increase	Decrease
Currency-to-deposit ratio	Nonbank public	Increase	Decrease



Deposit Expansion Multiplier

Figure 17.20 The M1 and M2 Multipliers, 1980-2004



Chapter 17

End of Chapter
