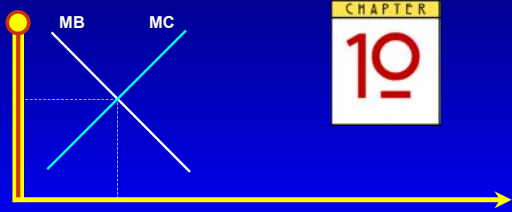


Money, Prices, and the Federal Reserve



CHAPTER
10

PLAN

- What is Money?
- Why Hold Money?
- How to measure Money?
- How is Money Created in the Banking System?
- Who Controls the Supply of Money? Monetary Policy and the Federal Reserve System.
- Money and Macroeconomics.

Introduction

- Money
 - Any asset that can be used in making purchases
 - Examples
 - ◆ Currency
 - ◆ Coins
 - ◆ Checks



Money and Its Uses

- Medium of Exchange
 - An asset used in purchasing goods and services
- Unit of Account
 - A basic measure of economic value
- Store of Value
 - An asset that serves as a means of holding wealth



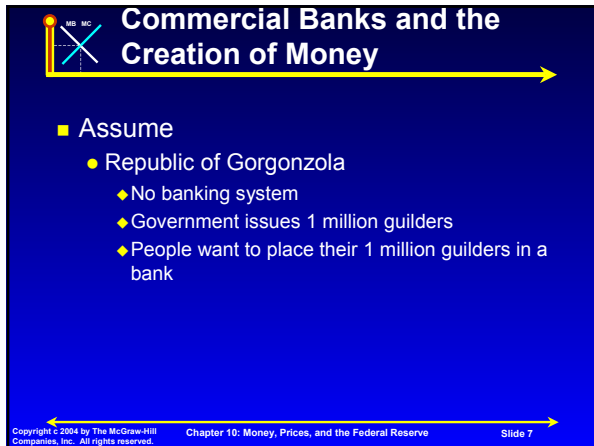
Components of M1 and M2, July 2002 (billions of dollars)

M1		1,197.8
Currency	615.1	
Demand deposits	303.8	
Other checkable deposits	270.3	
Travelers' checks	8.6	
M2		5,641.2
M1	1,197.8	
Savings deposits	2,552.8	
Small-denomination time deposits	920.8	
Money market mutual funds	969.8	



Money and Its Uses

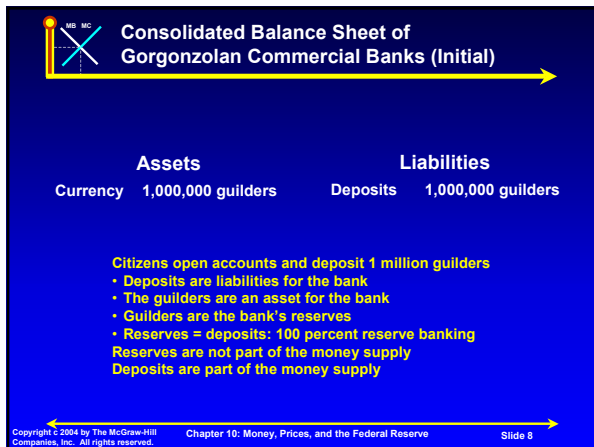
- M1
 - Sum of currency outstanding and balances held in checking accounts
- M2
 - All the assets in M1 plus some additional assets that are usable in making payments but at greater cost or inconvenience than currency or checks



Commercial Banks and the Creation of Money

- Assume
 - Republic of Gorgonzola
 - ◆ No banking system
 - ◆ Government issues 1 million guilders
 - ◆ People want to place their 1 million guilders in a bank

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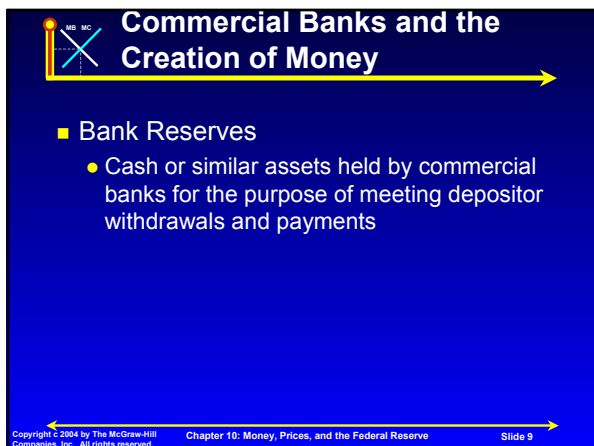


Consolidated Balance Sheet of Gorgonzolan Commercial Banks (Initial)

Assets		Liabilities	
Currency	1,000,000 guilders	Deposits	1,000,000 guilders

Citizens open accounts and deposit 1 million guilders
 • Deposits are liabilities for the bank
 • The guilders are an asset for the bank
 • Guilders are the bank's reserves
 • Reserves = deposits: 100 percent reserve banking
 Reserves are not part of the money supply
 Deposits are part of the money supply

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Commercial Banks and the Creation of Money

- Bank Reserves
 - Cash or similar assets held by commercial banks for the purpose of meeting depositor withdrawals and payments

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Consolidated Balance Sheet of Gorgonzolan Commercial Banks After One Round of Loans

Assets		Liabilities	
Currency (= reserves)	1,000,000 guilders	Deposits	1,000,000 guilders
Loans to farmers	900,000 guilders		

Fractional Reserve Banking System

- Bankers agree they only need a reserve to deposit ratio of 10%
- Required reserves = 100,000 guilders, 10% of deposits
- Loan out the excess reserves of 900,000 guilders

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Consolidated Balance Sheet of Gorgonzolan Commercial Banks after Guilders Are Redeposited

Assets		Liabilities	
Currency (= reserves)	1,000,000 guilders	Deposits	1,900,000 guilders
Loans to farmers	900,000 guilders		

Loan proceeds are deposited

- Reserves = 1,000,000 guilders
- Deposits = 1,900,000 guilders
- Money supply = 1,900,000 guilders
- Reserve to deposit ratio = 52.6% (1 million / 1.9 million)
- Want reserves = 10%
- Excess Reserves = 52.6% - 10% = 42.6%
- Excess reserves = 810,000 (42.6% * 1.9 million)
- Banks can loan the 810,000 guilders

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Consolidated Balance Sheet of Gorgonzolan Commercial Banks After Two Rounds of Loans and Redeposits

Assets		Liabilities	
Currency (= reserves)	1,000,000 guilders	Deposits	2,710,000 guilders
Loans to farmers	1,710,000 guilders (900,000 + 810,000)		

Loan proceeds are deposited

- Reserves = 1,000,000 guilders
- Deposits = 2,710,000 guilders (1,900,000 + 810,000)
- Money supply = 2,710,000 guilders
- Reserve to deposit ratio = 36.9%
- Excess Reserves = 36.9% - 10% = 26.9%
- Excess reserves = 729,000 guilders (26.9% * 2.71 million)

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Final Consolidated Balance Sheet of Gorgonzolan Commercial Banks

Assets		Liabilities	
Currency (= reserves)	1,000,000 guilders	Deposits	10,000,000 guilders
Loans to farmers	9,000,000 guilders		

Observations

- Lending will continue until the reserve to deposit ratio = 10%
- When loans = 9,000,000 guilders
 - Deposits = 10,000,000 guilders
 - Reserves = 1,000,000 guilders
 - Reserve to deposit ratio = 10%
 - No excess reserves
- The money supply = 10,000,000 guilders

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Commercial Banks and the Creation of Money

■ Observations

- The use of a fractional-reserve banking system allows the money supply to grow as a multiple of the reserves
- In Gorgonzola, with a 10% reserve-deposit ratio, 1 guilder in reserve can support 10 guilders in deposit.


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Commercial Banks and the Creation of Money

■ Summary


- Bank reserves/bank deposits = desired reserve-deposit ratio
- Bank deposits = bank reserves/desired reserve-deposit ratio

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 **The Federal Reserve System**

- Two Main Responsibilities
 - Monetary policy
 - Oversight and regulation of financial markets

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 **The Federal Reserve System**

- The History and Structure of the Federal Reserve System
 - Founded by the Federal Reserve Act of 1913
 - The primary mission of the Fed is to promote economic growth, low inflation, and stable financial markets.

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 **The Federal Reserve System**

- The Structure
 - 12 regional Federal Reserve banks
 - ◆ Assess economic conditions in their regions to assist in national policymaking
 - ◆ Provide service to the commercial banks in their districts

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The Federal Reserve System

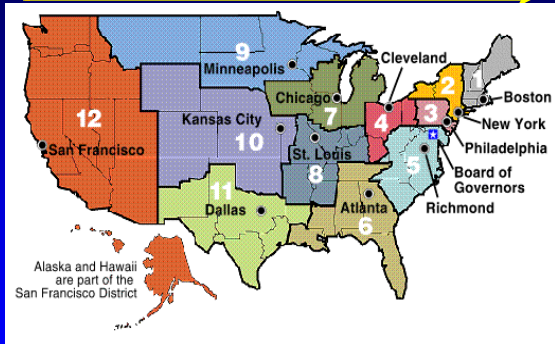
The Structure

Board of Governors

- ◆ Seven governors
 - Appointed by the president to 14 year staggered terms
- ◆ Chairman of the Board of Governors
 - Selected by the president from the governors
 - Serves a four year term



Federal Reserve Districts





The Federal Reserve System

The Structure

Federal Open Market Committee (FOMC)

- ◆ Members include:
 - The seven Fed governors
 - President of the New York Fed
 - Four presidents, chosen on a rotating basis, from the remaining Federal Reserve Banks
- ◆ Determines monetary policy



The Federal Reserve System

- Controlling the Money Supply: Open-Market Operations
 - The primary function of the Fed is monetary policy.
 - The Fed controls the money supply by changing the supply of bank reserves.



The Federal Reserve System

- Controlling the Money Supply: Open-Market Operations
 - Open-market operations are the most important method of changing the supply of bank reserves.



The Federal Reserve System

- Increasing The Money Supply
 - The Fed purchases government bonds from the public.
 - The people deposit the funds they get from their sale of bonds to the Fed.
 - The increase in deposits increase bank reserves.



The Federal Reserve System

- Increasing The Money Supply
 - The increase in reserves will lead to an expansion of the money supply as banks make more loans.
 - Recall
 - ◆ The change in the money supply is a multiple of the change in reserves.



The Federal Reserve System

- Reducing The Money Supply
 - The Fed sells government bonds to the public.
 - The Fed presents the checks from the sale of the bonds to the banks for payment.



The Federal Reserve System


- Reducing The Money Supply
 - The bank's reserves will fall when they clear the checks.
 - The money supply will fall by a multiple of the decrease in reserves.



The Federal Reserve System

- Open-Market Purchase
 - The purchase of government bonds from the public by the Fed for the purpose of increasing the supply of bank reserves and the money supply
- Open-Market Sale
 - The sale by the Fed of government bonds to the public for the purpose of reducing bank reserves and the money supply


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The Federal Reserve System

- Controlling the Money Supply: Discount Window Lending
 - Banks can borrow reserves from the Fed.
 - Discount window lending
 - ◆ The lending of reserves to commercial banks

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The Federal Reserve System

- Controlling the Money Supply: Discount Window Lending
 - The discount rate
 - ◆ The interest rate charged on these loans
 - Discount lending will increase reserves and the money supply.

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The Federal Reserve System

- Controlling the Money Supply: Changing Reserve Requirements
 - The Fed sets the reserve-deposit ratio
 - ◆ Called the reserve requirement
 - A reduction in the reserve requirement would allow the money supply to increase.
 - An increase in the reserve requirement may reduce the money supply.



The Federal Reserve System

- The Fed's Role in Stabilizing Financial Markets: Banking Panics
 - Suppose:
 - ◆ Depositors lose confidence in their bank.
 - ◆ They attempt to withdraw their funds.
 - ◆ Bank may not have enough reserves (fractional) to meet the depositors demand.
 - ◆ The bank fails and further erodes depositor confidence which triggers additional failures.



The Federal Reserve System

- The Fed's Role in Stabilizing Financial Markets: Banking Panics
 - The Fed to the rescue:
 - ◆ Instill confidence
 - ◆ Discount lending
 - ◆ Open Market Operations

Money and Prices

- Velocity
 - The speed at which money circulates

$$\text{Velocity} = \frac{\text{Value of transactions}}{\text{Money stock}} = \frac{\text{Nominal GDP}}{\text{Money stock}}$$

$$\text{Velocity (V)} = \frac{P (\text{price level}) \times Y (\text{real GDP})}{M (\text{money supply})} = \frac{P \times Y}{M}$$

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Money and Prices

- Velocity in 2001
 - M1 = \$1,177.9 billion
 - M2 = \$5,449.1 billion
 - Nominal GDP = \$10,082.2 billion

$$M1, V = \frac{\$10,082.2 \text{ billion}}{\$1,177.9 \text{ billion}} = 8.56$$

$$M2, V = \frac{\$10,082.2 \text{ billion}}{\$5,499.1 \text{ billion}} = 1.85$$

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Money and Prices

- Money and Inflation in the Long Run
 - Recall

$$V = \frac{P \times Y}{M}$$

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Money and Prices

- Money and Inflation in the Long Run
 - Quantity equation
 - ◆ $M \times V = P \times Y$
 - Assume V & Y are constant over the time period

$$M \times \bar{V} = P \times \bar{Y}$$



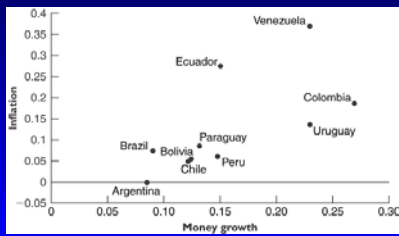
Money and Prices

- Money and Inflation in the Long Run
 - If the Fed increases M by 10%, then prices must increase by 10%.
 - High rates of money growth are associated with high rates of inflation (too much money chasing too few goods).

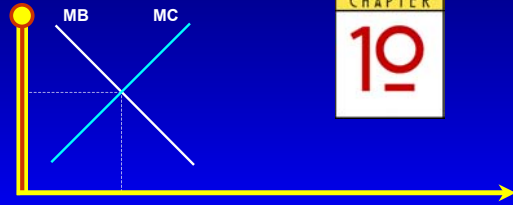
$$M \times \bar{V} = P \times \bar{Y}$$



Inflation and Money Growth in Latin America, 1995-2001



End of
Chapter



CHAPTER
10
