CHAPTER 1
WHY STUDY MONEY, BANKING, AND FINANCIAL MARKETS?

Why Study Financial Markets?
Financial markets are markets in which funds are transferred from people and firms who have an excess of available funds to people and firms who have a need of funds.

The Bond Market and Interest Rates
A security (financial instrument) is a claim on the issuer's future income or assets. A bond is a debt security that promises to make payments periodically for a specified period of time. An interest rate is the cost of borrowing or the price paid for the rental of funds.

Figure 1 Interest Rates on Selected Bonds, 1950–2011

The Stock Market
Common stock represents a share of ownership in a corporation. A share of stock is a claim on the residual earnings and assets of the corporation.

Why Study Financial Institutions and Banking?
Financial intermediaries: institutions that borrow funds from people who have saved and make loans to other people:
- Banks: accept deposits and make loans
- Other Financial Institutions: insurance companies, finance companies, pension funds, mutual funds and investment companies

Financial Innovation: the development of new financial products and services. Can be an important force for good by making the financial system more efficient.

Figure 2 Stock Prices as Measured by the Dow Jones Industrial Average, 1950–2011

Financial Crises
Financial crises are major disruptions in financial markets that are characterized by sharp declines in asset prices and the failures of many financial and nonfinancial firms.

Why Study Money and Monetary Policy?
Evidence suggests that money plays an important role in generating business cycles. Recessions (unemployment) and expansions affect all of us. Monetary theory ties changes in the money supply to changes in aggregate economic activity and the price level. The aggregate price level is the average price of goods and services in an economy. A continual rise in the price level (inflation) affects all economic players. Data shows a connection between the money supply and the price level.

Figure 3 Money Growth (M2 Annual Rate) and the Business Cycle in the United States 1950–2011

Figure 4 Aggregate Price Level and the Money Supply in the United States, 1950–2011

Figure 5 Average Inflation Rate Versus Average Rate of Money Growth for Selected Countries, 2000-2010
Money and Interest Rates
Interest rates are the price of money. Prior to 1980, the rate of money growth and the interest rate on long-term Treasury bonds were closely tied. Since then, the relationship is less clear but the rate of money growth is still an important determinant of interest rates.

Figure 6 Money Growth (M2 Annual Rate) and Interest Rates (Long-Term U.S. Treasury Bonds), 1950–2011

Fiscal Policy and Monetary Policy
Monetary policy is the management of the money supply and interest rates. Conducted in the U.S. by the Federal Reserve System (Fed). Fiscal policy deals with government spending and taxation. Budget deficit is the excess of expenditures over revenues for a particular year. Budget surplus is the excess of revenues over expenditures for a particular year. Any deficit must be financed by borrowing.

Figure 7 Government Budget Surplus or Deficit as a Percentage of Gross Domestic Product, 1950–2010

The Foreign Exchange Market
The foreign exchange market is where funds are converted from one currency into another. The foreign exchange rate is the price of one currency in terms of another currency. The foreign exchange market determines the foreign exchange rate.

Figure 8 Exchange Rate of the U.S. Dollar, 1970–2011

The International Financial System
Financial markets have become increasingly integrated throughout the world. The international financial system has tremendous impact on domestic economies:
- How a country’s choice of exchange rate policy affects their monetary policy?
- How capital controls impact domestic financial systems and therefore the performance of the economy?
- Which should be the role of international financial institutions like the IMF?

How We Will Study Money, Banking, and Financial Markets
- A simplified approach to demand for assets.
- The concept of equilibrium.
- Basic supply and demand to explain behavior in financial markets.
- The search for profits.
- An approach to financial structure based on transaction costs and asymmetric information.
- Aggregate supply and demand analysis.

CHAPTER 2
AN OVERVIEW OF THE FINANCIAL SYSTEM

Function of Financial Markets
1. Perform the essential function of channeling funds from economic players that have saved surplus funds to those that have a shortage of funds.
2. Direct finance: borrowers borrow funds directly from lenders in financial markets by selling them securities.
3. Promotes economic efficiency by producing an efficient allocation of capital, which increases production.
4. Directly improve the well-being of consumers by allowing them to time purchases better.

Figure 1 Flows of Funds Through the Financial System

Structure of Financial Markets
Debt and Equity Markets
- Debt instruments (maturity)
- Equities (dividends)
Primary and Secondary Markets
- Investment Banks underwrite securities in primary markets
- Brokers and dealers work in secondary markets
Exchanges and Over-the-Counter (OTC) Markets
- Exchanges: NYSE, Chicago Board of Trade
- OTC Markets: Foreign exchange, Federal funds
Money and Capital Markets
- Money markets deal in short-term debt and equity instruments
- Capital markets deal in longer-term debt and equity instruments

Table 1 Principal Money Market Instruments

<table>
<thead>
<tr>
<th>Type of Instrument</th>
<th>1990</th>
<th>1999</th>
<th>2000</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. Treasury bills</td>
<td>238</td>
<td>627</td>
<td>647</td>
<td>1,723</td>
</tr>
<tr>
<td>Negotiable bank certificates</td>
<td>317</td>
<td>435</td>
<td>1,613</td>
<td>1,653</td>
</tr>
<tr>
<td>Commercial paper</td>
<td>122</td>
<td>507</td>
<td>1,619</td>
<td>1,497</td>
</tr>
<tr>
<td>Federal funds and securities</td>
<td>84</td>
<td>168</td>
<td>168</td>
<td>1,216</td>
</tr>
</tbody>
</table>

Table 2 Principal Capital Market Instruments

<table>
<thead>
<tr>
<th>Type of Instrument</th>
<th>1990</th>
<th>1999</th>
<th>2000</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corporate stocks (small value)</td>
<td>1,601</td>
<td>6,146</td>
<td>17,623</td>
<td>17,394</td>
</tr>
<tr>
<td>Corporate bonds</td>
<td>3,000</td>
<td>3,000</td>
<td>3,000</td>
<td>3,000</td>
</tr>
<tr>
<td>U.S. government securities (marketable IOU)</td>
<td>4,000</td>
<td>4,000</td>
<td>4,000</td>
<td>4,000</td>
</tr>
<tr>
<td>U.S. government agency securities</td>
<td>5,000</td>
<td>5,000</td>
<td>5,000</td>
<td>5,000</td>
</tr>
<tr>
<td>Corporate notes</td>
<td>150</td>
<td>150</td>
<td>150</td>
<td>150</td>
</tr>
<tr>
<td>Commercial paper</td>
<td>150</td>
<td>150</td>
<td>150</td>
<td>150</td>
</tr>
<tr>
<td>Commercial and farm mortgage</td>
<td>150</td>
<td>150</td>
<td>150</td>
<td>150</td>
</tr>
</tbody>
</table>

Internationalization of Financial Markets
- Foreign Bonds: sold in a foreign country and denominated in that country’s currency.
- Eurobond: bond denominated in a currency other than that of the country in which it is sold.
Eurocurrencies: foreign currencies deposited in banks outside the home country. Eurodollars: U.S. dollars deposited in foreign banks outside the U.S. or in foreign branches of U.S. banks

World Stock Markets also help finance the federal government

Function of Financial Intermediaries: Indirect Finance
Lower transaction costs (time and money spent in carrying out financial transactions)
– Economies of scale
– Liquidity services

Reduce the exposure of investors to risk
– Risk Sharing (Asset Transformation)
– Diversification

Deal with asymmetric information problems
1. (before the transaction) Adverse Selection: try to avoid selecting the risky borrower. Gather information about potential borrower.
2. (after the transaction) Moral Hazard: ensure borrower will not engage in activities that will prevent him/her to repay the loan. Sign a contract with restrictive covenants.

Conclusion:
Financial intermediaries allow — small — savers and borrowers to benefit from the existence of financial markets.

Table 3 Primary Assets and Liabilities of Financial Intermediaries

<table>
<thead>
<tr>
<th>Type of Intermediary</th>
<th>Primary Liabilities</th>
<th>Primary Assets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depository institutions (banks)</td>
<td>Deposits</td>
<td>Deposits</td>
</tr>
<tr>
<td>Commercial banks</td>
<td></td>
<td>Borrowed and owned assets, loans, mortgages, U.S. government securities, and municipal bonds</td>
</tr>
<tr>
<td>Savings and loan associations</td>
<td></td>
<td>-mortgages</td>
</tr>
<tr>
<td>Mutual savings banks</td>
<td>Deposits</td>
<td>Deposits</td>
</tr>
<tr>
<td>Credit unions</td>
<td>Deposits</td>
<td>Deposits</td>
</tr>
<tr>
<td>Commercial and savings institutions</td>
<td></td>
<td>Borrowed and owned assets, loans, mortgages, U.S. government securities, and municipal bonds</td>
</tr>
<tr>
<td>Life insurance companies</td>
<td>Premiums</td>
<td>Premiums from policies:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Corporate bonds and mortgages</td>
</tr>
<tr>
<td>Mutual benefit insurance companies</td>
<td>Premiums</td>
<td>Premiums from policies:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Corporate bonds, mortgage bonds, and U.S. government securities</td>
</tr>
<tr>
<td>Pension funds, governmental retirement funds</td>
<td>Employee and employer contributions</td>
<td>Employee and employer contributions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Borrowed and owned assets, loans, mortgages, U.S. government securities</td>
</tr>
<tr>
<td>Investment intermediaries</td>
<td>Commercial paper, stocks, bonds</td>
<td>Commercial paper, stocks, bonds</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Borrowed and owned assets, loans, mortgages, U.S. government securities</td>
</tr>
<tr>
<td>Mutual funds</td>
<td>Shares</td>
<td>Shares</td>
</tr>
<tr>
<td>Money market mutual funds</td>
<td></td>
<td>Shares</td>
</tr>
</tbody>
</table>

Table 4 Principal Financial Intermediaries and Value of Their Assets

<table>
<thead>
<tr>
<th>Type of Intermediary</th>
<th>1990</th>
<th>1992</th>
<th>2000</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depository institutions (banks)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commercial banks</td>
<td>1,481</td>
<td>3,334</td>
<td>6,860</td>
<td>11,336</td>
</tr>
<tr>
<td>Savings and loan associations</td>
<td>792</td>
<td>1,105</td>
<td>1,218</td>
<td>1,244</td>
</tr>
<tr>
<td>Mutual savings banks</td>
<td>67</td>
<td>215</td>
<td>441</td>
<td>912</td>
</tr>
<tr>
<td>Credit unions</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commercial and savings institutions</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Life insurance companies</td>
<td>464</td>
<td>1,047</td>
<td>3,136</td>
<td>5,176</td>
</tr>
<tr>
<td>Mutual benefit insurance companies</td>
<td>152</td>
<td>333</td>
<td>862</td>
<td>1,242</td>
</tr>
<tr>
<td>Pension funds (private)</td>
<td>504</td>
<td>1,639</td>
<td>4,395</td>
<td>6,527</td>
</tr>
<tr>
<td>State and local government retirement funds</td>
<td>197</td>
<td>737</td>
<td>2,593</td>
<td>2,661</td>
</tr>
<tr>
<td>Investment intermediaries</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Finance companies</td>
<td>207</td>
<td>610</td>
<td>1,101</td>
<td>1,139</td>
</tr>
<tr>
<td>Mutual funds</td>
<td>70</td>
<td>634</td>
<td>4,483</td>
<td>7,033</td>
</tr>
<tr>
<td>Money market mutual funds</td>
<td>76</td>
<td>98</td>
<td>1,812</td>
<td>2,735</td>
</tr>
</tbody>
</table>

Meaning of Money
Money (or the — money supply()) : anything that is generally accepted in payment for goods or services or in the repayment of debts. A rather broad definition

Money (a stock concept) is different from:
Wealth: the total collection of pieces of property that serve to store value
Income: flow of earnings per unit of time (a flow concept)

Functions of Money Medium of Exchange:
– Eliminates the trouble of finding a double coincidence of needs (reduces transaction costs)
– Promotes specialization

A medium of exchange must
– be easily standardized
– be widely accepted
– be divisible
– be easy to carry
– not deteriorate over time

Unit of Account:
– used to measure value in the economy
– reduces transaction costs

Store of Value:
– used to save purchasing power over time.
– other assets also serve this function

Money is the most liquid of all assets but loses value during inflation

Evolution of the Payments System
1. Commodity Money: valuable, easily standardized and divisible commodities (e.g. precious metals, cigarettes).
2. Fiat Money: paper money decreed by governments as legal tender.
3. Checks: an instruction to your bank to transfer money from your account
4. Electronic Payment (e.g. online bill pay).
5. E-Money (electronic money):
   – Debit card
   – Stored-value card (smart card)
   – E-cash

FYI Are We Headed for a Cashless Society?
Predictions of a cashless society have been around for decades, but they have not come to fruition. Although e-money might be more convenient and efficient than a payments system based on paper, several factors work against the disappearance of the paper system. Still, the use of e-money will likely still increase in the future

Measuring Money
How do we measure money? Which particular assets can be called “money”?

Construct monetary aggregates using the concept of liquidity:

- **M1** (most liquid assets) = currency + traveler’s checks + demand deposits + other checkable deposits.
- **M2** (adds to M1 other assets that are not so liquid) = M1 + small denomination time deposits + savings deposits and money market deposit accounts + money market mutual fund shares.

### Table 1 Measures of the Monetary Aggregates

<table>
<thead>
<tr>
<th>Monetary Aggregates</th>
<th>Value as of May 16, 2011 (in billions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>M1</td>
<td>936.6</td>
</tr>
<tr>
<td>M2</td>
<td>1,833.5</td>
</tr>
<tr>
<td>M3</td>
<td>2,169.5</td>
</tr>
</tbody>
</table>

**M1 vs. M2**

Does it matter which measure of money is considered?

M1 and M2 can move in different directions. The choice of monetary aggregate is important for policymakers.

**FYI Where Are All the U.S. Dollars?**

The more than $2,000 of U.S. currency held per person in the United States is a surprisingly large number. Where are all these dollars and who is holding them?
- Criminals
- Foreigners

### Figure 1 Growth Rates of the M1 and M2 Aggregates, 1960–2011

**CHAPTER 4**

**UNDERSTANDING INTEREST RATES**

**Measuring Interest Rates**

Present Value: A dollar paid to you one year from now is less valuable than a dollar paid to you today.

Why?

**Discounting the Future**

A dollar deposited today can earn interest and become $1 \times (1+i)$ one year from today.

**Simple Present Value**

\[ PV = \frac{C}{(1+i)} \]

- **PV** = today’s (present) value
- **C** = future cash flow (payment)
- \(i\) = the interest rate

**Four Types of Credit Market Instruments**

1. Simple Loan
2. Fixed Payment Loan
3. Coupon Bond
4. Discount Bond

**Yield to Maturity**

The interest rate that equates the present value of cash flow payments received from a debt instrument with its value today.

**Simple Loan**

\[ PV = \text{loan value} = \frac{\text{CF}}{1+i^N} \]

\[ \text{CF} = \text{cash flow in any year} = $100 \]

\[ \text{N} = \text{number of years} \]

**Fixed Payment Loan**

The same cash flow payment every period throughout the life of the loan.

\[ PV = \text{loan value} = \frac{\text{FP}}{1+i + (1+i)^2 + \ldots + (1+i)^N} \]

\[ \text{FP} = \text{fixed yearly payment} \]

\[ \text{N} = \text{number of years until maturity} \]

**Coupon Bond**

Using the same strategy used for the fixed-payment loan:

\[ P = \text{price of coupon bond} \]

\[ C = \text{yearly coupon payment} \]

\[ F = \text{face value of the bond} \]

\[ N = \text{years to maturity date} \]

\[ P = \frac{\text{C}}{1+i} + \frac{\text{C}}{(1+i)^2} + \ldots + \frac{\text{C}}{(1+i)^N} + \frac{\text{F}}{(1+i)^N} \]

When the coupon bond is priced at its face value, the yield to maturity equals the coupon rate. The price of a coupon bond and the yield to maturity are negatively related. The yield to maturity is greater than the coupon rate when the bond price is below its face value.
Table 1 Yields to Maturity on a 10%-Coupon-Rate Bond Maturing in Ten Years (Face Value = $1,000)

<table>
<thead>
<tr>
<th>Price of Bond ($)</th>
<th>Yield to Maturity (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,200</td>
<td>7.13</td>
</tr>
<tr>
<td>1,100</td>
<td>8.46</td>
</tr>
<tr>
<td>1,000</td>
<td>10.00</td>
</tr>
<tr>
<td>900</td>
<td>11.75</td>
</tr>
<tr>
<td>800</td>
<td>13.81</td>
</tr>
</tbody>
</table>

Consol or Perpetuity
A bond with no maturity date that does not repay principal but pays fixed coupon payments forever yield to maturity of the consol yearly interest payment price of the consol

\[ P = C / \bar{c} \]

\[ P = \text{price of the consol} \]

\[ C = \gamma \text{yearly interest payment} \]

\[ \bar{c} = \text{yield to maturity of the consol} \]

Can rewrite above equation as this:

\[ \bar{c} = C / P \]

For coupon bonds, this equation gives the current yield, an easy to calculate approximation to the yield to maturity

Discount Bond
For any one year discount bond

\[ i = \frac{F - P}{P} \]

\[ F = \text{Face value of the discount bond} \]

\[ P = \text{current price of the discount bond} \]

The yield to maturity equals the increase in price over the year divided by the initial price. As with a coupon bond, the yield to maturity is negatively related to the current bond price.

The Distinction Between Interest Rates and Returns
Rate of Return: The payments to the owner plus the change in value expressed as a fraction of the purchase price

\[ \text{RET} = \frac{C + P_{t+1} - P_t}{P_t} \]

\[ P_{t+1} - P_t = \text{price of the bond at time } t+1 \]

\[ P_t = \text{price of the bond at time } t \]

\[ C = \text{coupon payment} \]

\[ C = \text{current yield} = \bar{c} \]

\[ P_{t+1} - P_t = \text{rate of capital gain} = g \]

The yield equals the yield to maturity only if the holding period equals the time to maturity. A rise in interest rates is associated with a fall in bond prices, resulting in a capital loss if time to maturity is longer than the holding period. The more distant a bond’s maturity, the lower the rate of return occurs as a result of an increase in the interest rate. Even if a bond has a substantial initial interest rate, its return can be negative if interest rates rise

Table 2 One-Year Returns on Different- Maturity 10%-Coupon-Rate Bonds When Interest Rates Rise from 10% to 20%

<table>
<thead>
<tr>
<th>Year to Maturity When Bond Is Purchased (%)</th>
<th>Initial Current Yield (%)</th>
<th>Initial Price ($)</th>
<th>Price Next Year* (%)</th>
<th>Rate of Capital Gain (%)</th>
<th>Rate of Return (G + 5) (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>10</td>
<td>1,200</td>
<td>1,200</td>
<td>-10.0</td>
<td>-0.7</td>
</tr>
<tr>
<td>20</td>
<td>10</td>
<td>1,200</td>
<td>1,000</td>
<td>-10.5</td>
<td>-6.8</td>
</tr>
<tr>
<td>10</td>
<td>10</td>
<td>1,200</td>
<td>1,100</td>
<td>-20.3</td>
<td>-10.3</td>
</tr>
<tr>
<td>5</td>
<td>10</td>
<td>1,200</td>
<td>1,000</td>
<td>-25.0</td>
<td>-15.0</td>
</tr>
<tr>
<td>2</td>
<td>10</td>
<td>1,200</td>
<td>1,000</td>
<td>-25.0</td>
<td>-15.0</td>
</tr>
<tr>
<td>1</td>
<td>10</td>
<td>1,200</td>
<td>1,000</td>
<td>-25.5</td>
<td>-15.5</td>
</tr>
</tbody>
</table>

Interest-Rate Risk

Prices and returns for long-term bonds are more volatile than those for shorter-term bonds. There is no interest-rate risk for any bond whose time to maturity matches the holding period. Nominal interest rate makes no allowance for inflation. Real interest rate is adjusted for changes in price level so it more accurately reflects the cost of borrowing. Ex ante real interest rate is adjusted for expected changes in the price level. Ex post real interest rate is adjusted for actual changes in the price level.

Fisher Equation

\[ i = \text{nominal interest rate} \]

\[ \pi = \text{expected inflation rate} \]

When the real interest rate is low, there are greater incentives to borrow and fewer incentives to lend.

Figure 1 Real and Nominal Interest Rates (Three-Month Treasury Bill), 1953–2011

CHAPTER 5
THE BEHAVIOR OF INTEREST RATES

Determinants of Asset Demand
1. Wealth: the total resources owned by the individual, including all assets
2. Expected Return: the return expected over the next period on one asset relative to alternative assets
3. Risk: the degree of uncertainty associated with the return on one asset relative to alternative assets
4. Liquidity: the ease and speed with which an asset can be turned into cash relative to alternative assets

Theory of Portfolio Choice
Holding all other factors constant:
1. The quantity demanded of an asset is positively related to wealth
2. The quantity demanded of an asset is positively related to its expected return relative to alternative assets
3. The quantity demanded of an asset is negatively related to the risk of its returns relative to alternative assets
4. The quantity demanded of an asset is positively related to its liquidity relative to alternative assets

Summary Table 1 Response of the Quantity of an Asset Demanded to Changes in Wealth, Expected Returns, Risk, and Liquidity

<table>
<thead>
<tr>
<th>Variable</th>
<th>Change in Variable</th>
<th>Change in Quantity Demanded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wealth</td>
<td>↑</td>
<td>↑</td>
</tr>
<tr>
<td>Expected return relative to assets</td>
<td>↑</td>
<td>↑</td>
</tr>
<tr>
<td>Risk relative to other assets</td>
<td>↑</td>
<td>↑</td>
</tr>
<tr>
<td>Liquidity relative to other assets</td>
<td>↑</td>
<td>↑</td>
</tr>
</tbody>
</table>

Supply and Demand in the Bond Market
At lower prices (higher interest rates), ceteris paribus, the quantity demanded of bonds is higher: an inverse relationship. At lower prices (higher interest rates), ceteris paribus, the quantity supplied of bonds is lower: a positive relationship

Figure 1 Supply and Demand for Bonds
Market Equilibrium
Occurs when the amount that people are willing to buy (demand) equals the amount that people are willing to sell (supply) at a given price.

Bd = Bs defines the equilibrium (or market clearing) price and interest rate.
- When Bd > Bs , there is excess demand, price will rise and interest rate will fall
- When Bd < Bs , there is excess supply, price will fall and interest rate will rise

Changes in Equilibrium Interest Rates
Shifts in the demand for bonds:
- Wealth: in an expansion with growing wealth, the demand curve for bonds shifts to the right
- Expected Returns: higher expected interest rates in the future lower the expected return for long-term bonds, shifting the demand curve to the left
- Expected Inflation: an increase in the expected rate of inflation lowers the expected return for bonds, causing the demand curve to shift to the left
- Risk: an increase in the riskiness of bonds causes the demand curve to shift to the left
- Liquidity: increased liquidity of bonds results in the demand curve shifting right

Summary Table 2 Factors That Shift the Demand Curve for Bonds

<table>
<thead>
<tr>
<th>Factor</th>
<th>Change in Demand</th>
<th>Shift in Demand Curve</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wealth</td>
<td>↑</td>
<td>↑</td>
</tr>
<tr>
<td>Expected Interest Rate</td>
<td>↑</td>
<td>↑</td>
</tr>
<tr>
<td>Expected Inflation</td>
<td>↑</td>
<td>↑</td>
</tr>
<tr>
<td>Risk</td>
<td>↑</td>
<td>↑</td>
</tr>
<tr>
<td>Liquidity</td>
<td>↑</td>
<td>↑</td>
</tr>
<tr>
<td>Relative to other assets</td>
<td>↑</td>
<td>↑</td>
</tr>
</tbody>
</table>

Shifts in the Supply of Bonds
Expected profitability of investment opportunities: in an expansion, the supply curve shifts to the right

Expected inflation: an increase in expected inflation shifts the supply curve for bonds to the right

Government budget: increased budget deficits shift the supply curve to the right

Summary Table 3 Factors That Shift the Supply of Bonds
Supply and Demand in the Market for Money: The Liquidity Preference Framework

Keynesian model that determines the equilibrium interest rate in terms of the supply of and demand for money. There are two main categories of assets that people use to store their wealth: money and bonds.

Total wealth in the economy = B^* + M^* = B^d + M^d

Rearranging: B^* - B^d = M^* - M^d

If the market for money is in equilibrium (M^* = M^d), then the bond market is also in equilibrium (B^* = B^d).

Demand for Money in the Liquidity Preference Framework

As the interest rate increases:
- The opportunity cost of holding money increases...
- The relative expected return of money decreases...
...and therefore the quantity demanded of money decreases.

Changes in Equilibrium Interest Rates in the Liquidity Preference Framework

Shifts in the demand for money:
Income Effect: a higher level of income causes the demand for money at each interest rate to increase and the demand curve to shift to the right.
Price-Level Effect: a rise in the price level causes the demand for money at each interest rate to increase and the demand curve to shift to the right.

Shifts in the Supply of Money
Assume that the supply of money is controlled by the central bank. An increase in the money supply engineered by the Federal Reserve will shift the supply curve for money to the right.

Summary Table 4 Factors That Shift the Demand for and Supply of Money

<table>
<thead>
<tr>
<th>Variable</th>
<th>Change in Demand (M^d) or Supply (M^s) at Each Interest Rate</th>
<th>Change in Interest Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Income</td>
<td>↑ M↑</td>
<td>↑</td>
</tr>
<tr>
<td>Price level</td>
<td>↑ M↑</td>
<td>↑</td>
</tr>
<tr>
<td>Money supply</td>
<td>↑ M↑</td>
<td>↓</td>
</tr>
</tbody>
</table>

Figure 5 Expected Inflation and Interest Rates (Three-Month Treasury Bills), 1953–2011

Figure 6 Response to a Business Cycle Expansion

Figure 7 Business Cycle and Interest Rates (Three-Month Treasury Bills), 1951–2011

Figure 8 Equilibrium in the Market for Money
Price-Level Effect and Expected-Inflation Effect

A one-time increase in the money supply will cause prices to rise to a permanently higher level by the end of the year. The interest rate will rise via the increased prices. Price-level effect remains even after prices have stopped rising. A rising price level will raise interest rates because people will expect inflation to be higher over the course of the year. When the price level stops rising, expectations of inflation will return to zero. Expected-inflation effect persists only as long as the price level continues to rise.

Does a Higher Rate of Growth of the Money Supply Lower Interest Rates?

Liquidity preference framework leads to the conclusion that an increase in the money supply will lower interest rates: the liquidity effect. Income effect finds interest rates rising because increasing the money supply is an expansionary influence on the economy (the demand curve shifts to the right).

Price-Level effect predicts an increase in the money supply leads to a rise in interest rates in response to the rise in the price level (the demand curve shifts to the right). Expected-inflation effect shows an increase in interest rates because an increase in the money supply may lead people to expect a higher price level in the future (the demand curve shifts to the right).

Figure 10 Response to a Change in the Money Supply

Figure 11 Response over Time to an Increase in Money Supply Growth

CHAPTER 6
THE RISK AND TERM STRUCTURE OF INTEREST RATES

Risk Structure of Interest Rates

Bonds with the same maturity have different interest rates due to:
- Default risk
- Liquidity
- Tax considerations

Figure 1 Long-Term Bond Yields, 1919–2011
– Default risk: probability that the issuer of the bond is unable or unwilling to make interest payments or pay off the face value. U.S. Treasury bonds are considered default free (government can raise taxes).
– Risk premium: the spread between the interest rates on bonds with default risk and the interest rates on (same maturity) Treasury bonds

Figure 2 Response to an Increase in Default Risk on Corporate Bonds

![Default Risk and Risk Premium Graph]

TABLE 1 Bond Ratings by Moody’s, Standard and Poor’s, and Fitch

<table>
<thead>
<tr>
<th>Rating</th>
<th>Moody’s</th>
<th>Standard and Poor’s</th>
<th>Fitch</th>
<th>Definitions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aaa</td>
<td>AAA</td>
<td>AAA</td>
<td></td>
<td>Prime Maximum Safety</td>
</tr>
<tr>
<td>Aa1</td>
<td>AA+</td>
<td>AA+</td>
<td></td>
<td>High Grade High Quality</td>
</tr>
<tr>
<td>Aa2</td>
<td>AA</td>
<td>AA</td>
<td></td>
<td>High Grade</td>
</tr>
<tr>
<td>Aa3</td>
<td>AA-</td>
<td>AA-</td>
<td></td>
<td>Medium Grade</td>
</tr>
<tr>
<td>A1</td>
<td>A+</td>
<td>A+</td>
<td></td>
<td>Upper Medium Grade</td>
</tr>
<tr>
<td>A2</td>
<td>A</td>
<td>A</td>
<td></td>
<td>Low Grade</td>
</tr>
<tr>
<td>A3</td>
<td>A-</td>
<td>A-</td>
<td></td>
<td>Lower Medium Grade</td>
</tr>
<tr>
<td>Ba1</td>
<td>BBB+</td>
<td>BBB+</td>
<td></td>
<td>High Grade Non-investment Grade</td>
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</tr>
<tr>
<td>Ba3</td>
<td>BBB-</td>
<td>BBB-</td>
<td></td>
<td>Sub-Investment Grade</td>
</tr>
<tr>
<td>B1</td>
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<td>B-</td>
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<td>Highly Speculative</td>
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<tr>
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<td>B3</td>
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<td></td>
<td>High Grade</td>
</tr>
<tr>
<td>Caa1</td>
<td>CCC+</td>
<td>CCC+</td>
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<td>Substantial Risk</td>
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<tr>
<td>Caa2</td>
<td>CCC</td>
<td>CCC</td>
<td></td>
<td>In Poor Standing</td>
</tr>
<tr>
<td>Caa3</td>
<td>CCC-</td>
<td>CCC-</td>
<td></td>
<td>Extremely Speculative</td>
</tr>
<tr>
<td>C</td>
<td>C</td>
<td>C</td>
<td></td>
<td>May Be in Default</td>
</tr>
<tr>
<td>D</td>
<td>D</td>
<td>D</td>
<td></td>
<td>Default</td>
</tr>
<tr>
<td>D-</td>
<td>D-</td>
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<td>D-</td>
<td>D</td>
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</tr>
</tbody>
</table>

Liquidity: the relative ease with which an asset can be converted into cash
– Cost of selling a bond
– Number of buyers/sellers in a bond market

Income tax considerations
– Interest payments on municipal bonds are exempt from federal income taxes.

Figure 3 Interest Rates on Municipal and Treasury Bonds

![Interest Rates Graph]

TABLE 1 Bond Ratings by Moody’s, Standard and Poor’s, and Fitch

<table>
<thead>
<tr>
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</tr>
</tbody>
</table>

Term Structure of Interest Rates
Bonds with identical risk, liquidity, and tax characteristics may have different interest rates because the time remaining to maturity is different

Yield curve: a plot of the yield on bonds with differing terms to maturity but the same risk, liquidity and tax considerations
– Upward-sloping: long-term rates are above short-term rates
– Flat: short- and long-term rates are the same
– Inverted: long-term rates are below short-term rates

Facts that the Theory of the Term Structure of Interest Rates Must Explain
1. Interest rates on bonds of different maturities move together over time
2. When short-term interest rates are low, yield curves are more likely to have an upward slope; when short-term rates are high, yield curves are more likely to slope downward and be inverted
3. Yield curves almost always slope upward

Three Theories to Explain the Three Facts
1. Expectations theory explains the first two facts but not the third
2. Segmented markets theory explains fact three but not the first two
3. Liquidity premium theory combines the two theories to explain all three facts

Figure 4 Movements over Time of Interest Rates on U.S. Government Bonds with Different Maturities

![Yield Curve Graph]

Expectations Theory
The interest rate on a long-term bond will equal an average of the short-term interest rates that people expect to occur over the life of the long-term bond. Buyers of bonds do not prefer bonds of one maturity over another; they will not hold any quantity of a bond if its expected return is less than that of another bond with a different maturity. Bond holders consider bonds with different maturities to be perfect substitutes

Expectations Theory: Example
Let the current rate on one-year bond be 6%. You expect the interest rate on a one-year bond to be 8% next year. Then the expected return for buying two one-year bonds averages (6% + 8%)/2 = 7%. The interest rate on a two-year bond must be 7% for you to be willing to purchase it.

For an investment of $1
\[ i_1 = \text{today’s interest rate on a one-period bond} \]
\[ i_2 = i_1 + \left( 1 + i_1 \right) - 1 \]

Expected return over the two periods from investing $1 in the two-period bond and holding it for the two periods
\[ \text{Expected return} = (1 + i_1)(1 + i_2) - 1 \]

Since \( i_2 \) is very small

The expected return for holding the two-period bond for two periods is

\[ 2i_2 \]

If two one-period bonds are bought with the $1 investment
\[ (1 + i_1)(1 + i_2) - 1 \]

\[ i_1 + i_2 + i_1i_2 \]

\[ i_1i_2 \] is extremly small

Simplifying we get
\[ i_1 + i_2 \]
Both bonds will be held only if the expected returns are equal

\[ 2y_0 = i + \frac{r_1}{2} \]

\[ i = \frac{r_1}{2} \]

The two-period rate must equal the average of the two one-period rates

For bonds with longer maturities

\[ i_n = i_1 + \frac{r_2}{2} + \frac{r_3}{n} \]

The n-period interest rate equals the average of the one-period interest rates expected to occur over the n-period life of the bond

- Explains why the term structure of interest rates changes at different times
- Explains why interest rates on bonds with different maturities move together over time (fact 1)
- Explains why yield curves tend to slope up when short-term rates are low and slope down when short-term rates are high (fact 2)
- Cannot explain why yield curves usually slope upward (fact 3)

Segmented Markets Theory

Bonds of different maturities are not substitutes at all. The interest rate for each bond with a different maturity is determined by the demand for and supply of that bond. Investors have preferences for bonds of one maturity over another. If investors generally prefer bonds with shorter maturities that have less interest-rate risk, then this explains why yield curves usually slope upward (fact 3)

Liquidity Premium & Preferred Habitat Theories

The interest rate on a long-term bond will equal an average of short-term interest rates expected to occur over the life of the long-term bond plus a liquidity premium that responds to supply and demand conditions for that bond. Bonds of different maturities are partial (not perfect) substitutes

Liquidity Premium Theory

\[ i_n = \frac{i_1 + i_2 + \cdots + i_n}{n} \]

where \( i_n \) is the liquidity premium for the n-period bond at time \( r \)

\( i_n \) is always positive

Rises with the term to maturity

Preferred Habitat Theory

Investors have a preference for bonds of one maturity over another. They will be willing to buy bonds of different maturities only if they earn a somewhat higher expected return. Investors are likely to prefer short-term bonds over longer-term bonds

Interest rates on different maturity bonds move together over time; explained by the first term in the equation. Yield curves tend to slope upward when short-term rates are low and to be inverted when short-term rates are high; explained by the liquidity premium term in the first case and by a low expected average in the second case. Yield curves typically slope upward; explained by a larger liquidity premium as the term to maturity lengthens

Figure 5 The Relationship Between the Liquidity Premium (Preferred Habitat) and Expectations Theory

The One-Period Valuation Model:

\[ P_0 = \frac{D_1}{(1 + k_0)} + \frac{P_1}{(1 + k_s)} \]

\( P_0 \) is the current price of the stock
\( D_1 \) is the dividend paid at the end of year 1
\( k_0 \) is the required rate of return on investment in equity
\( P_1 \) is the sale price of the stock at the end of the first period

The Generalized Dividend Valuation Model

CHAPTER 7

THE STOCK MARKET, THEORY OF RATIONAL EXPECTATIONS, AND THE EFFICIENT MARKET HYPOTHESIS
The value of stock today is the present value of all future cash flows

\[ P_t = \sum_{r=0}^{\infty} \frac{D_{t+r}}{(1+k)^{t+r}} \]

Where \( P_t \) is the price of the stock at time \( t \), \( D_{t+r} \) is the dividend at time \( t+r \), \( k \) is the required rate of return on equity, and \( r \) is the number of periods into the future.

The price of the stock is determined only by the present value of the future dividend stream.

**The Gordon Growth Model**

\[ P_t = \frac{D_t}{r - g} \]

Where \( P_t \) is the price of the stock, \( D_t \) is the most recent dividend paid, \( r \) is the interest rate, and \( g \) is the expected constant growth rate in dividends.

Dividends are assumed to continue growing at a constant rate forever. The growth rate is assumed to be less than the required return on equity.

**How the Market Sets Prices**

The price is set by the buyer willing to pay the highest price. The market price will be set by the buyer who can take best advantage of the asset. Superior information about an asset can increase its value by reducing its perceived risk. Information is important for individuals to value each asset. When new information is released about a firm, expectation and prices change. Market participants constantly receive information and revise their expectations, so stock prices change frequently.

**Application: The Global Financial Crisis and the Stock Market**

Financial crisis that started in August 2007 led to one of the worst bear market in 50 years. Downward revision of growth prospects. Increased uncertainty. "The Gordon model predicts a drop in stock prices.

**The Theory of Rational Expectations**

 Adaptive expectations: Expectations are formed from past experience only. Changes in expectations will occur slowly over time as data changes. However, people use more than just past data to form their expectations and sometimes change their expectations quickly.

 Expectations will be identical to optimal forecasts using all available information. Even though a rational expectation equals the optimal forecast using all available information, a prediction based on it may not always be perfectly accurate. It takes too much effort to make the expectation the best guess possible. Best guess will not be accurate because predictor is unaware of some relevant information.

**Formal Statement of the Theory**

\[ X^e = X^f \]

\[ X^f = \text{expected value of the variable that is being forecast} \]

\[ X^e = \text{optimal forecast using all available information} \]

**Rationale Behind the Theory**

 The incentives for equating expectations with optimal forecasts are especially strong in financial markets. In these markets, people with better forecasts of the future get rich. The application of the theory of rational expectations to financial markets (where it is called the efficient market hypothesis or the theory of efficient capital markets) is thus particularly useful.

**Implications of the Theory**

 If there is a change in the way a variable moves, the way in which expectations of the variable are formed will change as well. Changes in the conduct of monetary policy (e.g. target the federal funds rate). The forecast errors of expectations will, on average, be zero and cannot be predicted ahead of time.

**The Efficient Market Hypothesis: Rational Expectations in Financial Markets**

Recall: The rate of return from holding a security equals the sum of the capital gain on the security, plus any cash payments divided by the initial purchase price of the security.

\[ R = \frac{P_{t+1} + C - P_t}{P_t} \]

\[ R = \text{rate of return on the security} \]

\[ P_{t+1} = \text{price of the security at time } t+1, \text{ end of the holding period} \]

\[ P_t = \text{price of the security at time } t, \text{ beginning of the holding period} \]

\[ C = \text{cash payment (coupon or dividend) made during the holding period} \]

**The Efficient Market Hypothesis**: At the beginning of the period, we know \( P_t \) and \( C \). \( P_{t+1} \) is unknown and we must form an expectation of it.

The expected return formula is:

\[ E[R_t] = \frac{P_{t+1} - P_t + C}{P_t} \]

Expectations of future prices are equal to optimal forecasts using all currently available information so

\[ E[R_t] = \hat{P}_{t+1} - \hat{P}_t + \hat{C} \]

Supply and Demand analysis states \( R_t \) will equal the equilibrium return \( R^e \), so \( R_t = R^e \)

Current prices in a financial market will be set so that the optimal forecast of a security's return using all available information equals the security's equilibrium return. In an efficient market, a security's price fully reflects all available information.

In an efficient market, all unexploited profit opportunities will be eliminated.

**How Valuable are Published Reports by Investment Advisors?**

Information in newspapers and in the published reports of investment advisors is readily available to many market participants and is already reflected in market prices. So acting on this information will not yield abnormally high returns, on average. The empirical evidence for the most part confirms that recommendations from investment advisors cannot help us outperform the general market. Recommendations from investment advisors cannot help us outperform the market. A hot tip is probably information already contained in the price of the stock. Stock prices respond to announcements only when the information is new and unexpected. A buy and hold strategy is the most sensible strategy for the

Some financial economists believe all prices are always correct and reflect market fundamentals (items that have a direct impact on future income streams of the securities) and so financial markets are efficient. However, prices in markets like the stock market are unpredictable. This casts serious doubt on the stronger view that financial markets are efficient.

**Behavioral Finance**

The lack of short selling (causing over-priced stocks) may be explained by loss aversion. The large trading volume may be explained by investor overconfidence. Stock market bubbles may be explained by overconfidence and social contagion.

**CHAPTER 8**

**AN ECONOMIC ANALYSIS OF FINANCIAL STRUCTURE**

**Basic Facts about Financial Structure Throughout the World**

This chapter provides an economic analysis of how our financial structure is designed to promote economic efficiency.

The bar chart in Figure 1 shows how American businesses financed their activities using external funds (those obtained from outside the business itself) in the period 1970–2000 and compares U.S. data to those of Germany, Japan, and Canada.

Figure 1 Sources of External Funds for Nonfinancial Businesses: A Comparison of the United States with Germany, Japan, and Canada

<table>
<thead>
<tr>
<th>Year</th>
<th>United States</th>
<th>Germany</th>
<th>Japan</th>
<th>Canada</th>
</tr>
</thead>
<tbody>
<tr>
<td>1970</td>
<td>50%</td>
<td>30%</td>
<td>30%</td>
<td>20%</td>
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<td>2000</td>
<td>40%</td>
<td>20%</td>
<td>20%</td>
<td>10%</td>
</tr>
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</table>

**Eight Basic Facts**

- **Basic Facts about Financial Structure Throughout the World**
- **AN ECONOMIC ANALYSIS OF FINANCIAL STRUCTURE**
- **Behavioral Finance**
- **How Valuable are Published Reports by Investment Advisors?**
- **How the Market Sets Prices**
- **The Theory of Rational Expectations**
- **The Efficient Market Hypothesis: Rational Expectations in Financial Markets**
- **Basic Facts about Financial Structure Throughout the World**
1. Stocks are not the most important sources of external financing for businesses
2. Issuing marketable debt and equity securities is not the primary way in which businesses finance their operations
3. Indirect finance is many times more important than direct finance
4. Financial intermediaries, particularly banks, are the most important source of external funds used to finance businesses.
5. The financial system is among the most heavily regulated sectors of the economy.
6. Only large, well-established corporations have easy access to securities markets to finance their activities
7. Collateral is a prevalent feature of debt contracts for both households and businesses.
8. Debt contracts are extremely complicated legal documents that place substantial restrictive covenants on borrowers

Transaction Costs
Financial intermediaries have evolved to reduce transaction costs
- Economies of scale
- Expertise

Asymmetric Information: Adverse Selection and Moral Hazard
Adverse selection occurs before the transaction. Moral hazard arises after the transaction. Agency theory analyses how asymmetric information problems affect economic behavior.

The Lemons Problem: How Adverse Selection Influences Financial Structure
If quality cannot be assessed, the buyer is willing to pay at most a price that reflects the average quality. Sellers of good quality items will not want to sell at the price for average quality. The buyer will decide not to buy at all because all that is left in the market is poor quality items. This problem explains fact 2 and partially explains fact 1.

Tools to Help Solve Adverse Selection Problems
Private production and sale of information
- Free-rider problem
Government regulation to increase information
- Not always works to solve the adverse selection problem, explains Fact 5.
Financial intermediation
Collateral and net worth
- Explains fact 7.

How Moral Hazard Affects the Choice Between Debt and Equity Contracts
Called the Principal-Agent Problem
- Principal: less information (stockholder)
- Agent: more information (manager)

Separation of ownership and control of the firm
- Managers pursue personal benefits and power rather than the profitability of the firm

Tools to Help Solve the Principal-Agent Problem
Monitoring (Costly State Verification)
- Free-rider problem
- Fact 1
Government regulation to increase information
- Fact 5
Financial Intermediation
- Fact 3
Debt Contracts
- Fact 1

How Moral Hazard Influences Financial Structure in Debt Markets
Borrowers have incentives to take on projects that are riskier than the lenders would like. This prevents the borrower from paying back the loan.

Tools to Help Solve Moral Hazard in Debt Contracts
Net worth and collateral
- incentive compatible
Monitoring and Enforcement of Restrictive Covenants
- Discourage undesirable behavior
- Encourage desirable behavior
- Keep collateral valuable
- Provide information
Financial Intermediation
- Facts 3 & 4

Summary Table 1 Asymmetric Information Problems and Tools to Solve Them

Asymmetric Information in Transition and Developing Countries
Financial repression created by an institutional environment characterized by:
- Poor system of property rights (unable to use collateral efficiently)
- Poor legal system (difficult for lenders to enforce restrictive covenants)
- Weak accounting standards (less access to good information)
- Government intervention through directed credit programs and state owned banks (less incentive to proper channel funds to its most productive use).

Application: Financial Development and Economic Growth
The financial systems in developing and transition countries face several difficulties that keep them from operating efficiently. In many developing countries, the system of property rights (the rule of law, constraints on government expropriation, absence of corruption) functions poorly, making it hard to use these two tools effectively.

CHAPTER 9
FINANCIAL CRISES

What is a Financial Crisis?
A financial crisis occurs when there is a particularly large disruption to information flows in financial markets, with the result that financial frictions increase sharply and financial markets stop functioning.

Asset Markets Effects on Balance Sheets
- Stock market decline
  Decreases net worth of corporations.
- Anticipated decline in the price level
  Liabilities increase in real terms and net worth decreases.
- Anticipated decline in the value of the domestic currency
  Increases debt denominated in foreign currencies and decreases net worth.
- Asset write-downs.

Factors Causing Financial Crises
Deterioration in Financial Institutions’ Balance Sheets
- Decline in lending.

Banking Crisis
- Loss of information production and disintermediation.

Increases in Uncertainty
- Decrease in lending.

Increases in Interest Rates
- Increases adverse selection problem
 increases need for external funds and therefore adverse selection and moral hazard.

Government Fiscal Imbalances
- Create fears of default on government debt.
- Investors might pull their money out of the country.

Dynamics of Financial Crises in Advanced Economies
1. Stage One: Initiation of Financial Crisis
   - Mismanagement of financial liberalization/innovation
   - Asset price boom and bust
   - Spikes in interest rates
   - Increase in uncertainty
2. Stage two: Banking Crisis
3. Stage three: Debt Deflation

APPLICATION The Mother of All Financial Crises: The Great Depression
How did a financial crisis unfold during the Great Depression and how it led to the worst economic downturn in U.S. history?

This event was brought on by:
- Stock market crash
- Bank panics
- Continuing decline in stock prices
- Debt deflation

Figure 2 Stock Price Data During the Great Depression Period

FYI Collateralized Debt Obligations (CDOs)
The creation of a collateralized debt obligation involves a corporate entity called a special purpose vehicle (SPV) that buys a collection of assets such as corporate bonds and loans, commercial real estate bonds, and mortgage-backed securities. The SPV separates the payment streams (cash flows) from these assets into buckets referred to as tranches. The highest rated tranches, referred to as super senior tranches, have the least risk and are not paid out if the underlying assets go into default and stop making payments. This tranche has the highest risk and is often not traded.

Figure 3 Credit Spreads During the Great Depression

Causes:
- Financial innovations emerge in the mortgage markets
- Subprime and Alt-A mortgages
- Mortgage-backed securities
- Collateralized debt obligations (CDOs)

Housing price bubble forms
- Increase in liquidity from cash flows surging to the United States
- Development of subprime mortgage market fueled housing demand and housing prices.

Agency problems arise
- Originate to distribute (mortgage broker) problem.
- Borrowers had little incentive to disclose information about their ability to pay.
- Commercial and investment banks (as well as rating agencies) had weak incentives to assess the quality of securities
  - Information problems surface
  - Housing price bubble bursts

Crisis spreads globally
- Sign of the globalization of financial markets
- TED spread (3 months interest rate on Eurodollar minus 3 months Treasury bills interest rate) increased from 40 basis points to almost 240 in August 2007.

Banks' balance sheets deteriorate
- Write downs
- Sell of assets and credit restriction

High-profile firms fail
- Bear Stearns (March 2008)
- Fannie Mae and Freddie Mac (July 2008)
- Lehman Brothers, Merrill Lynch, AIG, Reserve Primary Fund (mutual fund) and Washington Mutual (September 2008).

Bailout package debated
- House of Representatives voted down the $700 billion bailout package on September 29, 2008.
- It passed on October 3.

Recovery in sight?
- Congress approved a $787 billion economic stimulus plan on February 13, 2009.

Inside the Fed Was the Fed to Blame for the Housing Price Bubble?
Some economists have argued that the low rate interest policies of the Federal Reserve in the 2003–2006 period caused the housing price bubble. Taylor argues that the low federal funds rate led to low mortgage rates that stimulated housing demand and encouraged the issuance of subprime mortgages, both of which led to rising housing prices and a bubble. Federal Reserve Chairman Ben Bernanke countered this argument, saying the culprits were the proliferation of new mortgage products that lowered mortgage payments, a relaxation of lending standards that brought more buyers into the housing market, and capital inflows from emerging market countries. The debate over whether monetary policy was to blame for the housing price bubble continues to this day.

Figure 5 Stock Prices and the Financial Crisis of 2007–2009

Figure 6 Credit Spreads and the 2007–2009 Financial Crisis

**Dynamics of Financial Crises in Emerging Market Economies**

**Stage one: Initiation of Financial Crisis**
- Weak supervision and lack of expertise leads to a lending boom.
- Domestic banks borrow from foreign banks.
- Fixed exchange rates give a sense of lower risk.
- Banks play a more important role in emerging market economies, since securities markets are not well developed yet.

**Stage two: Severe fiscal imbalances**
- Governments in need of funds sometimes force banks to buy government debt.
- When government debt loses value, banks lose and their net worth decreases.

**Additional factors**
- Increase in interest rates (from abroad)
- Asset price decrease
- Uncertainty linked to unstable political systems

**Stage three: Currency crisis**
Deterioration of bank balance sheets triggers currency crises:
- Government cannot raise interest rates (doing so forces banks into insolvency).
- ... and speculators expect a devaluation.

How severe fiscal imbalances triggers currency crises:
- Foreign and domestic investors sell the domestic currency.

**Stage three: Full-Fledged Financial Crisis**
- The debt burden in terms of domestic currency increases (net worth decreases).
- Increase in expected and actual inflation reduces firms' cash flow.
- Banks are more likely to fail:
  1. Individuals are less able to pay off their debts (value of assets fall).
  2. Debt denominated in foreign currency increases (value of liabilities increase).

Figure 7 Sequence of Events in Emerging Market Financial Crises


**Mexico**: Financial liberalization in the early 1990s:
- Lending boom, coupled with weak supervision and lack of expertise.
- Banks accumulated losses and their net worth declined.
  - Rise in interest rates abroad.
  - Uncertainty increased (political instability).
  - Domestic currency devaluated on December 20, 1994.
  - Rise in actual and expected inflation.

**East Asia**: Financial liberalization in the early 1990s:
- Lending boom, coupled with weak supervision and lack of expertise.
- Banks accumulated losses and their net worth declined.


**CHAPTER 10**

**BANKING AND THE MANAGEMENT OF FINANCIAL INSTITUTIONS**

**The Bank Balance Sheet**
- **Liabilities**
  - Checkable deposits
  - Nontransaction deposits
  - Borrowings
  - Bank capital

**Assets**
- Reserves
- Cash items in process of collection
- Deposits at other banks
- Securities
- Loans
- Other assets

Table 1 Balance Sheet of All Commercial Banks (items as a percentage of the total, June 2011)
Basic Banking: Cash Deposit

Opening of a checking account leads to an increase in the bank's reserves equal to the increase in checkable deposits. When a bank receives additional deposits, it gains an equal amount of reserves; when it loses deposits, it loses an equal amount of reserves.

<table>
<thead>
<tr>
<th>First National Bank</th>
<th>First National Bank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assets</td>
<td>Liabilities</td>
</tr>
<tr>
<td>Cash</td>
<td>$100</td>
</tr>
<tr>
<td>Checkable deposits</td>
<td>$100</td>
</tr>
</tbody>
</table>

Liquidity Management: Ample Excess Reserves

Suppose bank's required reserves are 10%. If a bank has ample excess reserves, a deposit outflow does not necessitate changes in other parts of its balance sheet.

<table>
<thead>
<tr>
<th>Balance Sheet of All Commercial Banks (in % of total, June 2011)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assets (Uses of Funds)</td>
</tr>
<tr>
<td>Reserves and cash items: 15%</td>
</tr>
<tr>
<td>Securities: U.S. government and agency: 13%</td>
</tr>
<tr>
<td>State and local government and other securities: 6%</td>
</tr>
<tr>
<td>Loans: Commercial and Industrial: 10%</td>
</tr>
<tr>
<td>Real estate: 18%</td>
</tr>
<tr>
<td>Consumer: 9%</td>
</tr>
<tr>
<td>Interbank: 1%</td>
</tr>
<tr>
<td>Total: 100%</td>
</tr>
</tbody>
</table>

Reserves are a legal requirement and the shortfall must be eliminated. Excess reserves are insurance against the costs associated with deposit outflows.

<table>
<thead>
<tr>
<th>Liquidity Management: Borrowing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assets</td>
</tr>
<tr>
<td>Reserves $90M</td>
</tr>
<tr>
<td>Loans $90M</td>
</tr>
<tr>
<td>Securities $10M</td>
</tr>
</tbody>
</table>

The cost of selling securities is the brokerage and other transaction costs.

<table>
<thead>
<tr>
<th>Liquidity Management: Federal Reserve</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assets</td>
</tr>
<tr>
<td>Reserves $9M</td>
</tr>
<tr>
<td>Loans $90M</td>
</tr>
<tr>
<td>Securities $12M</td>
</tr>
</tbody>
</table>

Liquidity Management: Reduce Loans

Borrowing from the Fed also incurs interest payments based on the discount rate.

<table>
<thead>
<tr>
<th>Asset Management: Three Goals</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Seek the highest possible returns on loans and securities</td>
</tr>
<tr>
<td>2. Reduce risk</td>
</tr>
<tr>
<td>3. Have adequate liquidity</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Asset Management: Four Tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Find borrowers who will pay high interest rates and have low possibility of defaulting</td>
</tr>
<tr>
<td>2. Purchase securities with high returns and low risk</td>
</tr>
<tr>
<td>3. Lower risk by diversifying</td>
</tr>
<tr>
<td>4. Balance need for liquidity against increased returns from less liquid assets</td>
</tr>
</tbody>
</table>

Recent phenomenon due to rise of money center banks. Expansion of overnight loan markets and new financial instruments (such as negotiable CDs). Checkable deposits have decreased in importance as source of bank funds.

<table>
<thead>
<tr>
<th>Liability Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recent phenomenon due to rise of money center banks. Expansion of overnight loan markets and new financial instruments (such as negotiable CDs). Checkable deposits have decreased in importance as source of bank funds</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Capital Adequacy Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recent phenomenon due to rise of money center banks. Expansion of overnight loan markets and new financial instruments (such as negotiable CDs). Checkable deposits have decreased in importance as source of bank funds</td>
</tr>
</tbody>
</table>
Bank capital helps prevent bank failure. The amount of capital affects return for the owners (equity holders) of the bank. Regulatory requirement

**Capital Adequacy Management: Preventing Bank Failure**

<table>
<thead>
<tr>
<th>High Bank Capital</th>
<th>Low Bank Capital</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reserves $100M</td>
<td>Deposits $90M</td>
</tr>
<tr>
<td>Loans $90M</td>
<td>Bank Capital $10M</td>
</tr>
<tr>
<td></td>
<td>Loans $90M</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>High Bank Capital</th>
<th>Low Bank Capital</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reserves $100M</td>
<td>Deposits $90M</td>
</tr>
<tr>
<td>Loans $90M</td>
<td>Bank Capital $1M</td>
</tr>
<tr>
<td></td>
<td>Loans $90M</td>
</tr>
</tbody>
</table>

**Capital Adequacy Management: Returns to Equity Holders**

Return on Assets: net profit after taxes per dollar of assets

\[ \text{ROA} = \frac{\text{net profit after taxes}}{\text{assets}} \]

Return on Equity: net profit after taxes per dollar of equity capital

\[ \text{ROE} = \frac{\text{net profit after taxes}}{\text{equity capital}} \]

Equity Multiplier: the amount of assets per dollar of equity capital

\[ \text{EM} = \frac{\text{assets}}{\text{Equity Capital}} \]

Capital Adequacy Management: Safety

Benefits the owners of a bank by making their investment safe. Costly to owners of a bank because the higher the bank capital, the lower the return on equity. Choice depends on the state of the economy and levels of confidence.

Application: How a Capital Crunch Caused a Credit Crunch During the Global Financial Crisis

Shortfalls of bank capital led to slower credit growth

- Huge losses for banks from their holdings of securities backed by residential mortgages.
- Losses reduced bank capital

Banks could not raise much capital on a weak economy, and had to tighten their lending standards and reduce lending.

**Managing Credit Risk**

Screening and Monitoring

- Screening
- Specialization in lending
- Monitoring and enforcement of restrictive covenants
- Long-term customer relationships
- Loan commitments
- Collateral and compensating balances
- Credit rationing

**Managing Interest-Rate Risk**

If a bank has more rate-sensitive liabilities than assets, a rise in interest rates will reduce bank profits and a decline in interest rates will raise bank profits.

\[ (\text{rate sensitive assets} - \text{rate sensitive liabilities}) \times \Delta \text{interest rates} = \Delta \text{in bank profit} \]

Maturity bucketed approach

- Measures the gap for several maturity subintervals.

Standardized gap analysis

\[ \% \Delta \text{market value of security} \times \% \text{point} \times \text{interest rate} \times \text{duration in years} \]

- Accounts for different degrees of rate sensitivity.

Uses the weighted average duration of a financial institution’s assets and its liabilities to see how net worth responds to a change in interest rates.

**Off-Balance-Sheet Activities**

Loan sales (secondary loan participation)

Generation of fee income. Examples:

- Servicing mortgage-backed securities
- Creating SIVs (structured investment vehicles) which can potentially expose banks to risk, as it happened in the global financial crisis

Trading activities and risk management techniques

- Financial futures, options for debt instruments, interest rate swaps, transactions in the foreign exchange market and speculation.
- Principal-agent problem arises

Internal controls to reduce the principal-agent problem

- Separation of trading activities and bookkeeping
- Limits on exposure
- Value-at-risk
- Stress testing

**CHAPTER 12**

**BANKING INDUSTRY: STRUCTURE AND COMPETITION**

**Historical Development of the Banking System**


- Office of the Comptroller of the Currency
- Dual banking system

Federal Reserve System is created in 1913.

Figure 1 Time Line of the Early History of Commercial Banking in the United States

**Primary Supervisory Responsibility of Bank Regulatory Agencies**

Federal Reserve and state banking authorities: state banks that are members of the Federal Reserve System. Fed also regulates bank holding...
companies. FDIC: insured state banks that are not Fed members. State banking authorities: state banks without FDIC insurance.

Financial Innovation and the Growth of the “Shadow Banking System”
Financial innovation is driven by the desire to earn profits. A change in the financial environment will stimulate a search by financial institutions for innovations that are likely to be profitable.

– Financial engineering

Responses to Changes in Demand Conditions: Interest Rate Volatility
Adjustable-rate mortgages
– Flexible interest rates keep profits high when rates rise
– Lower initial interest rates make them attractive to home buyers

Financial Derivatives
– Ability to hedge interest rate risk
– Payoffs are linked to previously issued (i.e. derived from) securities.

Responses to Changes in Supply Conditions: Information Technology
Bank credit and debit cards
– Improved computer technology lowers transaction costs

Electronic banking
– ATM, home banking, ABM and virtual banking
– Junk bonds
– Commercial paper market

Securitization
– To transform otherwise illiquid financial assets into marketable capital market securities.
– Securitization played an especially prominent role in the development of the subprime mortgage market in the mid 2000s.

Avoidance of Existing Regulations: Loophole Mining
Reserve requirements act as a tax on deposits. Restrictions on interest paid on deposits led to disintermediation.
– Money market mutual funds
– Sweep accounts

Financial Innovation and the Decline of Traditional Banking
As a source of funds for borrowers, market share has fallen. Commercial banks’ share of total financial intermediary assets has fallen. No decline in overall profitability. Increase in income from off-balance-sheet activities

Figure 2 Bank Share of Total Nonfinancial Borrowing, 1960–2011

Decline in cost advantages in acquiring funds (liabilities)
– Rising inflation led to rise in interest rates and disintermediation
– Low-cost source of funds, checkable deposits, declined in importance

Decline in income advantages on uses of funds (assets)
– Information technology has decreased need for banks to finance short-term credit needs or to issue loans
– Information technology has lowered transaction costs for other financial institutions, increasing competition

Banks’ Responses
Expand into new and riskier areas of lending
– Commercial real estate loans
– Corporate takeovers and leveraged buyouts
Pursue off-balance-sheet activities
– Non-interest income
– Concerns about risk

Structure of the U.S. Commercial Banking Industry
Restrictions on branching
– McFadden Act and state branching regulations.

Response to ranching restrictions
– Bank holding companies.
– Automated teller machines.

Table 1 Size Distribution of Insured Commercial Banks, March 30, 2011

<table>
<thead>
<tr>
<th>Assets</th>
<th>Number of Banks</th>
<th>Share of Banks (%)</th>
<th>Share of Assets Held (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than $100 million</td>
<td>2,328</td>
<td>35.7</td>
<td>1.9</td>
</tr>
<tr>
<td>$100 million-$1 billion</td>
<td>3,693</td>
<td>56.6</td>
<td>11.5</td>
</tr>
<tr>
<td>$1 billion-$10 billion</td>
<td>423</td>
<td>6.5</td>
<td>12.8</td>
</tr>
<tr>
<td>More than $10 billion</td>
<td>85</td>
<td>1.3</td>
<td>73.6</td>
</tr>
<tr>
<td>Total</td>
<td>6,530</td>
<td>100.00</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Table 2 Ten Largest U.S. Banks, December 30, 2010

<table>
<thead>
<tr>
<th>Bank</th>
<th>Assets ($ millions)</th>
<th>Share of All Commercial Bank Assets (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>JPMorgan Chase</td>
<td>1,723,460</td>
<td>15.14</td>
</tr>
<tr>
<td>Bank of America Corp.</td>
<td>1,451,267</td>
<td>13.75</td>
</tr>
<tr>
<td>Citibank</td>
<td>1,161,359</td>
<td>10.20</td>
</tr>
<tr>
<td>Wells Fargo</td>
<td>1,093,030</td>
<td>9.60</td>
</tr>
<tr>
<td>U.S. Bank</td>
<td>1,035,989</td>
<td>8.89</td>
</tr>
<tr>
<td>PNC</td>
<td>251,221</td>
<td>2.21</td>
</tr>
<tr>
<td>Bank of NY Mellon</td>
<td>200,249</td>
<td>1.70</td>
</tr>
<tr>
<td>HSBC USA</td>
<td>197,345</td>
<td>1.69</td>
</tr>
<tr>
<td>FHA Gud Service</td>
<td>188,638</td>
<td>1.66</td>
</tr>
<tr>
<td>TD Bank</td>
<td>175,145</td>
<td>1.54</td>
</tr>
<tr>
<td>Total</td>
<td>5,743,029</td>
<td>59.23</td>
</tr>
</tbody>
</table>

Bank Consolidation and Nationwide Banking
The number of banks has declined over the last 25 years
– Bank failures and consolidation.
– Economies of scale and scope from information technology.
Results may be not only a smaller number of banks but a shift in assets to much larger banks.

Benefits and Costs of Bank Consolidation
Benefits
– Increased competition, driving inefficient banks out of business
– Increased efficiency also from economies of scale and scope
– Lower probability of bank failure from more diversified portfolios

Costs
– Elimination of community banks may lead to less lending to small business.
– Banks expanding into new areas may take increased risks and fail

Figure 3 Number of Insured Commercial Banks in the United States, 1934–2010 (Third Quarter)

Separation of the Banking and Other Financial Service Industries
Erosion of Glass-Steagall Act
Prohibited commercial banks from underwriting corporate securities or engaging in brokerage activities. Section 20 loophole was allowed by the
Federal Reserve enabling affiliates of approved commercial banks to underwrite securities as long as the revenue did not exceed a specified amount. – U.S. Supreme Court validated the Fed’s action in 1988

Gramm-Leach-Bliley Financial Services Modernization Act of 1999
– Abolishes Glass-Steagall
– States regulate insurance activities
– SEC keeps oversight of securities activities
– Office of the Comptroller of the Currency regulates bank subsidiaries engaged in securities underwriting
– Federal Reserve oversees banks holding companies

Separation of Banking and Other Financial Services Industries Throughout the World

Universal banking
– No separation between banking and securities industries

British-style universal banking
– May engage in security underwriting Separate legal subsidiaries are common
  1. Bank equity holdings of commercial firms are less common
  2. Few combinations of banking and insurance firms

Some legal separation
Allowed to hold substantial equity stakes in commercial firms but holding companies are illegal

Thrift Industry: Regulation and Structure
Savings and Loan Associations
– Chartered by the federal government or by states
– Most are members of Federal Home Loan Bank System (FHLBS)
– Deposit insurance provided by Savings Association Insurance Fund (SAIF), part of FDIC
– Regulated by the Office of Thrift Supervision

Mutual Savings Banks
– Approximately half are chartered by states
– Regulated by state in which they are located
– Deposit insurance provided by FDIC or state insurance

Credit Unions
– Tax-exempt
– Chartered by federal government or by states
– Regulated by the National Credit Union Administration (NCUA)
– Deposit insurance provided by National Credit Union Share Insurance Fund (NCUSIF)

International Banking
Rapid growth
– Growth in international trade and multinational corporations
– Global investment banking is very profitable
– Ability to tap into the Eurodollar market

Eurodollar Market
Dollar-denominated deposits held in banks outside of the U.S. Most widely used currency in international trade. Offshore deposits not subject to regulations. Important source of funds for U.S. banks

Structure of U.S. Banking Overseas
Shell operations
– Edge Act corporation
– International banking facilities (IBFs)
– Not subject to regulation and taxes
– May not make loans to domestic residents

Foreign Banks in the U.S.
Agency office of the foreign bank
– Can lend and transfer fund in the U.S.
– Cannot accept deposits from domestic residents
– Not subject to regulations

Subsidiary U.S. bank
– Subject to U.S. regulations
– Owned by a foreign bank

Branch of a foreign bank
– May open branches only in state designated as home state or in state that allow entry of out-of-state banks
– Limited-service may be allowed in any other state

Subject to the International Banking Act of 1978

Basel Accord (1988)
– Example of international coordination of bank regulation
– Sets minimum capital requirements for banks

Table 3 Ten Largest Banks in the World, 2011

<table>
<thead>
<tr>
<th>Bank</th>
<th>Assets (U.S. $ millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. BNP Paribas SA, France</td>
<td>2,675,627</td>
</tr>
<tr>
<td>2. Deutsche Bank AG, Germany</td>
<td>2,531,737</td>
</tr>
<tr>
<td>3. Barclays PLC, UK</td>
<td>2,326,004</td>
</tr>
<tr>
<td>4. Credit Agricole SA, France</td>
<td>2,133,810</td>
</tr>
<tr>
<td>5. Industrial and Commercial Bank of China, China</td>
<td>2,043,861</td>
</tr>
<tr>
<td>6. The Royal Bank of Scotland Group PLC, UK</td>
<td>2,020,700</td>
</tr>
<tr>
<td>7. The Bank of Tokyo-Mitsubishi UFJ Ltd, Japan</td>
<td>1,644,758</td>
</tr>
<tr>
<td>8. China Construction Bank Corp, China</td>
<td>1,641,683</td>
</tr>
<tr>
<td>9. JP Morgan-Chase NA, US</td>
<td>1,621,521</td>
</tr>
<tr>
<td>10. Bank Santander, Spain</td>
<td>1,590,560</td>
</tr>
</tbody>
</table>

CHAPTER 13
CENTRAL BANKS AND THE FEDERAL RESERVE SYSTEM

Origins of the Federal Reserve System
Resistance to establishment of a central bank
– Fear of centralized power
– Distrust of moneyed interests

No lender of last resort
– Nationwide bank panics on a regular basis
– Panic of 1907 so severe that the public was convinced a central bank was needed

Federal Reserve Act of 1913
– Elaborate system of checks and balances
– Decentralized

Structure of the Federal Reserve System
The writers of the Federal Reserve Act wanted to diffuse power along regional lines, between the private sector and the government, and among bankers, business people, and the public. This initial diffusion of power has resulted in the evolution of the Federal Reserve System to include the following entities:

– The Federal Reserve banks, the Board of Governors of the Federal Reserve System, the Federal Open Market Committee (FOMC), the Federal Advisory Council, and around 2,900 member commercial banks.
Federal Reserve Banks
Quasi-public institution owned by private commercial banks in the district that are members of the Fed system. Member banks elect six directors for each district; three more are appointed by the Board of Governors:
- Three A directors are professional bankers
- Three B directors are prominent leaders from industry, labor, agriculture, or consumer sector
- Three C directors appointed by the Board of Governors are not allowed to be officers, employees, or stockholders of banks
- Designed to reflect all constituencies of the public
- Nine directors appoint the president of the bank subject to approval by Board of Governors

Functions of the Federal Reserve Banks
1. Clear checks
2. Issue new currency
3. Withdraw damaged currency from circulation
4. Administer and make discount loans to banks in their districts
5. Evaluate proposed mergers and applications for banks to expand their activities
6. Act as liaisons between the business community and the Federal Reserve System
7. Examine bank holding companies and statechartered member banks
8. Collect data on local business conditions
9. Use staffs of professional economists to research topics related to the conduct of monetary policy

Federal Reserve Banks and Monetary Policy
Directors — establish the discount rate. Decide which banks can obtain discount loans. Directors select one commercial banker from each district to serve on the Federal Advisory Council which consults with the Board of Governors and provides information to help conduct monetary policy. Five of the 12 bank presidents have a vote in the Federal Open Market Committee (FOMC)

Member Banks
All national banks are required to be members of the Federal Reserve System. Commercial banks chartered by states are not required but may choose to be members. Depository Institutions Deregulation and Monetary Control Act of 1980 subjected all banks to the same reserve requirements as member banks and gave all banks access to Federal Reserve facilities

Board of Governors of the Federal Reserve System
Seven members headquartered in Washington, D.C. Appointed by the president and confirmed by the Senate. 14-year non-renewable term Required to come from different districts. Chairman is chosen from the governors and serves four-year term

Duties of the Board of Governors
1. Votes on conduct of open market operations. Sets reserve requirements.
2. Controls the discount rate through — review and determination process
3. Sets margin requirements.
4. Sets salaries of president and officers of each Federal Reserve Bank and reviews each bank’s budget
5. Approves bank mergers and applications for new activities
6. Specifies the permissible activities of bank holding companies
7. Supervises the activities of foreign banks operating in the U.S.

Chairman of the Board of Governors
1. Advises the president on economic policy
2. Testifies in Congress
3. Speaks for the Federal Reserve System to the media
4. May represent the U.S. in negotiations with foreign governments on economic matters

Federal Open Market Committee (FOMC)
- Meets eight times a year
- Consists of seven members of the Board of Governors, the president of the Federal Reserve
- Bank of New York and the presidents of four other Federal Reserve banks
- Chairman of the Board of Governors is also chair of FOMC
- Issues directives to the trading desk at the Federal Reserve Bank of New York

FOMC Meeting
- Report by the manager of system open market operations on foreign currency and domestic open market operations and other related issues
- Presentation of Board’s staff national economic forecast
- Outline of different scenarios for monetary policy actions
- Presentation on relevant Congressional actions
- Public announcement about the outcome of the meeting

Why the Chairman of the Board of Governors Really Runs the Show
- Spokesperson for the Fed and negotiates with Congress and the President
- Sets the agenda for meetings
- Speaks and votes first about monetary policy
- Supervises professional economists and advisers

How Independent is the Fed?
- Instrument and goal independence.
- Independent revenue
- Fed’s structure is written by Congress, and is subject to change at any time.

Presidential influence
- Influence on Congress
- Appoints members
- Appoints chairman although terms are not concurrent

Should the Fed Be Independent?

The Case for Independence
The strongest argument for an independent central bank rests on the view that subjecting It to more political pressures would impart an inflationary bias to monetary policy.

The Case Against Independence
Proponents of a Fed under the control of the president or Congress argue that it is undemocratic to have monetary policy (which affects almost everyone in the economy) controlled by an elite group that is responsible to no one.

The Case for Independence
1. Political pressure would impart an inflationary bias to monetary policy
2. Political business cycle
3. Could be used to facilitate Treasury financing of large budget deficits: accommodation
4. Too important to leave to politicians—the principal-agent problem is worse for politicians

The Case Against Independence
- Undemocratic
- Unaccountable
- Difficult to coordinate fiscal and monetary policy
- Has not used its independence successfully

Explaining Central Bank Behavior
One view of government bureaucratic behavior is that bureaucracies serve the public interest view. Yet some economists have developed a theory of bureaucratic behavior that suggests other factors that influence how bureaucracies operate. The theory of bureaucratic behavior may be a useful guide to predicting what motivates the Fed and other central banks.

Theory of bureaucratic behavior: objective is to maximize its own welfare
- Fight vigorously to preserve autonomy
- Avoid conflict with more powerful groups

Does not rule out altruism

Structure and Independence of the European Central Bank
Patterned after the Federal Reserve. Central banks from each country play similar role as Fed banks

Executive Board
- President, vice-president and four other members
- Eight year, nonrenewable terms

Governing Council

Differences Between the European System of Central Banks and the Federal Reserve System
National Central Banks control their own budgets and the budget of the ECB. Monetary operations are not centralized. Does not supervise and regulate financial institutions.

**Governing Council**
- Monthly meetings at ECB in Frankfurt, Germany
- Twelve National Central Bank heads and six Executive Board members
- Operates by consensus
- ECB announces the target rate and takes questions from the media
- To stay at a manageable size as new countries join, the Governing Council will be on a system of rotation

How Independent is the ECB?

**Most independent in the world**
- Members of the Executive Board have long terms
- Less goal independent
- Price stability
- Charter cannot be changed by legislation; only by revision of the Maastricht Treaty

**Structure and Independence of Other Foreign Central Banks**

- **Bank of Canada**
  - Essentially controls monetary policy

- **Bank of England**
  - Has some instrument independence.

- **Bank of Japan**
  - Recently (1998) gained more independence
  - The trend toward greater independence

**CHAPTER 14**

**THE MONEY SUPPLY PROCESS**

Three Players in the Money Supply Process
1. Central bank (Federal Reserve System)
2. Banks (depository institutions; financial intermediaries)
3. Depositors (individuals and institutions)

The Fed’s Balance Sheet

| Federal Reserve System | | |
|------------------------|-----------------|
| **Assets**             | **Liabilities** |
| Securities             | Currency in circulation |
| Loans to Financial Institutions | Reserves |

Liabilities
- Currency in circulation: in the hands of the public
- Reserves: bank deposits at the Fed and vault cash

Assets
- Government securities: holdings by the Fed that affect money supply and earn interest
- Discount loans: provide reserves to banks and earn the discount rate

**Control of the Monetary Base**

High-powered money

\[
MB = C + R
\]

\[
C = \text{currency in circulation}
\]

\[
R = \text{total reserves in the banking system}
\]

**Open Market Purchase from a Bank**

Net result is that reserves have increased by $100
No change in currency
Monetary base has risen by $100

| Federal Reserve System | | |
|------------------------|-----------------|
| **Assets**             | **Liabilities** |
| Securities             | Currency in circulation |
| Money base             | Reserves |

**Open Market Purchase from the Nonbank Public**

Person selling bonds to the Fed deposits the Fed’s check in the bank. Identical result as the purchase from a bank

| Federal Reserve System | | |
|------------------------|-----------------|
| **Assets**             | **Liabilities** |
| Securities             | Currency in circulation |
| Money base             | Reserves |

The person selling the bonds cashes the Fed’s check. Reserves are unchanged. Currency in circulation increases by the amount of the open market purchase. Monetary base increases by the amount of the open market purchase.

**Open Market Purchase: Summary**

The effect of an open market purchase on reserves depends on whether the seller of the bonds keeps the proceeds from the sale in currency or in deposits. The effect of an open market purchase on the monetary base always increases the monetary base by the amount of the purchase

**Open Market Sale**

- Reduces the monetary base by the amount of the sale
- Reserves remain unchanged
- The effect of open market operations on the monetary base is much more certain than the effect on reserves

**Shifts from Deposits into**

| Federal Reserve System | | |
|------------------------|-----------------|
| **Assets**             | **Liabilities** |
| Checkable deposits     | Currency in circulation |
| Mony base              | Reserves |

**Loans to Financial Institutions**

Net effect on monetary liabilities is zero; Reserves are changed by random fluctuations; Monetary base is a more stable variable

**Loans to Financial Institutions**

Monetary liabilities of the Fed have increased by $100. Monetary base also increases by this amount

**Banking System**

Assets Liabilities
Reserve

Muhammad Firman (University of Indonesia - Accounting)
Other Factors that Affect the Monetary Base

1. Float
2. Treasury deposits at the Federal Reserve
3. Interventions in the foreign exchange market

Overview of The Fed’s Ability to Control the Monetary Base

Open market operations are controlled by the Fed. The Fed cannot determine the amount of borrowing by banks from the Fed. Split the monetary base into two components

\[ M_{BN} = M - BR \]

The money supply is positively related to both the non-borrowed monetary base \( M_{BN} \) and to the level of borrowed reserves, \( BR \), from the Fed

Multiple Deposit Creation: A Simple Model First National Bank First National Bank

Deposit Creation: Single Bank

<table>
<thead>
<tr>
<th>First National Bank</th>
<th>First National Bank</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Assets</strong></td>
<td><strong>Liabilities</strong></td>
</tr>
<tr>
<td>Securities</td>
<td>-$100m</td>
</tr>
<tr>
<td>Reserves</td>
<td>+$100m</td>
</tr>
<tr>
<td><strong>Assets</strong></td>
<td><strong>Liabilities</strong></td>
</tr>
<tr>
<td>Securities</td>
<td>-$100m</td>
</tr>
<tr>
<td>Checkable deposits</td>
<td>+$100m</td>
</tr>
<tr>
<td>Reserves</td>
<td>+$100m</td>
</tr>
<tr>
<td>Loans</td>
<td>-$506</td>
</tr>
</tbody>
</table>

Excess reserves increase; Bank loans out the excess reserves; Creates a checking account; Borrower makes purchases; The money supply has increased

Deposit Creation: The Banking System

<table>
<thead>
<tr>
<th>Bank A</th>
<th>Bank A</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Assets</strong></td>
<td><strong>Liabilities</strong></td>
</tr>
<tr>
<td>Reserves</td>
<td>Checkable deposits</td>
</tr>
<tr>
<td>-$100m</td>
<td>-$100m</td>
</tr>
<tr>
<td>Loans</td>
<td>+$506</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bank B</th>
<th>Bank B</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Assets</strong></td>
<td><strong>Liabilities</strong></td>
</tr>
<tr>
<td>Reserves</td>
<td>Checkable deposits</td>
</tr>
<tr>
<td>-$90</td>
<td>-$90</td>
</tr>
<tr>
<td>Loans</td>
<td>+$51</td>
</tr>
</tbody>
</table>

Table 1 Creation of Deposits (assuming 10% reserve requirement and a $100 increase in reserves)

<table>
<thead>
<tr>
<th>Bank</th>
<th>Increase in Deposits ($)</th>
<th>Increase in Loans ($)</th>
<th>Increase in Reserves ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First National</td>
<td>0.00</td>
<td>100.00 m</td>
<td>0.00</td>
</tr>
<tr>
<td>A</td>
<td>100.00 m</td>
<td>90.00 m</td>
<td>10.00 m</td>
</tr>
<tr>
<td>B</td>
<td>90.00 m</td>
<td>81.00 m</td>
<td>9.00 m</td>
</tr>
<tr>
<td>C</td>
<td>81.00 m</td>
<td>72.90 m</td>
<td>8.10 m</td>
</tr>
<tr>
<td>D</td>
<td>72.90 m</td>
<td>65.61 m</td>
<td>7.29 m</td>
</tr>
<tr>
<td>E</td>
<td>65.61 m</td>
<td>59.05 m</td>
<td>6.56 m</td>
</tr>
<tr>
<td>F</td>
<td>59.05 m</td>
<td>53.14 m</td>
<td>5.91 m</td>
</tr>
</tbody>
</table>

Deriving The Formula for Multiple Deposit Creation

Assuming banks do not hold excess reserves

\[ \text{Required Reserves (RR)} = \text{Total Reserves (R)} \]

Substituting

\[ r \times D = R \]

Dividing both sides by \( r \)

Taking the change in both sides yields

\[ \Delta D = \frac{1}{r} \times \Delta R \]

Critique of the Simple Model

Holding cash stops the process. Currency has no multiple deposit expansion. Banks may not use all of their excess reserves to buy securities or make loans. Depositors’ decisions (how much currency to hold) and bank’s decisions (amount of excess reserves to hold) also cause the money supply to change.

Factors that Determine the Money Supply

1. Changes in the nonborrowed monetary base \( M_{BN} \). The money supply is positively related to the non-borrowed monetary base \( M_{BN} \). Changes in borrowed reserves from the Fed. The money supply is positively related to the level of borrowed reserves, \( BR \), from the Fed
2. Changes in the required reserves ratio. – The money supply is negatively related to the required reserve ratio.
3. Changes in currency holdings. The money supply is negatively related to currency holdings.
4. Changes in excess reserves. – The money supply is negatively related to the amount of excess reserves.

Overview of the Money Supply Process

The Money Multiplier

Define money as currency plus checkable deposits: \( M_1 \). Link the money supply \( (M) \) to the monetary base \( (MB) \) and let \( m \) be the money multiplier

\[ M = m \times MB \]

Deriving the Money Multiplier

Assume that the desired holdings of currency \( C \) and excess reserves \( ER \) grow proportionally with checkable deposits \( D \).

\[ \epsilon = \frac{(CD)}{D} = \text{currency ratio} \]

\[ \phi = \frac{(ERD)}{D} = \text{excess reserves ratio} \]

The total amount of reserves \( (R) \) equals the sum of required reserves \( (RR) \) and excess reserves \( (ER) \).

\[ R = RR + ER \]

The total amount of required reserves equals the required reserve ratio times the amount of checkable deposits

\[ RR = r \times D \]

Substituting for \( RR \) in the first equation

\[ R = (r \times D) + ER \]

The Fed sets \( r \) to less than 1

The monetary base \( MB \) equals currency \( (C) \) plus reserves \( (R) \):
MB = C + R = C + (r x D) + ER

Equation reveals the amount of the monetary base needed to support the existing amounts of checkable deposits, currency and excess reserves.

\[ c = \frac{C}{D} \Rightarrow C = c \times D \text{ and} \]
\[ e = \frac{ER}{D} \Rightarrow ER = e \times D \]

Substituting in the previous equation
\[ MB = (r \times D) + (e \times D) + (c \times D) = (r + e + c) \times D \]

Divide both sides by the term in parentheses
\[ D = \frac{1}{r + e + c} \times MB \]
\[ M = D + C \text{ and } C = c \times D \]
\[ M = D + (c \times D) = (1+c) \times D \]

Substituting again
\[ M = \frac{1+c}{r+e+c} \times MB \]

The money multiplier is then
\[ m = \frac{1+c}{r+e+c} \]

Intuition Behind the Money Multiplier

\[ r = \text{required reserve ratio} = 0.10 \]
\[ C = \text{currency in circulation} = 400B \]
\[ D = \text{checkable deposits} = 800B \]
\[ ER = \text{excess reserves} = 0.8B \]
\[ M = \text{money supply (M1)} = C + D = 1,200B \]
\[ \frac{400B}{800B} = 0.5 \]
\[ \frac{0.8B}{800B} = 0.001 \]
\[ m = \frac{1+0.5}{0.1+0.001+0.5} = \frac{1.5}{0.601} = 2.5 \]

This is less than the simple deposit multiplier Although there is multiple expansion of deposits, there is no such expansion for currency


Bank failures (and no deposit insurance) determined:
- Increase in deposit outflows and holding of currency (depositors)
- An increase in the amount of excess reserves (banks)

For a relatively constant MB, the money supply decreased due to the fall of the money multiplier.

Figure 1 Deposits of Failed Commercial Banks, 1929–1933

APPLICATION The 2007-2009 Financial Crisis and the Money Supply

During the recent financial crisis, as shown in Figure 4, the monetary base more than tripled as a result of the Fed's purchase of assets and new lending facilities to stem the financial crisis. Figure 5 shows the currency ratio c and the excess reserves ratio e for the 2007-2009 period. We see that the currency ratio fell somewhat during this period, which our money supply model suggests would raise the money multiplier and the money supply because it would increase the overall level of deposit expansion. However, the effects of the decline in c were entirely offset by the extraordinary rise in the excess reserves ratio e

Figure 4 M1 and the Monetary Base, 2007-2009

Figure 5 Excess Reserves Ratio and Currency Ratio, 2007-2009
CHAPTER 15
TOOLS OF MONETARY POLICY

The Market For Reserves and the Federal Funds Rate
Demand and Supply in the Market for Reserves. What happens to the quantity of reserves demanded by banks, holding everything else constant, as the federal funds rate changes? Excess reserves are insurance against deposit outflows. – The cost of holding these is the interest rate that could have been earned minus the interest rate that is paid on these reserves, ier

Demand in the Market for Reserves
Since the fall of 2008 the Fed has paid interest on reserves at a level that is set at a fixed amount below the federal funds rate target. When the federal funds rate is above the rate paid on excess reserves, ier, as the federal funds rate decreases, the opportunity cost of holding excess reserves falls and the quantity of reserves demanded rises. Downward sloping demand curve that becomes flat (infinitely elastic) at ier

Supply in the Market for Reserves
Two components: non-borrowed and borrowed reserves. Cost of borrowing from the Fed is the discount rate. Borrowing from the Fed is a substitute for borrowing from other banks. If iff < id, then banks will not borrow from the Fed and borrowed reserves are zero. The supply curve will be vertical. As iff rises above id, banks will borrow more and more at id, and re-lend at iff. The supply curve is horizontal (perfectly elastic) at id

How Changes in Tools of Monetary Policy Affect the Federal Funds Rate
Effects of open market operation depends on whether the supply curve initially intersects the demand curve in its downward sloped section versus its flat section. An open market purchase causes the federal funds rate to fall whereas an open market sale causes the federal funds rate to rise (when intersection occurs at the downward sloped section). Open market operations have no effect on the federal funds rate when intersection occurs at the flat section of the demand curve.

If the intersection of supply and demand occurs on the vertical section of the supply curve, a change in the discount rate will have no effect on the federal funds rate. If the intersection of supply and demand occurs on the horizontal section of the supply curve, a change in the discount rate shifts that portion of the supply curve and the federal funds rate may either rise or fall depending on the change in the discount rate. When the Fed raises reserve requirement, the federal funds rate rises and when the Fed decreases reserve requirement, the federal funds rate falls.

Conventional Monetary Policy Tools
During normal times, the Federal Reserve uses three tools of monetary policy—open market operations, discount lending, and reserve requirements—to control the money supply and interest rates, and these are referred to as conventional monetary policy tools.

**Open Market Operations**
- Dynamic open market operations
- Defensive open market operations
- Primary dealers
- TRAPS (Trading Room Automated Processing System)
- Repurchase agreements
- Matched sale-purchase agreements

**Advantages of Open Market Operations**
1. The Fed has complete control over the volume
2. Flexible and precise
3. Easily reversed
4. Quickly implemented

**Discount Policy and the Lender of Last Resort**
- Discount window
  - Primary credit: standing lending facility, Lombard facility
  - Secondary credit
  - Seasonal credit
  - Lender of last resort to prevent financial
  - Panics, Creates moral hazard problem

**Advantages and Disadvantages of Discount Policy**
- Used to perform role of lender of last resort. Important during the subprime financial crisis of 2007-2008. Cannot be controlled by the Fed; the decision maker is the bank. Discount facility is used as a backup facility to prevent the federal funds rate from rising too far above the target

**Reserve Requirements**
Depository Institutions Deregulation and Monetary Control Act of 1980 sets the reserve requirement the same for all depository institutions. 3% of the first $48.3 million of checkable deposits; 10% of checkable deposits over $48.3 million. The Fed can vary the 10% requirement between 8% to 14%

**Disadvantages of Reserve Requirements**
- No longer binding for most banks
- Can cause liquidity problems
- Increases uncertainty for banks

**Nonconventional Monetary Policy Tools During the Global Financial Crisis**
- Discount Window Expansion
- Term Auction Facility
- New Lending Programs

**Asset Purchases:** During the crisis the Fed started two new asset purchase programs to lower interest rates for particular types of credit: Government Sponsored Entities Purchase Program; QE2

**Monetary Policy Tools of the European Central Bank**
- Open market operations
  - Main refinancing operations, Weekly reverse transactions
  - Longer-term refinancing operations
- Lending to banks
  - Marginal lending facility/marginal lending rate
  - Deposit facility

**CHAPTER 16**

**THE CONDUCT OF MONETARY POLICY:**

**STRATEGY AND TACTICS**

The Price Stability Goal and the Nominal Anchor
Over the past few decades, policy makers throughout the world have become increasingly aware of the social and economic costs of inflation and more concerned with maintaining a stable price level as a goal of economic policy. The role of a nominal anchor: a nominal variable such as the inflation rate or the money supply, which ties down the price level to achieve price stability

Other Goals of Monetary Policy
Five other goals are continually mentioned by central bank officials when they discuss the objectives of monetary policy:
- (1) high employment and output stability
- (2) economic growth
- (3) stability of financial markets
- (4) interest-rate stability
- (5) stability in foreign exchange markets

Should Price Stability Be the Primary Goal of Monetary Policy?

Hierarchical Versus Dual Mandates:
- hierarchical mandates put the goal of price stability first, and then say that as long as it is achieved other goals can be pursued
- dual mandates are aimed to achieve two coequal objectives: price stability and maximum employment (output stability)

Price Stability as the Primary, Long-Run Goal of Monetary Policy. Either type of mandate is acceptable as long as it operates to make price stability the primary goal in the long run, but not the short run

Inflation Targeting
Public announcement of medium-term numerical target for inflation. Institutional commitment to price stability as the primary, long-run goal of monetary policy and a commitment to achieve the inflation goal. Information-inclusive approach in which many variables are used in making decisions. Increased transparency of the strategy. Increased accountability of the central bank

New Zealand (effective in 1990)
- Inflation was brought down and remained within the target most of the time.
- Growth has generally been high and unemployment has come down significantly

Canada (1991)
- Inflation decreased since then, some costs in term of unemployment

United Kingdom (1992)
- Inflation has been close to its target.
- Growth has been strong and unemployment has been decreasing.

Advantages
- Does not rely on one variable to achieve target
- Easily understood
- Reduces potential of falling in time inconsistency trap
- Stresses transparency and accountability

Disadvantages
- Delayed signaling
- Too much rigidity
- Potential for increased output fluctuations
- Low economic growth during disinflation

Figure 1 Inflation Rates and Inflation Targets for New Zealand, Canada, and the United Kingdom, 1980–2011

[Image]
The United States has achieved excellent macroeconomic performance (including low and stable inflation) until the onset of the global financial crisis without using an explicit nominal anchor such as an inflation target.

History:
– Fed began to announce publicly targets for money supply growth in 1975.
– Paul Volcker (1979) focused more in nonborrowed reserves.
– Greenspan announced in July 1993 that the Fed would not use any monetary aggregates as a guide for conducting monetary policy.

There is no explicit nominal anchor in the form of an overriding concern for the Fed. Forward looking behavior and periodic, preemptive strikes are aimed to prevent inflation from getting started.

Advantages:
– Uses many sources of information.
– Demonstrated success.

Disadvantages:
– Lack of accountability.
– Inconsistent with democratic principles.

Advantages of the Fed’s — Just Do It! Approach:
Forward-looking behavior and stress on price stability also help to discourage overly expansionary monetary policy, thereby ameliorating the time-inconsistency problem.

Disadvantages of the Fed’s — Just Do It! Approach:
Lack of transparency, strong dependence on the preferences, skills, and trustworthiness of the individuals in charge of the central bank.

Lessons for Monetary Policy Strategy from the Global Financial Crisis:
1. Developments in the financial sector have a far greater impact on economic activity than was earlier realized.
2. The zero-lower-bound on interest rates can be a serious problem.
3. The cost of cleaning up after a financial crisis is very high.

How should Central banks respond to asset price bubbles?
– Asset-price bubble: pronounced increase in asset prices that depart from fundamental values, which eventually burst.

Types of asset-price bubbles:
– Credit-driven bubbles, Subprime financial crisis.
– Bubbles driven solely by irrational exuberance.

Should central banks respond to bubbles?
– Strong argument for not responding to bubbles driven by irrational exuberance.
– Bubbles are easier to identify when asset prices and credit are increasing rapidly at the same time.
– Monetary policy should not be used to prick bubbles.

Macropudential policy: regulatory policy to affect what is happening in credit markets in the aggregate.

Monetary policy: Central banks and other regulators should not have a laissez-faire attitude and let credit-driven bubbles proceed without any reaction.

Tactics: Choosing the Policy Instrument

Tools:
– Open market operation
– Reserve requirements
– Discount rate

Policy instrument (operating instrument):
– Reserve aggregates
– Interest rates
– May be linked to an intermediate target

Figure 2 Linkages Between Central Bank Tools, Policy Instruments, Intermediate Targets, and Goals of Monetary Policy

Criteria for Choosing the Policy Instrument
1. Observability and Measurability
2. Controllability
3. Predictable effect on Goals

Tactics: The Taylor Rule, NAIRU, and the Phillips Curve

Federal funds rate target = inflation rate + equilibrium real fed funds rate + 1/2 (inflation gap) + 1/2 (output gap)

An inflation gap and an output gap:
– Stabilizing real output is an important concern.
– Output gap is an indicator of future inflation as shown by Phillips curve.

NAIRU:
– Rate of unemployment at which there is no tendency for inflation to change.

Figure 5 The Taylor Rule for the Federal Funds Rate, 1970–2011
CHAPTER 17
THE FOREIGN EXCHANGE MARKET

Foreign Exchange Market
Exchange rate: price of one currency in terms of another. Foreign exchange market: the financial market where exchange rates are determined. Spot transaction: immediate (two-day) exchange of bank deposits. Forward transaction: the exchange of bank deposits at some specified future date, forward exchange rate.

Appreciation: a currency rises in value relative to another currency
Depreciation: a currency falls in value relative to another currency

When a country’s currency appreciates, the country’s goods abroad become more expensive and foreign goods in that country become less expensive and vice versa. Over-the-counter market mainly banks

Figure 1 Exchange Rates, 1990–2011

Exchange Rates in the Long Run
Law of one price. Theory of Purchasing Power Parity assumptions:
- All goods are identical in both countries
- Trade barriers and transportation costs are low
- Many goods and services are not traded across borders

Figure 2 Purchasing Power Parity, United States/United Kingdom, 1973–2011 (Index: March 1973 = 100.)

Factors that Affect Exchange Rates in the Long Run
- Relative price levels
- Trade barriers
- Preferences for domestic versus foreign goods
- Productivity

Summary Table 1 Factors That Affect Exchange Rates in the Long Run

Exchange Rates in the Short Run: A Supply and Demand Analysis
An exchange rate is the price of domestic assets in terms of foreign assets. Supply curve for domestic assets. Assume amount of domestic assets is fixed (supply curve is vertical). Demand curve for domestic assets. Most important determinant is the relative expected return of domestic assets. At lower current values of the dollar (everything else equal), the quantity demanded of dollar assets is higher

Figure 3 Equilibrium in the Foreign Exchange Market

Explaining Changes in Exchange Rates
Shifts in the demand for domestic assets
- Domestic interest rate
- Foreign interest rate
- Expected future exchange rate

Figure 4 Response to an Increase in the Domestic Interest Rate, iD

Figure 5 Response to an Increase in the Foreign Interest Rate, iF

Figure 6 Response to an Increase in the Expected Future Exchange Rate, Ee t+1
Summary Table 2 Factors That Shift the Demand Curve for Domestic Assets and Affect the Exchange Rate

<table>
<thead>
<tr>
<th>Factor</th>
<th>Change in Quantity Demanded of Domestic Assets at Each Exchange Rate</th>
<th>Response of Exchange Rate, $E_t$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic interest rate, $i^d$</td>
<td>$\uparrow$</td>
<td>$\uparrow$</td>
</tr>
<tr>
<td>Foreign interest rate, $i^f$</td>
<td>$\downarrow$</td>
<td>$\downarrow$</td>
</tr>
<tr>
<td>Expected domestic price level*</td>
<td>$\downarrow$</td>
<td>$\downarrow$</td>
</tr>
<tr>
<td>Expected trade barriers*</td>
<td>$\uparrow$</td>
<td>$\uparrow$</td>
</tr>
<tr>
<td>Expected import demand</td>
<td>$\downarrow$</td>
<td>$\downarrow$</td>
</tr>
<tr>
<td>Expected export demand</td>
<td>$\uparrow$</td>
<td>$\uparrow$</td>
</tr>
<tr>
<td>Expected productivity*</td>
<td>$\downarrow$</td>
<td>$\downarrow$</td>
</tr>
</tbody>
</table>

Application: The Dollar and Interest Rates

The value of the dollar and the measure of real interest rates tend to rise and fall together. Our model of exchange rate determination helps explain the rise in the dollar in the early 1980s and fall thereafter. A rise in the U.S. real interest rate raises the relative expected return on dollar assets, which leads to purchases of dollar assets that raise the exchange rate.

Application: The Global Financial Crisis and the Dollar

During 2007 interest rates fell in the United States and remained unchanged in Europe. The dollar depreciated. Starting in the summer of 2008 interest rates fell in Europe. Increased demand for U.S. Treasuries flight to quality. The dollar appreciated.

CHAPTER 18

THE INTERNATIONAL FINANCIAL SYSTEM

A central bank’s purchase of domestic currency and corresponding sale of foreign assets in the foreign exchange market results in an equal rise in its international reserves and the monetary base. A central bank’s sale of domestic currency to purchase foreign assets in the foreign exchange market results in an equal rise in its international reserves and the monetary base.

Foreign exchange intervention and the money supply
Unsterilized foreign exchange intervention: An unsterilized intervention in which domestic currency is sold to purchase foreign assets leads to a gain in international reserves, an increase in the money supply, and a depreciation of the domestic currency.

To counter the effect of the foreign exchange intervention, conduct an offsetting open market operation. There is no effect on the monetary base and no effect on the exchange rate.

Sterilized foreign exchange intervention

Fixed exchange rate regime
- Value of a currency is pegged relative to the value of one other currency (anchor currency)

Floating exchange rate regime
- Value of a currency is allowed to fluctuate against all other currencies

Managed float regime (dirty float)
- Attempt to influence exchange rates by buying and selling currencies

Gold standard
- Fixed exchange rates
- No control over monetary policy
- Influenced heavily by production of gold and gold discoveries

Bretton Woods System
- Fixed exchange rates using U.S. dollar as reserve currency
- International Monetary Fund (IMF)
- World Bank
- General Agreement on Tariffs and Trade (GATT), World Trade Organization

European Monetary System
- Exchange rate mechanism

Managed Float
Hybrid of fixed and flexible
Capital Controls
Controls on outflows
- Promote financial instability by forcing a devaluation
- Controls are seldom effective and may increase capital flight
- Lead to corruption
- Lose opportunity to improve the economy

Controls on inflows
- Lead to a lending boom and excessive risk taking by financial intermediaries
- Controls may block funds for productions uses
- Produce substantial distortion and misallocation
- Lead to corruption

Strong case for improving bank regulation and supervision

The Role of the IMF
Emerging market countries with poor central bank credibility and short-run debt contracts denominated in foreign currencies have limited ability to engage in this function. May be able to prevent contagion. The safety net may lead to excessive risk taking (moral hazard problem)

How Should the IMF Operate?
- May not be tough enough
- Austerity programs focus on tight macroeconomic policies rather than financial reform
- Too slow, which worsens crisis and increases costs
- Countries were restricting borrowing from the IMF until the recent subprime financial crisis

GLOBAL The Global Financial Crisis and the IMF
When the global financial crisis became more virulent in October 2008, a number of emerging market countries, as well as Iceland and former communist countries, found that foreigners were pulling funds out of their financial systems. The IMF created a new lending program at the end of October 2008, called the Short-Term Liquidity Facility, with $100 billion of funds to distribute loans where needed

International Considerations and Monetary Policy
Balance of payment considerations:
- Current account deficits in the U.S. suggest that American businesses may be losing ability to compete because the dollar is too strong
- U.S. deficits mean surpluses in other countries, large increases in their international reserve holdings, world inflation

Exchange rate considerations:
- A contractionary monetary policy will raise the domestic interest rate and strengthen the currency.
- An expansionary monetary policy will lower interest rates and weaken currency

Advantages of Exchange-Rate Targeting:
1. Contributes to keeping inflation under control
2. Automatic rule for conduct of monetary policy
3. Simplicity and clarity

Disadvantages of exchange-rate targeting:
1. Cannot respond to domestic shocks and shocks to anchor country are transmitted
2. Open to speculative attacks on currency
3. Weaken the accountability of policymakers as the exchange rate loses value as signal

Exchange-rate targeting for industrialized countries is desirable if:
- Domestic monetary and political institutions are not conducive to good policy making
- Other important benefits such as integration arise from this strategy

When is Exchange-Rate Targeting Desirable for Emerging Market Countries?
Exchange-rate targeting for emerging market countries is desirable if:
- Political and monetary institutions are weak (strategy becomes the stabilization policy of last resort)

Currency Boards
Solution to lack of transparency and commitment to target. Domestic currency is backed 100% by a foreign currency. Note issuing authority establishes a fixed exchange rate and stands ready to exchange currency at this rate. Money supply can expand only when foreign currency is exchanged for domestic currency. Stronger commitment by central bank. Loss of independent monetary policy and increased exposure to shock from anchor country. Loss of ability to create money and act as lender of last resort

Dollarization
- Another solution to lack of transparency and commitment
- Adoption of another country’s money
- Even stronger commitment mechanism
- Completely avoids possibility of speculative attack on domestic currency
- Lost of independent monetary policy and increased exposure to shocks from anchor country
- Inability to create money and act as lender of last resort
- Loss of seignorage

CHAPTER 19
QUANTITY THEORY, INFLATION AND THE DEMAND FOR MONEY

Quantity Theory of Money
Velocity of Money and The Equation of Exchange

\[ V = \frac{M}{P} \]

\[ P = \text{the money supply} \]
\[ P = \text{price level} \]
\[ V = \text{aggregate output (income)} \]
\[ V = \text{velocity of money} \]
\[ M = \text{average number of times per year that a dollar is spent} \]
\[ M \times P = P \times V \]

Equation of Exchange

Velocity fairly constant in short run. Aggregate output at full-employment level. Changes in money supply affect only the price level. Movement in the price level results solely from change in the quantity of money

Demand for money: To interpret Fisher’s quantity theory in terms of the demand for money...

\[ M = \frac{1}{V} \times PY \]

When the money market is in equilibrium

\[ M = M' \]

Let

\[ M' = k \times PY \]

Because k is constant, the level of transactions generated by a fixed level of PY determines the quantity of Md. The demand for money is not affected by interest rates
From the equation of exchange to the quantity theory of money

Fisher’s view that velocity is fairly constant in the short run, so that, transforms the equation of exchange into the quantity theory of money, which states that nominal income (spending) is determined solely by movements in the quantity of money $M$

$$P \times Y = M \times V$$

**Quantity Theory and the Price Level**

Because the classical economists (including Fisher) thought that wages and prices were completely flexible, they believed that the level of aggregate output $Y$ produced in the economy during normal times would remain at the full-employment level. Dividing both sides by $Y$, we can then write the price level as follows:

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

**Quantity Theory and Inflation**

Percentage Change in $(x \times y) = (\text{Percentage Change in } x) + (\text{Percentage change in } y)$

Using this mathematical fact, we can rewrite the equation of exchange as follows:

$$\% \Delta M + \% \Delta Y = \% \Delta P + \% \Delta Y$$

Subtracting from both sides of the preceding equation, and recognizing that the inflation rate, is the growth rate of the price level,

$$\pi = \% \Delta P = \% \Delta M + \% \Delta Y - \% \Delta Y$$

Since we assume velocity is constant, its growth rate is zero, so the quantity theory of money is also a theory of inflation:

$$\pi = \% \Delta M - \% \Delta Y$$

**Budget Deficits and Inflation**

There are two ways the government can pay for spending: raise revenue or borrow. Raise revenue by levying taxes or go into debt by issuing government bonds. The government can also create money and use it to pay for the goods and services it buys.

The government budget constraint thus reveals two important facts:
- If the government deficit is financed by an increase in bond holdings by the public, there is no effect on the monetary base and hence on the money supply.
- But, if the deficit is not financed by increased bond holdings by the public, the monetary base and the money supply increase.

**Hyperinflation**

Hyperinflations are periods of extremely high inflation of more than 50% per month. Many economies—both poor and developed—have experienced hyperinflation over the last century, but the United States has been spared such turmoil. One of the most extreme examples of hyperinflation throughout world history occurred recently in Zimbabwe in the 2000s.

**Keynesian Theories of Money Demand**

**Keynes’s Liquidity Preference Theory**

Why do individuals hold money? Three motives
- Transactions motive
- Precautionary motive
- Speculative motive

Distinguishes between real and nominal quantities of money

**Transactions Motive**

Keynes initially accepted the quantity theory view that the transactions component is proportional to income. Later, he and other economists recognized that new methods for payment, referred to as payment technology, could also affect the demand for money.

**Precautionary Motive**

Keynes also recognized that people hold money as a cushion against unexpected wants. Keynes argued that the precautionary money balances people want to hold would also be proportional to income.

**Speculative Motive**

Keynes also believed people choose to hold money as a store of wealth, which he called the speculative motive.

**Putting the Three Motives Together**

$$M^d = f(t, Y)$$

where the demand for real money balances is negatively related to the interest rate $t$, and positively related to real income $Y$.

Rewriting

$$P \times M^d = \frac{1}{f(t, Y)}$$

Multiply both sides by $Y$ and replacing $M^d$ with $M$

$$\frac{P \times Y}{M} = \frac{Y}{f(t, Y)}$$

- The procyclical movement of interest rates should induce procyclical movements in velocity.
- Velocity will change as expectations about future normal levels of interest rates change.

**Portfolio Theories of Money Demand**
Theory of Portfolio Choice and Keynesian Liquidity Preference. The theory of portfolio choice can justify the conclusion from the Keynesian liquidity preference function that the demand for real money balances is positively related to income and negatively related to the nominal interest rate.

Other Factors That Affect the Demand for Money: Wealth, Risk, – Liquidity of other assets

Empirical Evidence on the Demand for Money

Summary Table 1 Factors That Determine the Demand for Money

<table>
<thead>
<tr>
<th>Variable</th>
<th>Change in Variable</th>
<th>Money Demand Response</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interest rates</td>
<td>↑</td>
<td>↑</td>
<td>Opportunity cost of money rises</td>
</tr>
<tr>
<td>Income</td>
<td>↑</td>
<td>↑</td>
<td>Higher transactions</td>
</tr>
<tr>
<td>Payment technology</td>
<td>↓</td>
<td>↓</td>
<td>Less need for money in transactions</td>
</tr>
<tr>
<td>Wealth</td>
<td>↑</td>
<td>↑</td>
<td>More resources to put into money</td>
</tr>
<tr>
<td>Risk of other assets</td>
<td>↑</td>
<td>↑</td>
<td>Money relatively less risky and so more desirable</td>
</tr>
<tr>
<td>Inflation risk</td>
<td>↑</td>
<td>↑</td>
<td>Money relatively more risky and so less desirable</td>
</tr>
<tr>
<td>Liquidity of other assets</td>
<td>↑</td>
<td>↑</td>
<td>Money relatively less liquid and so less desirable</td>
</tr>
</tbody>
</table>

Precautionary Demand

Similar to transactions demand. As interest rates rise, the opportunity cost of holding precautionary balances rises. The precautionary demand for money is negatively related to interest rates.

Interest Rates and Money Demand

We have established that if interest rates do not affect the demand for money, velocity is more likely to be constant—or at least predictable—so that the quantity theory view that aggregate spending is determined by the quantity of money is more likely to be true. However, the more sensitive the demand for money is to interest rates, the more unpredictable velocity will be, and the less clear the link between the money supply and aggregate spending will be.

Stability of Money Demand

If the money demand function is unstable and undergoes substantial, unpredictable shifts as Keynes believed, then velocity is unpredictable, and the quantity of money may not be tightly linked to aggregate spending, as it is in the quantity theory. The stability of the money demand function is also crucial to whether the Federal Reserve should target interest rates or the money supply. If the money demand function is unstable and so the money supply is not closely linked to aggregate spending, then the level of interest rates the Fed sets will provide more information about the stance of monetary policy than will the money supply.

CHAPTER 20
THE IS CURVE

Planned Expenditure and Aggregate Demand

Planned expenditure is the total amount of spending on domestically produced goods and services that households, businesses, the government, and foreigners want to make. Aggregate demand is the total amount of output demanded in the economy.

The total quantity demanded of an economy’s output is the sum of 4 types of spending: Consumption expenditure (C), Planned investment spending (I), Government purchases (G), Net exports (NX).

Consumption Expenditure and the Consumption Function

Income is the most important factor determining consumption spending.

Disposable income ($I_d$) is total income less taxes ($Y - T$).

The marginal propensity to consume ($mpc$) is the slope of the consumption function ($AC/ΔT_d$), the change in consumer expenditure that results from an additional dollar of disposable income ($a$ is autonomous consumer expenditure, the amount of consumer expenditure that is independent of disposable income (how much will be spent when disposable income is 0).

Planned Investment Spending

Fixed investment: always planned

Inventory investment: can be unplanned

Planned investment spending
- Interest rates
- Expectations

Net Exports

Made up of two components: autonomous net exports and the part of net exports that is affected by changes in real interest rates.

Net export function:

$$NX = N - X$$

Government Purchases and Taxes

The government affects aggregate demand in two ways: through its purchases and taxes.

Government purchases:

$$G = \overline{G}$$

Government taxes:

$$T = \overline{T}$$

Goods Market Equilibrium

Keynes recognized that equilibrium would occur in the economy when the total quantity of output produced in the economy equals the total amount of aggregate demand (planned expenditure). Solving for goods market equilibrium:

$$\text{Aggregate Output} = \text{Consumption Expenditure} + \text{Planned Investment Spending} + \text{Government Purchases} + \text{Net Exports}$$

Understanding the IS Curve

What the IS curve tells us: traces out the points at which the goods market is in equilibrium. Examines an equilibrium where aggregate output equals aggregate demand. Assumes fixed price level where nominal and real quantities are the same. IS curve is the relationship between equilibrium aggregate output and the interest rate.

Figure 1 The IS Curve

Why the Economy Heads Toward the Equilibrium

Interest rates and planned investment spending
- Negative relationship

Interest rates and net exports
- Negative relationship

IS curve: the points at which the total quantity of goods produced equals the total quantity of goods demanded. Output tends to move toward points on the curve that satisfies the goods market equilibrium.

Factors that Shift the IS Curve

The IS curve shifts whenever there is a change in autonomous factors (factors independent of aggregate output and the real interest rate). One example is changes in government purchases, as in Figure 2.

Figure 2 Shift in the IS Curve from an Increase in Government Purchases
APPLICATION The Vietnam War Buildup, 1964–1969
The United States’ involvement in Vietnam began to escalate in the early 1960s. Usually during a period when government purchases are rising rapidly, central banks raise real interest rates to keep the economy from overheating. The Vietnam War period, however, is unusual because the Federal Reserve decided to keep real interest rates constant. Hence, this period provides an excellent example of how policymakers could make use of the IS curve analysis to inform policy.

Changes in Taxes
At any given real interest rate, a rise in taxes causes aggregate demand and hence equilibrium output to fall, thereby shifting the IS curve to the left. Conversely, a cut in taxes at any given real interest rate increases disposable income and causes aggregate demand and equilibrium output to rise, shifting the IS curve to the right.

Another example of what shifts the IS curve is changes in taxes, as in Figure 4

APPLICATION The Fiscal Stimulus Package of 2009
In the fall of 2008, the U.S. economy was in crisis. By the time the new Obama administration had taken office, the unemployment rate had risen from 4.7% just before the recession began in December 2007 to 7.6% in January 2009. To stimulate the economy, the Obama administration proposed a fiscal stimulus package that, when passed by Congress, included $288 billion in tax cuts for households and businesses and $499 billion in increased federal spending, including transfer payments.

These tax cuts and spending increases were predicted to increase aggregate demand, thereby raising the equilibrium level of aggregate output at any given real interest rate and so shifting the IS curve to the right. Unfortunately, most of the government purchases did not kick in until after 2010, while the decline in autonomous consumption and investment were much larger than anticipated. The fiscal stimulus was more than offset by weak consumption and investment, with the result that the aggregate demand ended up contracting rather than rising, and the IS curve did not shift to the right, as hoped.

Changes in autonomous spending also affect the IS curve:
– Autonomous consumption
– Autonomous investment spending
– Autonomous net exports

Autonomous Consumption
A rise in autonomous consumption would raise aggregate demand and equilibrium output at any given interest rate, shifting the IS curve to the right. Conversely, a decline in autonomous consumption expenditure causes aggregate demand and equilibrium output to fall, shifting the IS curve to the left.

Autonomous Investment Spending
An increase in autonomous investment spending increases equilibrium output at any given interest rate, shifting the IS curve to the right. On the other hand, a decrease in autonomous investment spending causes aggregate demand and equilibrium output to fall, shifting the IS curve to the left.

Autonomous Net Exports
An autonomous increase in net exports leads to an increase in equilibrium output at any given interest rate and shifts the IS curve to the right. Conversely, an autonomous fall in net exports causes aggregate demand and equilibrium output to decline, shifting the IS curve to the left.

Another factor that shifts the IS curve is changes in financial frictions
– An increase in financial frictions, as occurred during the financial crisis of 2007-2009, raises the real cost of borrowing to firms and hence causes investment spending and aggregate demand to fall.
Masterbook of Business and Industry (MBI)

CHAPTER 22
AGGREGATE DEMAND AND SUPPLY ANALYSIS

Aggregate Demand
Aggregate demand is made up of four component parts:
- consumption expenditure, the total demand for consumer goods and services
- planned investment spending, the total planned spending by business firms on new machines, factories, and other capital goods, plus planned spending on new homes
- government purchases, spending by all levels of government (federal, state, and local) on goods and services
- net exports, the net foreign spending on domestic goods and services

\[ Y^{d} = C + I + G + NX \]

The aggregate demand curve is downward sloping because

\[ P \downarrow \Rightarrow M/P \uparrow \Rightarrow Y \uparrow \Rightarrow Y^{d} \uparrow \]

and

\[ P \downarrow \Rightarrow M/P \uparrow \Rightarrow Y \uparrow \Rightarrow E \downarrow \Rightarrow NX \uparrow \Rightarrow Y^{d} \uparrow \]

The fact that the aggregate demand curve is downward sloping can also be derived from the quantity theory of money analysis. If velocity stays constant, a constant money supply implies constant nominal aggregate spending, and a decrease in the price level is matched with an increase in aggregate demand.

Figure 1 Leftward Shift in the Aggregate Demand Curve

Figure 2 Rightward Shift in the Aggregate Demand Curve

Factors that Shift the Aggregate Demand Curve
An increase in the money supply shifts AD to the right: holding velocity constant, an increase in the money supply increases the quantity of aggregate demand at each price level. An increase in spending from any of the components C, I, G, NX, will also shift AD to the right.

Summary Table 1 Factors That Shift the Aggregate Demand Curve

<table>
<thead>
<tr>
<th>Factor</th>
<th>Change</th>
<th>Shift in Aggregate Demand Curve</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autonomous monetary policy, ( \bar{r} )</td>
<td>↓</td>
<td>Y</td>
</tr>
<tr>
<td>Government purchases, ( G )</td>
<td>↑</td>
<td>Y</td>
</tr>
<tr>
<td>Taxes, ( T )</td>
<td>↑</td>
<td>Y</td>
</tr>
<tr>
<td>Autonomous net exports, ( NX )</td>
<td>↑</td>
<td>Y</td>
</tr>
<tr>
<td>Autonomous consumption expenditure, ( C )</td>
<td>↑</td>
<td>Y</td>
</tr>
<tr>
<td>Autonomous investment, ( I )</td>
<td>↑</td>
<td>Y</td>
</tr>
<tr>
<td>Financial frictions, ( j )</td>
<td>↑</td>
<td>Y</td>
</tr>
</tbody>
</table>

Aggregate Supply
Long-run aggregate supply curve
- Determined by amount of capital and labor and the available technology
- Vertical at the natural rate of output generated by the natural rate of unemployment

Short-run aggregate supply curve
- Wages and prices are sticky
- Generates an upward sloping SRAS as firms attempt to take advantage of short-run profitability when price level rises

Figure 3 Long- and Short-Run Aggregate Supply Curves

Shifts in Aggregate Supply Curves
Shifts in the long run aggregate supply curve
The long-run aggregate supply curve shifts to the right from when there is 1) an increase in the total amount of capital in the economy, 2) an increase in the total amount of labor supplied in the economy, 3) an increase in the available technology, or 4) a decline in the natural rate of unemployment. An opposite movement in these variables shifts the LRAS curve to the left

Figure 4 Shift in the Long-Run Aggregate Supply Curve
There are three factors that can shift the short-run aggregate supply curve:

1) expected inflation
2) price shocks
3) a persistent output gap

SUMMARY TABLE 2 Factors That Shift the Short-Run Aggregate Supply Curve

<table>
<thead>
<tr>
<th>Factor</th>
<th>Change</th>
<th>Shift in Supply Curve</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expected inflation, $\pi'$</td>
<td>↑</td>
<td>AS₁ ↑</td>
</tr>
<tr>
<td>Price shock</td>
<td>↑</td>
<td>AS₂ ↑</td>
</tr>
<tr>
<td>Output gap, ($Y' - Y$)</td>
<td>↑</td>
<td>AS₃ ↑</td>
</tr>
</tbody>
</table>

Figure 5 Shift in the Short-Run Aggregate Supply Curve from Changes in Expected Inflation and Price Shocks

Figure 6 Shift in the Short-Run Aggregate Supply Curve from a Persistent Positive Output Gap

Equilibrium in Aggregate Demand and Supply Analysis

We can now put the aggregate demand and supply curves together to describe general equilibrium in the economy, when all markets are simultaneously in equilibrium at the point where the quantity of aggregate output demanded equals the quantity of aggregate output supplied.

Short-Run Equilibrium

Figure 7 illustrates a short-run equilibrium in which the quantity of aggregate output demanded equals the quantity of output supplied. In Figure 8, the short-run aggregate demand curve $AD$ and the short-run aggregate supply curve $AS$ intersect at point $E$ with an equilibrium level of aggregate output at $Y$ and an equilibrium inflation rate at $\pi$.

Figure 7 Short-Run Equilibrium

Figure 8 Adjustment to Long-Run Equilibrium in Aggregate Supply and Demand Analysis

Self-Correcting Mechanism

Regardless of where output is initially, it returns eventually to the natural rate. Wages are inflexible, particularly downward. Need for active government policy.

Rapid
- Wages and prices are flexible
- Less need for government intervention

Changes in Equilibrium: Aggregate Demand Shocks
With an understanding of the distinction between the short-run and long-run equilibria, you are now ready to analyze what happens when there are demand shocks, shocks that cause the aggregate demand curve to shift.

Figure 9 Positive Demand Shock

Changes in Equilibrium: Aggregate Supply (Price) Shocks

The aggregate supply curve can shift from temporary supply (price) shocks in which the long-run aggregate supply curve does not shift, or from permanent supply shocks in which the long-run aggregate supply curve does shift.

Temporary Supply Shocks:
- When the temporary shock involves a restriction in supply, we refer to this type of supply shock as a negative (or unfavorable) supply shock, and it results in a rise in commodity prices.
- A temporary positive supply shock shifts the short-run aggregate supply curve downward and to the right, leading initially to a fall in inflation and a rise in output. In the long run, however, output and inflation will be unchanged (holding the aggregate demand curve constant).

Figure 10 The Volcker Disinflation

Figure 11 Negative Demand Shocks, 2001–2004

(b) Unemployment and Inflation, 2000–2004

<table>
<thead>
<tr>
<th>Year</th>
<th>Unemployment Rate (%)</th>
<th>Inflation (Year to Year) (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>4.0</td>
<td>3.4</td>
</tr>
<tr>
<td>2001</td>
<td>4.7</td>
<td>2.8</td>
</tr>
<tr>
<td>2002</td>
<td>5.8</td>
<td>1.6</td>
</tr>
<tr>
<td>2003</td>
<td>6.0</td>
<td>2.3</td>
</tr>
<tr>
<td>2004</td>
<td>5.5</td>
<td>2.7</td>
</tr>
</tbody>
</table>

Permanent Supply Shocks and Real Business Cycle Theory

A permanent negative supply shock—such as an increase in ill advised regulations that causes the economy to be less efficient, thereby reducing supply—would decrease potential output and shift the long-run aggregate supply curve to the left. Because the permanent supply shock will result in higher prices, there will be an immediate rise in inflation and so the short-run aggregate supply curve will shift up and to the left. One group of economists, led by Edward Prescott of Arizona State University, believe...
that business cycle fluctuations result from permanent supply shocks alone and their theory of aggregate economic fluctuations is called real business cycle theory.

Figure 14 Permanent Negative Supply Shock

Figure 15 Positive Supply Shocks, 1995–1999

Conclusions

Aggregate demand and supply analysis yields the following conclusions:

1. A shift in the aggregate demand curve affects output only in the short run and has no effect in the long run.
2. A temporary supply shock affects output and inflation only in the short run and has no effect in the long run (holding the aggregate demand curve constant).
3. A permanent supply shock affects output and inflation both in the short and the long run.
4. The economy has a self-correcting mechanism that returns it to potential output and the natural rate of unemployment over time.

Figure 16 Negative Supply and Demand Shocks and the 2007–2009

AD/AS Analysis of Foreign Business Cycle Episodes

Our aggregate demand and supply analysis also can help us understand business cycle episodes in foreign countries.

– Figure 17 shows the UK Financial Crisis, 2007–2009
– Figure 18 shows China and the Financial Crisis, 2007–2009

Figure 17 UK Financial Crisis, 2007–2009

Figure 18 China and the Financial Crisis, 2007–2009
Appendix to Chapter 22: The Phillips Curve and the Short-Run Aggregate Supply Curve

The Phillips Curve: the negative relationship between unemployment and inflation. The idea behind the Phillips curve is intuitive. When labor markets are tight—that is, the unemployment rate is low—firms may have difficulty hiring qualified workers and may even have a hard time keeping their present employees. Because of the shortage of workers in the labor market, firms will raise wages to attract needed workers and raise their prices at a more rapid rate.

Three Important Conclusions
1. There is no long-run trade-off between unemployment and inflation
2. There is a short-run trade-off between unemployment and inflation
3. There are two types of Phillips curves, long run and short run

The Short-Run Aggregate Supply Curve
To complete our aggregate demand and supply model, we need to use our analysis of the Phillips curve to derive a short-run aggregate supply curve, which represents the relationship between the total quantity of output that firms are willing to produce and the inflation rate. We can translate the modern Phillips curve into a short-run aggregate supply curve by replacing the unemployment gap (U – Un) with the output gap, the difference between output and potential output (Y – YP).

Okun’s Law
Okun’s law describes the negative relationship between the unemployment gap and the output gap. Okun’s law states that for each percentage point that output is above potential, the unemployment rate is one-half of a percentage point below the natural rate of unemployment. Alternatively, for every percentage point that unemployment is above its natural rate, output is two percentage points below potential output.

Response to an Aggregate Demand Shock
Policy makers can respond to this shock in two possible ways:
– No policy response
– Policy stabilizes economic activity and inflation in the short run

In the case of aggregate demand shocks, there is no tradeoff between the pursuit of price stability and economic activity stability.
in the Short Run

APPLICATION Quantitative (Credit) Easing to Respond to the Global Financial Crisis

Sometimes the negative aggregate demand shock is so large that at some point the central bank cannot lower the real interest rate further because the nominal interest rate hits a floor of zero, as occurred after the Lehman Brothers bankruptcy in late 2008. In this situation when the zero-lower-bound problem arises, the central bank must turn to unconventional monetary policy.

Though the Fed took action, the negative aggregate demand shock to the economy from the global financial crisis was so great that the Fed's quantitative (credit) easing was insufficient to overcome it, and the Fed was unable to shift the aggregate demand curve all the way back and the economy still suffered a severe recession.

Response to a Permanent Supply Shock

There are two possible policy responses to a permanent supply shock:
- No policy response
- Policy stabilizes inflation

Response to a Temporary Supply Shock

When a supply shock is temporary, policymakers face a short-run tradeoff between stabilizing inflation and economic activity. Policymakers can respond to the temporary supply shock in three possible ways:
- No policy response
- Policy stabilizes inflation in the short run
- Policy stabilizes economic activity in the short run

The Bottom Line: The Relationship Between Stabilizing Inflation and Stabilizing Economic Activity

We can draw the following conclusions from this analysis:
1. If most shocks to the economy are aggregate demand shocks or permanent aggregate supply shocks, then policy that stabilizes inflation will also stabilize economic activity, even in the short run.
2. If temporary supply shocks are more common, then a central bank must choose between the two stabilization objectives in the short run.
3. In the long run there is no conflict between stabilizing inflation and economic activity in response to shocks.
How Actively Should Policy Makers Try to Stabilize Economic Activity?
All economists have similar policy goals (to promote high employment and price stability), yet they often disagree on the best approach to achieve those goals. Nonactivists believe government action is unnecessary to eliminate unemployment. Activists see the need for the government to pursue active policy to eliminate high unemployment when it develops.

Lags and Policy Implementation
Several types of lags prevent policymakers from shifting the aggregate demand curve instantaneously:
- Data lag: the time it takes for policy makers to obtain data indicating what is happening in the economy.
- Recognition lag: the time it takes for policy makers to be sure of what the data are signaling about the future course of the economy.
- Legislative lag: the time it takes to pass legislation to implement a particular policy.
- Implementation lag: the time it takes for policy makers to change policy instruments once they have decided on the new policy.
- Effectiveness lag: the time it takes for the policy actually to have an impact on the economy.

FYI: The Activist/Nonactivist Debate Over the Obama Fiscal Stimulus Package
Many activists argued that the government needed to do more by implementing a massive fiscal stimulus package. On the other hand, nonactivists opposed the fiscal stimulus package, arguing that fiscal stimulus would take too long to work because of long implementation lags. The Obama administration came down squarely on the side of the activists and proposed the American Recovery and Reinvestment Act of 2009, a $787 billion fiscal stimulus package that Congress passed on February 13, 2009.

Inflation: Always and Everywhere a Monetary Phenomenon
This adage is supported by our aggregate demand and supply analysis because it shows that monetary policy makers can target any inflation rate in the long run by shifting the aggregate demand curve with autonomous monetary policy.

Causes of Inflationary Monetary Policy
High Employment Targets and Inflation
- Cost-push inflation results either from a temporary negative supply shock or a push by workers for wage hikes beyond what productivity gains can justify.
- Demand-pull inflation results from policy makers pursuing policies that increase aggregate demand.

APPLICATION The Great Inflation
Now that we have examined the roots of inflationary monetary policy, we can investigate the causes of the rise in U.S. inflation from 1965 to 1982, a period dubbed the Great Inflation. Panel (a) of Figure 11 documents the rise in inflation during those years. Just before the Great Inflation started, the inflation rate was below 2% at an annual rate; by the late 1970s, it averaged around 8% and peaked at nearly 14% in 1980 after the oil price shock in 1979. Panel (b) of Figure 11 compares the actual unemployment rate to estimates of the natural rate of unemployment.

CHAPTER 24
THE ROLE OF EXPECTATIONS IN MONETARY POLICY
Macro-econometric models—collections of equations that describe statistical relationships among economic variables—are used by economists to forecast economic activity and to evaluate the potential effects of policy options. In his famous 1976 paper, “Econometric Policy Evaluation: A Critique,” Robert Lucas argued that econometric models are unreliable for evaluation policy options if they do not incorporate rational expectations. According to Lucas, when policies change, public expectations will shift as well, and such changing expectations (as ignored by conventional econometric models) can have a real effect on economic behavior and outcomes.

APPLICATION The Term Structure of Interest Rates
The term structure application demonstrates an aspect of the Lucas Critique: The effects of a particular policy depend critically on the public’s expectations about the policy. If the public expects the rise in the short-term interest rate to be purely temporary, the response of long-term interest rates will be negligible. If the public expects the rise to be more permanent, the response of long-term rates will be far greater. The Lucas critique points out not only that conventional econometric models cannot be used for policy evaluation, but also that the public’s expectations about a policy will influence the response to that policy.

Policy Conduct: Rules or Discretion?
Policy rules are binding plans that specify how policy will respond (or not respond) to particular data such as unemployment and inflation. Policy discretion is applied when policymakers make no commitment to future actions, but instead make what they believe in that moment to be the right decision for the situation.

Finn Kydland, Edward Prescott, and Guillermo Calvo argued that discretionary policy is subject to the time inconsistency problem—the tendency to deviate from good long-run plans when making short-run decisions. Policymakers are always tempted to pursue expansionary policy to boost output in the short run, but the best policy is not to pursue it: Unexpected expansionary policy will raise workers and firms’ expectations about inflation, thus driving up wages and prices, and the end results will be higher inflation but no increase in output.

The time-inconsistency problem implies that a policy will have better inflation performance in the long run if it does not try to surprise people with an unexpectedly expansionary policy, but instead sticks to a certain rule.

Types of Rules
Nonactivist rules, which do not react to economic activity, include: Milton Friedman’s constant-money-growth-rate rule, in which the money supply is kept growing at a constant rate regardless of the state of the economy. Variants of the Friedman rule, as proposed by other monetarists such as Bennett McCallum and Alan Meltzer, allow the rate of money supply growth to be adjusted for shifts in velocity. Activist rules, which specify that monetary policy reacts to changes in economic activity, such as the level of output and to inflation.

The Case for Rules
One argument for rules is that they lead to desirable long-run outcomes because commitment to a policy rule solves the time-inconsistency problem because it does not allow policymakers to exercise discretion and try to exploit the short-run tradeoff between inflation and employment. Another argument for rules is that policymakers and politicians cannot be trusted: Politicians have strong incentives to pursue expansionary policy that help them win the next election, leading to the political business cycle.

The Case for Discretion
Drawbacks of policy rules:
Rules can be too rigid because they cannot foresee every contingency. Rules do not easily incorporate the use of judgment because monetary policymakers need to look at a wide range of information and some of this information is not easily quantifiable. No one really knows what the true model of the economy is and so any policy rule that is based on a particular model will prove to be wrong if the model is not correct. Even if the model were correct, structural changes in the economy would lead to changes in the coefficients of the model (the Lucas critique).

Constrained Discretion
Constrained discretion, developed by Ben Bernanke and Frederic Mishkin, imposes a conceptual structure and inherent discipline on policymakers, but without eliminating all flexibility. The idea is to combine some of the advantages ascribed to rules with those ascribed to discretion.

The Role of Credibility and a Nominal Anchor
An important way to constrain discretion is by committing to a nominal anchor: a variable that ties down the price level or inflation to a certain level. Committing to a nominal anchor and so it will pursue inflationary policy in the future. The result is rising inflation expectations, so that the short-run AS curve will shift up to the left, so that aggregate output falls even further. Monetary policy credibility has the benefit of stabilizing economic activity in the short run when faced with negative demand shocks.

Credibility and Aggregate Supply Shocks
Negative aggregate demand shocks (the AD curve shifts to the left so that aggregate output falls below YP). If the central bank’s credibility is weak, the public will see an easing of monetary policy as the central bank’s losing its commitment to the nominal anchor and so it will pursue inflationary policy in the future. The result is rising inflation expectations, so that the short-run AS curve will shift up to the left, so that aggregate output falls even further. Monetary policy credibility has the benefit of stabilizing economic activity in the short run when faced with negative demand shocks.

Positive aggregate demand shocks (the AD curve shifts to the right so that inflation rises above πt).

\[
\pi = \pi^e + \gamma (Y - Y^p) + \rho
\]

If the commitment to the nominal anchor is credible, then expected inflation will remain unchanged so that the short-run AS curve (as represented by the above equation) will not shift. The appropriate policy response is to tighten monetary policy so that the short-run AD curve shifts back while inflation falls back down to the inflation target of πT.

Positive aggregate demand shocks (the AD curve shifts to the right so that inflation rises above πT). If monetary policy is not credible, the public would worry that the central bank would drive the AD curve back down quickly, then expected inflation will rise and so the short-run AS curve will shift up to the left, driving up inflation. Even if the central bank tightens monetary policy by shifting the AD curve back, inflation would have risen more than it would have if the central bank had credibility. Monetary policy credibility has the benefit of stabilizing inflation in the short run when faced with positive demand shocks.

Figure 1 Credibility and Aggregate Demand Shocks

Figure 2 Credibility and Aggregate Supply Shocks
APPLICATION A Tale of Three Oil Price Shocks
In 1973, 1979, and 2007, the U.S. economy was hit by three major negative supply shocks when the price of oil rose sharply; and yet in the first two episodes inflation rose sharply, while in the most recent episode it rose much less. We can see this in Figure 3

Figure 3 Inflation and Unemployment 1970–2010

APPLICATION Credibility and the Reagan Budget Deficits
The Reagan administration was strongly criticized for creating huge budget deficits by cutting taxes in the early 1980s. Although many economists agree that the Fed’s anti-inflation program lacked credibility, not all agree that the Reagan budget deficits were the cause of that lack of credibility. The conclusion that the Reagan budget deficits helped create a more severe recession in 1981–1982 is controversial

Approaches to Establishing Central Bank Credibility

Credibility and Anti-Inflation Policy
The greater is the credibility of the central bank as an inflation fighter, the more rapid will be the decline in inflation and the lower will be the loss of output to achieve the inflation objective. If the central bank has very little credibility, then the public will not be convinced that the central bank will stay the course to reduce inflation and they will not revise their inflation expectations

Approaches to Establishing Central Bank Credibility

Credibility and Anti-Inflation Policy

Inflation Targeting, Strategy that involves:

- public announcement of medium-term numerical targets for inflation
- an institutional commitment to price stability as the primary, long-run goal of monetary policy
- an information-inclusive approach in which policymakers use many variables in making decisions about monetary policy
- increased transparency of the monetary policy strategy through communication with the public and the markets
- increased accountability of the central bank for attaining its inflation objectives

Appoint “Conservative” Central Bankers
Kenneth Rogoff of Harvard University suggested that another way to establish policy credibility is for the government to appoint central bankers who have a strong aversion to inflation. The public will then expected that the conservative central banker will be less tempted to pursue expansionary monetary policy and will try to keep inflation under control. The problem with this approach is that it is not clear what it will work over time.

Inside the Fed: The Appointment of Paul Volcker, Anti-Inflation Hawk
Paul Volcker is known as an inflation hawk and thus his appointment as the chairman of the Fed in October 1979 is a good example of the appointment of a “conservative” central banker. Shortly after he took the helm of the Fed, the federal funds rate rose by 8 percentage points to nearly 20% by April 1980. Despite the unemployment rate rose to nearly 10% in 1982, the federal funds rate remained at around 15% until the inflation rate began to fall in July 1982

CHAPTER 25
TRANSMISSIONS MECHANISMS OF MONETARY POLICY

Examines whether one variable affects another by using data to build a model that explains the channels through which the variable affects the other.

Transmission mechanism
- The change in the money supply affects interest rates
- Interest rates affect investment spending
- Investment spending is a component of aggregate spending (output)

Traditional Interest-Rate Channels
An important feature of the interest-rate transmission mechanism is its emphasis on the real (rather than the nominal) interest rate as the rate that affects consumer and business decisions. In addition, it is often the real long-term interest rate (not the real short-term interest rate) that is viewed as having the major impact on spending

Other Asset Price Channels
In addition to bond prices, two other asset prices receive substantial attention as channels for monetary policy effects:

- foreign exchange rates
- the prices of equities (stocks)
Figure 1 The Link Between Monetary Policy and Aggregate Demand: Monetary Transmission Mechanisms

Tobin’s q Theory
Theory that explains how monetary policy can affect the economy through its effects on the valuation of equities (stock). Defines q as the market value of firms divided by the replacement cost of capital. If q is high, the market price of firms is high relative to the replacement cost of capital, and new plant and equipment capital is cheap relative to the market value of firms. When q is low, firms will not purchase new investment goods because the market value of firms is low relative to the cost of capital

Wealth Effects
Franco Modigliani looked at how consumers’ balance sheets might affect their spending decisions. Consumption is spending by consumers on nondurable goods and services. An important component of consumers’ lifetime resources is their financial wealth, a major component of which is common stocks. When stock prices rise, the value of financial wealth increases, thereby increasing the lifetime resources of consumers, and consumption should rise

Credit View
Dissatisfaction with the conventional stories that interest-rate effects explain the impact of monetary policy on expenditures on durable assets has led to a new explanation based on the problem of asymmetric information in financial markets that leads to financial frictions. This explanation, referred to as the credit view, proposes that two types of monetary transmission channels arise as a result of financial frictions in credit markets: those that operate through effects on bank lending and those that operate through effects on firms’ and households’ balance sheets

Bank Lending Channel: based on the analysis that demonstrates that banks play a special role in the financial system because they are especially well suited to solve asymmetric information problems in credit markets

Balance Sheet Channel: Like the bank lending channel, the balance sheet channel arises from the presence of financial frictions in credit markets

Cash Flow Channel: another balance sheet channel operates by affecting cash flow, the difference between cash receipts and cash expenditures

Unanticipated Price Level Channel: another balance sheet channel operates through monetary policy effects on the general price level

FYI Consumers’ Balance Sheets and the Great Depression
The years between 1929 and 1933 witnessed the worst deterioration in consumers’ balance sheets ever seen in the United States. Because of the decline in the price level in that period, the level of real debt consumers owed also increased sharply (by over 20%). Consequently, the value of financial assets relative to the amount of debt declined sharply, increasing the likelihood of financial distress

Household Liquidity Effects
Another way of looking at how the balance sheet channel may operate through consumers is to consider liquidity effects on consumer durable and housing expenditures. If, as a result of a bad income shock, consumers needed to sell their consumer durables or housing to raise money, they would expect a big loss because they could not get the full value of these assets in a distress sale. In contrast, if consumers held financial assets (such as money in the bank, stocks, or bonds), they could easily sell them quickly for their full market value and raise the cash

Why Are Credit Channels Likely to Be Important?
There are three reasons to believe that credit channels are important monetary transmission mechanisms

1. a large body of evidence on the behavior of individual firms supports the view that financial frictions of the type crucial to the operation of credit channels do affect firms’ employment and spending decisions
2. there is evidence that small firms (which are more likely to be credit-constrained) are hurt more by tight monetary policy than large firms, which are unlikely to be credit-constrained
3. the asymmetric information view of credit market imperfections at the core of the credit channel analysis is a theoretical construct that has proved useful in explaining many other important phenomena, such as why many of our financial institutions exist, why our financial system has the structure that it has, and why financial crises are so damaging to the economy

Application: The Great Recession
With the advent of the financial crisis in the summer of 2007, the Fed began a very aggressive easing of monetary policy. At first, it appeared that the Fed’s actions would keep the growth slowdown mild and prevent a recession. However, the economy proved to be weaker than the Fed or private forecasters expected, with the most severe recession in the post-war period beginning in December of 2007. Why did the economy become so weak despite this unusually rapid reduction in the Fed’s policy instrument?

The subprime meltdown led to negative effects on the economy from many of the channels we have outlined. The rising level of subprime mortgage defaults, which led to a decline in the value of mortgage-backed securities and CDOs, led to large losses on the balance sheets of financial institutions. With weaker balance sheets, these financial institutions began to deleverage and cut back on their lending. With no one else to collect information and make loans, adverse selection and moral hazard problems increased in credit markets, leading to a slowdown of the economy. Credit spreads also went through the roof with the increase in uncertainty from failures of so many financial markets. The decline in the stock market and housing prices also weakened the economy, because it lowered household wealth

Lessons for Monetary Policy
Four basic lessons:

1. It is dangerous always to associate the easing or the tightening of monetary policy with a fall or a rise in short-term nominal interest rates
2. Other asset prices besides those on short-term debt instruments contain important information about the stance of monetary policy because they are important elements in various monetary policy transmission mechanisms
3. Monetary policy can be effective in reviving a weak economy even if short-term interest rates are already near zero
4. Avoiding unanticipated fluctuations in the price level is an important objective of monetary policy, thus providing a rationale for price stability as the primary long-run goal for monetary policy

APPLICATION Applying the Monetary Policy Lessons to Japan
1. First lesson suggests that it is dangerous to think that declines in interest rates always mean that monetary policy has been easing
2. Second lesson suggests that monetary policymakers should pay attention to other asset prices in assessing the stance of monetary policy
3. Third lesson indicates that monetary policy can still be effective even if short-term interest rates are near zero
4. Fourth lesson indicates that unanticipated fluctuations in the price level should be avoided

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