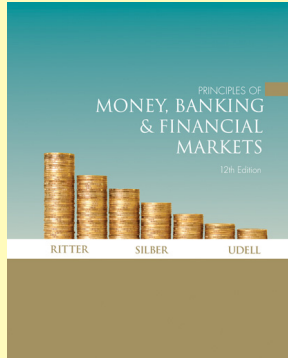


Chapter 8

Money and Capital Markets



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Learning Objectives



- Visualize the structure of the government bond market
- Explain the interaction of Eurodollars, CDs, and Repurchase agreements and their connection to short-term government debt
- Understand the market structure of the corporate and municipal debt markets
- Describe the structure of equity markets and the fundamentals that help determine their price

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8-2

Introduction



- Market for U.S. government securities is the center of the money and capital markets
- U.S. Treasury has to sell many hundred billion dollars worth of securities each year to pay off maturing issues and finance current government operations
- Provides reference point for money market (debt less than one year) and capital markets (long-term debt/equities)

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The Government Bond Market



- When U.S. government runs a deficit, the Treasury Department **borrow**s money by selling government bonds
- Sell to anyone willing to lend money to U.S. government
- Treasury issues a wide variety of maturities and types of government securities

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The Government Bond Market (Cont.)



- U.S. securities are basically two types
 - **Marketable** [50%]--bought/sold in financial markets
 - **Nonmarketable** [50%]--sell back to Treasury
- **Types of Securities and Investors**
 - **Treasury Bills (T-bills)**
 - Short-term—maturity of 3, 6 months or 1 year
 - Zero-coupon—sold at discount below face value

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The Government Bond Market (Cont.)



- **Types of Securities and Investors (Cont.)**
 - **Treasury Notes**
 - Maturity between one and ten years
 - Coupon instruments—interest usually paid semiannually
 - **Treasury Bonds**
 - Maturity longer than 10 year, up a maximum of 30 year
 - Coupon instruments
 - Coupons can be “stripped” and sold as separate instruments

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The Government Bond Market (Cont.)



• Types of Securities and Investors (Cont.)

– Treasury Inflation Protected Securities (TIPS)

- Most complicated security issued by the Treasury
- Issued in three maturities—5, 10, and 20 years
- Interest is paid semi-annually
- The principal of the TIPS grows at the same rate as inflation
- Interest payments increase with the increased principal
- Upon maturity, bearer receives higher of the original principal or principle grown at the rate of inflation

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The Government Bond Market (Cont.)



• Owners of marketable government securities

– Federal Reserve

- Purchases **Open Market Operations**—mostly T-bills
- Provides Fed with most of its income

– Private Sector

- Commercial banks
- Individuals
- Insurance companies/Pension Funds
- Money market mutual funds

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The Government Bond Market (Cont.)



• Owners of marketable government securities (Cont.)

– Foreigners

- Now own about 50% of U.S. national debt
- Without foreign purchases, U.S. interest rates would be much higher
- Foreigners are attracted to U.S. securities:
 - Political stability
 - Financial freedom—Dollar is easily traded
 - Relative high interest rates

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The Government Bond Market (Cont.)



• How the Market Works

- Most trading takes place in over-the counter markets
- Trading in government securities averages more than 20 times trading on the New York Stock Exchange
- Increasingly traded around the clock in different parts of the world

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The Government Bond Market (Cont.)



• How the Market Works (Cont.)

- Dealers get much of their inventory of bonds by bidding at competitive auctions
 - Three- and six-month T-Bills are auctioned weekly
 - Notes are auctioned on a regular scheduled basis
- Initially issued at auctions held by Treasury
 - Raise new funds
 - Replace funds of maturing securities

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The Government Bond Market (Cont.)



• Treasury Bills: Auctions and Yields

- Zero coupon held for one year:

$$\text{Price} = \frac{\text{Face Value}}{(1 + r)}$$

$$r = \frac{\text{Face Value} - \text{Price}}{\text{Price}}$$

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The Government Bond Market (Cont.)



• Treasury Bills: Auctions and Yields (Cont)

- Zero Coupon held for less than one year

$$r = \left[\frac{\text{Face Value} - \text{Price}}{\text{Price}} \right] \times t$$

- Where “t” is the inverse of the fraction of a year the bill takes to mature

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The Government Bond Market (Cont.)



• Treasury Bills: Auctions and Yields (Cont.)

- At closing time of auction Treasury does following:
 - Ranks bids from highest price down
 - Selects bids in this order until amount sold equals amount scheduled to be sold
 - Successful bidders purchase bills at the same price and will earn the same yield
 - **Yield on a discount basis**—Calculated as face value minus purchase price divided by the face value
 - **Coupon Equivalent Yield**—More accurate measure since it uses purchase price rather than face value

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The Government Bond Market (Cont.)



• Repurchase Agreements (Repos)

- An efficient mechanism for financing purchases of government securities
- Along with the federal funds market, the Repo market is the focal point of overnight borrowing and lending
- Securities dealer sells government security and agrees to repurchase at a higher price the next day which reflects the overnight cost of funds

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The Government Bond Market (Cont.)



• Repurchase Agreements (Repos) (Cont.)

- Repo market is closely related to market for borrowing and lending reserves owned by banks—**Federal Funds Market**
 - Both markets are sources of overnight funds
 - Both markets settle payments the same day the transaction is completed
 - Main difference is that a repo agreement is a collateralized loan
 - **Federal Funds rate and rate on repo agreements tend to move together**

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The Government Bond Market (Cont.)



• Repurchase Agreements (Repos) (Cont.)

- The Repo market has evolved into a much broader use
 - Repos are done over a wide variety of maturities ranging from the traditional one day to three months
 - Repo agreements are now used to raise funds for anything the borrower chooses, simply acting as collateral for the lender

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Bank-Related Securities: CDs and Eurodollars



- Commercial banks have other money market options than repos and federal funds
- **Certificates of Deposit [CDs]**
 - Savings deposits with a specific maturity date
 - CDs in excess of \$100,000 are negotiable instruments and traded through network of dealers

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Bank-Related Securities: CDs and Eurodollars (Cont.)



- **Eurodollars**

- Dollar denominated time deposits held abroad in foreign banks or foreign branches of U.S. banks
- Used by US banks to raise funds
- **LIBOR (London Interbank Offered Rate)**—overnight rate of borrowing eurodollars and tends to follow money market rates in the U.S.
- **(Figure 8.1)**

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FIGURE 8.1 Yields on three-month Treasury bills and LIBOR move closely together.



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Corporate Securities



- **Corporate Bonds**

- Corporations borrow across all maturity ranges—mainly at the long end
- High-quality corporate bonds usually yield more than government bonds and are safer than corporate stocks
- Bonds have prior claim before stocks—payment of interest is first priority
- Being long term, these bonds are subject to interest-rate risk—interest rises, prices fall

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Corporate Securities (Cont.)



• Corporate Bonds (Cont.)

– Callable bonds

- Issuer has right to pay off the bond before maturity date
- Bond option will be exercised if it is in the interest of the borrower
- These carry higher interest rate

– Convertible bonds—holders have right to convert to common stock at predetermined price

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Corporate Securities (Cont.)



• Corporate Bonds (Cont.)

– Corporate bonds differ in **quality**—danger of default by borrower

- U.S. government is safest
- Various bond rating agencies
 - Standard and Poor's
 - Moody's
- **Investment grade**—highest quality bonds

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Corporate Securities (Cont.)



• Corporate Bonds (Cont.)

• Junk bonds

- Very risky, but pay high interest to compensate for risk
- Tend to perform well when the economy is strong, but extremely risky when economy does poorly
- Michael Milken [convicted of securities fraud] and Drexel, Burnham Lambert [bankrupt in 1990] are two examples of problems in the junk bond market

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Corporate Securities (Cont.)



• Corporate Bonds (Cont.)

- Life insurance and pension/retirement funds hold most corporate bonds
 - Schedule cash flow based on life expectancies
 - Hold to maturity—little need for quick liquidation
- Foreigners also hold large amount of corporate bonds
- Generally traded in over-the-counter market—usually by telephone

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Corporate Securities (Cont.)



• Commercial Paper

- Unsecured corporate borrowing in the money market (short-term)
- Two categories of issuers:
 - Finance companies associated with well known manufacturing companies
 - Nonfinancial companies--generally to finance inventory
- Usually purchased directly from issuer by large institutional investors

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Corporate Securities (Cont.)



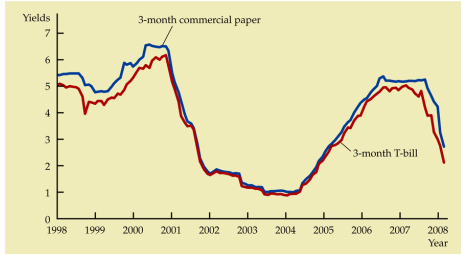
• Commercial Paper (Cont.)

- Because of possibility of default, yields are typically higher than Treasury Bills, but tend to move closely together (**Figure 8.2**)
- Not much of a secondary market—investors generally redeem with issuer

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FIGURE 8.2 Yields on three-month Treasury bills and commercial paper.



Source: Federal Reserve.

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Municipal Securities

- Issued by state and local governments
- Lowest yield because interest earnings are exempt from federal tax
- By law Congress does have the power to tax, but has decided not to tax this source of revenue

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Municipal Securities (Cont.)

- **“Serial” maturity form**
 - Portion of the issue matures each year until entire issue is retired
 - Each portion carries its own interest rate and is separate from the rest of the issue
 - In essence a 10 year serial bond is really 10 separate issues, each maturing at different times
- Sold through underwriting syndicates who sell to ultimate investors at slightly higher prices

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Municipal Securities (Cont.)



- **Two types of municipal bonds**

- **General Obligation Bonds**—Backed by general taxing power of the state or local government
- **Revenue Bonds**—Issued to finance a specific project; interest and principal are paid solely out of receipts from the project
- General obligation bonds are safer than revenue bonds and pay lower interest

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Municipal Securities (Cont.)



- Secondary trading in the over-the-counter market—not much activity
- **Tax-anticipation notes (TAN) and bond-anticipation notes (BAN)**—short-term securities cover cash flow problems of taxes (TAN) or upcoming capital projects (BAN)

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Mortgage Securities



- Most complicated of all debt instruments
- Borrowing by individuals using real estate as collateral
- Most mortgages are insured by some type of government agency minimizing potential default of borrowers
 - Governmental National Mortgage Association
 - Federal Home Loan Mortgage Corporation

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Mortgage Securities (Cont.)



- Mortgages can be repaid prior to maturity date
 - Prepayment or refinancing due to lower rates
 - Investors are not sure of maturity
 - Investments undesirable to institutional investors
- Innovations in mortgage terms
 - Shorter maturity period
 - Adjustable rate—minimizes interest rate risk of lender
 - Balloon payments—low front end with large lump sum payment at end

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Mortgage Securities (Cont.)



- To reduce uncertainty and broaden the appeal of mortgages, dealers developed **Collateralized Mortgage Obligations (CMOs)**
 - Number of mortgages are placed in a trust
 - Interest and principal repayments are divided by trustee into four (or more) segments according to a predetermined formula
 - Investors select which segment from which to receive their payments
 - Makes the cash flow more predictable

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The Stock Market



- **Structure of the Stock Market**
 - About 90 million individual shareholders in U.S.
 - During past decade **institutional investors** (pension funds, mutual funds, and insurance) have begun to dominate the market
 - **Stock Market**—refers principally to secondary market for common stock
 - Primary issues are handled through investment banks

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The Stock Market (Cont.)



• Structure of the Stock Market (Cont.)

- **New York Stock Exchange**—most visible part of stock market
 - **Posts**—location where individual stocks are traded
 - **Traders**—receive orders from brokerage houses
 - **Specialists**—individuals who maintain orderly trading for securities in their charge
 - May just match publicly tendered buy and sell orders
 - Floor traders stand at posts and compete for orders not matched by specialists
 - If neither of these occur, specialists will buy or sell for their own account to prevent excessive price swings

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The Stock Market (Cont.)



• Structure of the Stock Market (Cont.)

- **Other markets**
 - American Stock Exchange
 - **Over-the-counter [OTC]**
 - Network of dealers and brokers who deal via telephone and computer terminals
 - **National Association of Securities Dealers Automated Quotation System [NASDAQ]**—Shows bid and asked prices of OTC traded securities

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The Stock Market (Cont.)



• What Determines Whether Stock Prices Rise or Fall

- Stocks (**equities**) represent ownership company
- Investor receives future cash flows in form of dividends
- In its simplest form the price of a stock with constant dividends forever is:

$$\text{Price} = \frac{\text{Expected Annual Dividend}}{\text{Annual Rate of Discount}}$$

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The Stock Market (Cont.)



• What Determines Whether Stock Prices Rise or Fall (Cont.)

- Therefore, the price will rise if:
 - **Expected future dividends** increases
 - **Annual rate of discount** decreases
- Rate of discount is higher than the government bond rate to compensate for the risk of stocks
- **However, the rate of discount will follow movements in the government bond rate**

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The Stock Market (Cont.)



• What Determines Whether Stock Prices Rise or Fall (Cont.)

- Therefore, price of stocks move in same direction of earnings and inversely with interest rates
- To predict movements of stock prices must predict:
 - **Expected** future earnings
 - **Expected** future interest rates
 - **This requires knowledge of future movements of the entire economy which is notoriously difficult**

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The Stock Market (Cont.)



• Money and Stock Prices

- Some economists believe that fluctuations in the money supply will provide key to movements in stock prices
- Increase in money supply will increase stock price:
 - Individuals hold larger cash that they need
 - Spend some on stock which increases demand and increases price (assume supply fixed in short-run)
- Opposite for a decrease in money supply

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The Stock Market (Cont.)

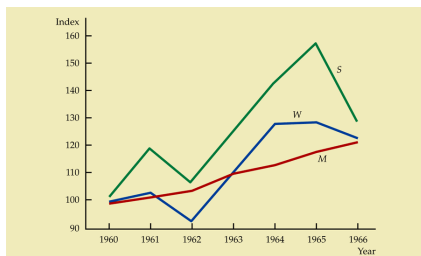
• Money and Stock Prices (Cont.)

- Therefore, rapidly expanding money supply generally leads to higher stock prices; inadequate growth of money leads to a fall
- Difficult to determine if stock and money growth are related to each other or reacting to a third causal force (**Figure 8.3**)
- However, other economic forces may cause stock prices and growth of money supply to move in opposite directions

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FIGURE 8.3 Stock prices and other variables, 1960–1966.



Sources: For stock prices: Dow Jones Industrial, monthly closing averages for December of each year (December 1960 = 100). For money supply: Demand deposits plus currency, monthly averages for December of each year (December 1960 = 100).

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TABLE 8.1 Results of a Typical Treasury Bill Auction

	Three-month bills	Six-month bills
Amount applied for at auction	\$69.6 billion	\$70.9 billion
Amount scheduled to be sold	\$24.0 billion	\$22.0 billion
Noncompetitive tenders	\$2.8 billion	\$2.3 billion
Sales by competitive bidding	\$21.2 billion	\$19.7 billion
High price	99.469	98.999
Low price paid (stop out price)	99.454	98.9535
Annual yield on a discount basis	2.16%	2.07%
Coupon equivalent yield	2.20%	2.12%

Source: United States Treasury, Feb. 25, 2008 Auction.

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