CHAPTER 2: ASSET CLASSES AND FINANCIAL INSTRUMENTS

PROBLEM SETS

1. Preferred stock is like long-term debt in that it typically promises a fixed payment each year. In this way, it is a perpetuity. Preferred stock is also like long-term debt in that it does not give the holder voting rights in the firm.

   Preferred stock is like equity in that the firm is under no contractual obligation to make the preferred stock dividend payments. Failure to make payments does not set off corporate bankruptcy. With respect to the priority of claims to the assets of the firm in the event of corporate bankruptcy, preferred stock has a higher priority than common equity but a lower priority than bonds.

2. Money market securities are called *cash equivalents* because of their high level of liquidity. The prices of money market securities are very stable, and they can be converted to cash (i.e., sold) on very short notice and with very low transaction costs. Examples of money market securities include Treasury bills, commercial paper, and banker's acceptances, each of which is highly marketable and traded in the secondary market.

3. (a) A repurchase agreement is an agreement whereby the seller of a security agrees to "repurchase" it from the buyer on an agreed upon date at an agreed upon price. Repos are typically used by securities dealers as a means for obtaining funds to purchase securities.

4. Spreads between risky commercial paper and risk-free government securities will widen. Deterioration of the economy increases the likelihood of default on commercial paper, making them more risky. Investors will demand a greater premium on all risky debt securities, not just commercial paper.

5.

	Corp. Bonds	Preferred Stock	Common Stock
Voting rights (typically)			Yes
contractual obligation	Yes		
Perpetual payments		Yes	Yes
Accumulated dividends		Yes	
Fixed payments (typically)	Yes	Yes	
Payment preference	First	Second	Third

6. Municipal bond interest is tax-exempt at the federal level and possibly at the state level as well. When facing higher marginal tax rates, a high-income investor would be more inclined to invest in tax-exempt securities.

7. a. You would have to pay the ask price of:

   111.8203% of par value of $1,000 = $1118.203

   b. The coupon rate is 3.125% implying coupon payments of $31.25 annually or, more precisely, $15.625 semiannually.

   c. The yield to maturity on a fixed income security is also known as its required return and is reported by *The Wall Street Journal* and others in the financial press as the ask yield. In this case, the yield to maturity is 2.496%. An investor buying this security today and holding it until it matures will earn an annual return of 2.496%. Students will learn in a later chapter how to compute both the price and the yield to maturity with a financial calculator.

8. Treasury bills are discount securities that mature for $10,000. Therefore, a specific T-bill price is simply the maturity value divided by one plus the semi-annual return:

   P = $10,000/1.02 = $9,803.92

9. The total before-tax income is $4. After the 70% exclusion for preferred stock dividends, the taxable income is: $0.30 \times \$4 = \$1.20$

   Therefore, taxes are: $0.30 \times \$1.20 = \$0.36$

   After-tax income is: $\$4.00 - \$0.36 = \$3.64$

   Rate of return is: $\$3.64/\$40.00 = 9.10\%$

10. a. You could buy: $5,000/$142.97 = 34.97 shares. Since it is not possible to trade in fractions of shares, you could buy 34 shares of GD.

    b. Your annual dividend income would be: $34 \times \$3.04 = \$103.36$

    c. The price-to-earnings ratio is 15.39 and the price is $142.97. Therefore:

    $142.97/Earnings per share = 15.39 $\Rightarrow$ Earnings per share = $9.29

    d. General Dynamics closed today at $142.97, which was $0.47 lower than yesterday's price of $143.44.

11. a. At $t = 0$, the value of the index is: (90 + 50 + 100)/3 = 80

At $t = 1$, the value of the index is: (95 + 45 + 110)/3 = 83.333

The rate of return is: (83.333/80) – 1 = 4.17%

b. In the absence of a split, Stock C would sell for 110, so the value of the index would be: (95+45+110)/3 = 250/3 = 83.333 with a divisor of 3.

After the split, stock C sells for 55. Therefore, we need to find the divisor (d) such that: 83.333 = (95 + 45 + 55)/d $\Rightarrow$ d = 2.340. The divisor fell, which is always the case after one of the firms in an index splits its shares.

c. The return is zero. The index remains unchanged because the return for each stock separately equals zero.

12. a. Total market value at $t = 0$ is: ($9,000 + $10,000 + $20,000) = $39,000

Total market value at $t = 1$ is: ($9,500 + $9,000 + $22,000) = $40,500

Rate of return = ($40,500/$39,000) – 1 = 3.85%

b. The return on each stock is as follows:

r_A = (95/90) – 1 = 0.0556

r_B = (45/50) – 1 = –0.10

r_C = (110/100) – 1 = 0.10

The equally weighted average is:

[0.0556 + (-0.10) + 0.10]/3 = 0.0185 = 1.85%

13. The after-tax yield on the corporate bonds is: 0.09 × (1 – 0.30) = 0.063 = 6.30%
Therefore, municipals must offer a yield to maturity of at least 6.30%.

14. Equation (2.2) shows that the equivalent taxable yield is: $r = r_m/(1 – t)$, so simply substitute each tax rate in the denominator to obtain the following:

a. 4.00%

b. 4.44%

c. 5.00%

d. 5.71%

15. In an equally weighted index fund, each stock is given equal weight regardless of its market capitalization. Smaller cap stocks will have the same weight as larger cap stocks. The challenges are as follows:
    - Given equal weights placed to smaller cap and larger cap, equal-weighted indices (EWI) will tend to be more volatile than their market-capitalization counterparts;
    - It follows that EWIs are not good reflectors of the broad market that they represent; EWIs underplay the economic importance of larger companies.
    - Turnover rates will tend to be higher, as an EWI must be rebalanced back to its original target. By design, many of the transactions would be among the smaller, less-liquid stocks.

16. a. The ten-year Treasury bond with the higher coupon rate will sell for a higher price because its bondholder receives higher interest payments.

    b. The call option with the lower exercise price has more value than one with a higher exercise price.

    c. The put option written on the lower priced stock has more value than one written on a higher priced stock.

17. a. You bought the contract when the futures price was \$3.96 (see Table 2.8). The contract closes at a price of \$4.06, which is \$0.10 more than the original futures price. The contract multiplier is 5000. Therefore, the gain will be: $\$0.08 \times 5000 = \$400.00$

18. a. Owning the call option gives you the right, but not the obligation, to buy at \$150, while the stock is trading in the secondary market at \$152. Since the stock price exceeds the exercise price, you exercise the call.

    The payoff on the option will be: \$152 - \$150 = \$2

    The cost was originally \$3.31, so the profit is: \$2 - \$3.31 = -\$1.31

    b. Since the stock price is greater than the exercise price, you will exercise the call. The payoff on the option will be: \$152 - \$145 = \$7

    The option originally cost \$6.60, so the profit is \$7 - \$6.60 = \$.40.

    c. Owning the put option gives you the right, but not the obligation, to sell at \$155, but you could sell in the secondary market for \$152, if you exercise the call the payoff on the option will be: \$155 - \$152 = \$3.

The option originally cost $6.53, so the profit is $3-$6.53 = -$3.53.

19. There is always a possibility that the option will be in-the-money at some time prior to expiration. Investors will pay something for this possibility of a positive payoff.

20.

	Value of Call at Expiration	Initial Cost	Profit
a.	0	4	-4
b.	0	4	-4
c.	0	4	-4
d.	5	4	1
e.	10	4	6

	Value of Put at Expiration	Initial Cost	Profit
a.	10	6	4
b.	5	6	-1
c.	0	6	-6
d.	0	6	-6
e.	0	6	-6

21. A put option conveys the *right* to sell the underlying asset at the exercise price. A short position in a futures contract carries an *obligation* to sell the underlying asset at the futures price. Both positions, however, benefit if the price of the underlying asset falls.

22. A call option conveys the *right* to buy the underlying asset at the exercise price. A long position in a futures contract carries an *obligation* to buy the underlying asset at the futures price. Both positions, however, benefit if the price of the underlying asset rises.

CFA PROBLEMS

1. (d) There are tax advantages for corporations that own preferred shares.

2. The equivalent taxable yield is: 6.75%/(1 – 0.34) = 10.23%

3. (a) Writing a call entails unlimited potential losses as the stock price rises.

4. a. The taxable bond. With a zero tax bracket, the after-tax yield for the taxable bond is the same as the before-tax yield (5%), which is greater than the yield on the municipal bond.

   b. The taxable bond. The after-tax yield for the taxable bond is:
   $0.05 \times (1 - 0.10) = 4.5\%$

   c. You are indifferent. The after-tax yield for the taxable bond is:

   $0.05 \times (1 - 0.20) = 4.0\%$

   The after-tax yield is the same as that of the municipal bond.

   d. The municipal bond offers the higher after-tax yield for investors in tax brackets above 20%.

5. If the after-tax yields are equal, then: $0.056 = 0.08 \times (1 - t)$

   This implies that $t = 0.30 = 30\%$.

CHAPTER TWO
ASSET CLASSES AND FINANCIAL INSTRUMENTS

CHAPTER OVERVIEW

This chapter describes the financial instruments traded in the primary and secondary markets. The broad market place is divided into Money Markets and Capital Markets. The chapter begins with Money Market characteristics and examples of Money Markets instruments. It then moves to longer-term Capital Markets. The four subdivisions of Capital Markets are discussed: Longer-term bonds, equity, futures and options.

LEARNING OBJECTIVES

Upon completion of this chapter the student should have a thorough understanding of the various financial instruments available to the potential investor. The student should have an insight as to the interpretation, composition, and calculation process involved in the various market indexes presented on the evening news. The student should have some understanding of the basics of options and futures.

PRESENTATION OF MATERIAL

2.1 The Money Market

The major money market instruments are presented here. In describing the individual instruments, it is helpful for the students' understanding of the market to integrate discussion of institutional characteristics of the instruments. For example, commercial banks are the major participants for many of the instruments. If students have adequate backgrounds from prerequisite classes, discussion of characteristics of marketability, liquidity, and default risk may be appropriate. Discussion of the concepts should be delayed to later chapters if students' backgrounds are not adequate.

2.2 The Bond Market

Debt instruments are issued by both public and private entities. The Treasury and Agency issues have the direct or implied guaranty of the federal government. Since state and local entities issue municipal bonds, performance on these bonds does not have the same degree of safety. Since the interest income on municipal bonds is not subject to federal taxes, the taxable equivalent yield is used for comparison.

Key characteristics of the Treasury Notes and Bonds are described here. Debt of federal agencies has become a very significant component of the debt market. Major issuers of agency debt are described. Municipal bonds issued by state and local governments can be general obligation bonds or revenue bonds. General obligation bonds are considered less risky since they are backed by the full taxing power of the government entity. Revenue from specific projects is dedicated to revenue bonds. Interest income on most municipal bonds is not subject to taxes. To compare the yield on municipals with other taxable securities the taxable equivalent yield is used.

Bonds issued by private corporations are subject to greater default risk than bonds issued by government entities. Corporate bonds often contain imbedded options such as the call feature which allows an existing corporation to repurchase the bond from issuers when rates have fallen. Bonds backed by mortgages have grown to compose a major element of the bond market. Such bonds can represent proportional shares of a

pool of mortgages or specific portion of a pool of mortgages. The mortgage backed market has grown rapidly in recent years.

2.3. Equity Securities

Two key points are relevant in the discussion of equity instruments. First, it should be emphasized that with the issue of common stock owners having a residual claim to the earnings of the firm. The priorities of debt holders and preferred stockholders are contrasted with common shareholders. Second, the differences in preferred stock and common stock dividends should be emphasized. Preferred shareholders have a priority claim to income in the form of dividends. Preferred stockholders are limited to the fixed dividend while common shareholders do not have limits. The partial tax exemption on dividends of one corporation being received by another corporation is important in discussing preferred stock. A brief discussion on depository receipts can introduce international investing to the students.

2.4 Stock and Bond Market Indexes

The uses of stock indexes provide a good starting point for the discussion of the structure and construction of stock indexes. Motivational factors include tracking average returns, making comparisons of managers' performance to average performance and, increasingly, indexes are used as a base for derivative instruments. Discussion of the factors in constructing or using an index focuses the students' attention on key differences in the indexes. For example, the DJIA captures the returns from the bluest of blue chips. Tables 2.3 and 2.4 are useful ways to introduce the construction of an index.

The major factor to contrast in the discussion is whether the index is price weighted or market value weighted. The third possibility is equal weighting. While this method is not too commonly observed in published indexes, it is commonly used in research. Example 2.2 provides an example of price weighting which is used in the DJIA. An example of a broad-based index is the Standard & Poor Index. It provides an example of a market-value-weighted index as compared to the price-weighted average computed in Example 2.2. The examples of market-value indexes used in the text shows their diversity. The Wilshire, being the broadest of the indexes, captures the overall domestic market.

The international indexes represent the most popular indexes used by investors. They include only a small example of what it available but they are representative of the major types of indexes and major countries. The text has several examples of greater detail in several exhibits.

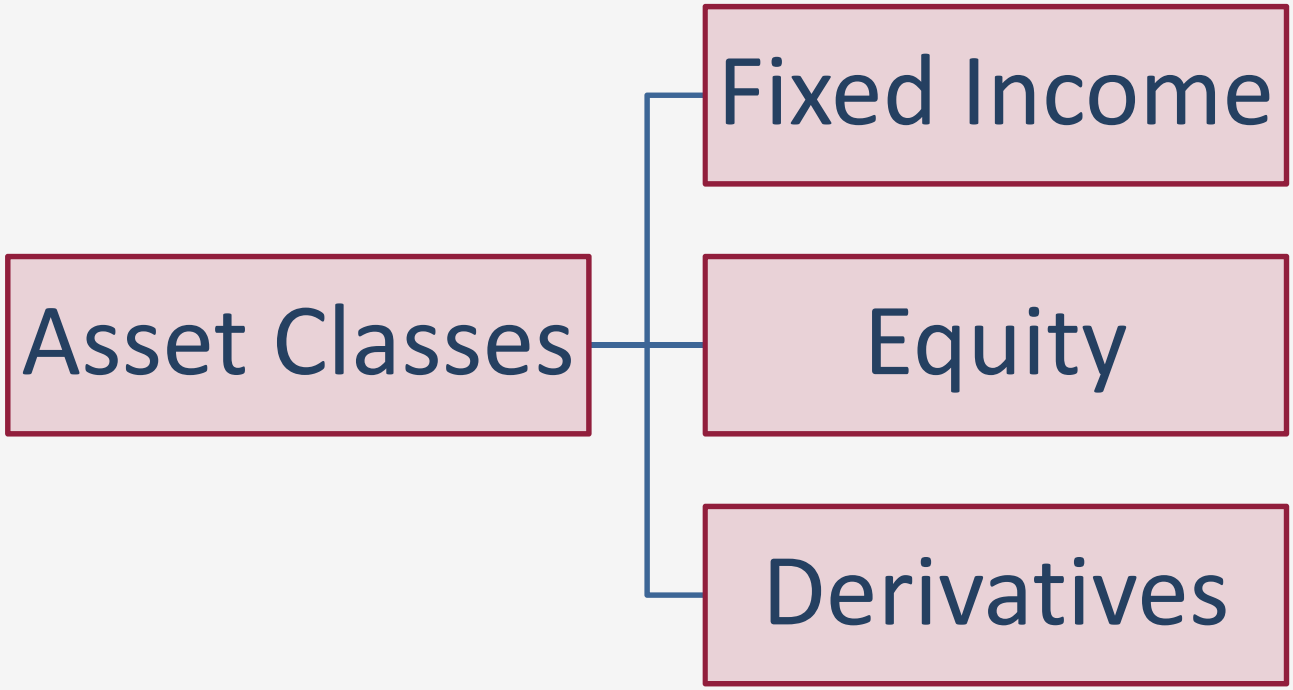
2.5 Derivative Markets

Basic positions and terms for options and futures are described here. The basic positions and terms are used to contrast the differences in futures and options. The essential difference is that while an option confers the right but not the requirement to exercise, a futures contract represents a firm commitment to buy or sell for future delivery. The text provides discussion of options for individual stocks and on agricultural futures contracts. The extension to discussion of other assets enhances understanding of the uses and differences of options and futures.

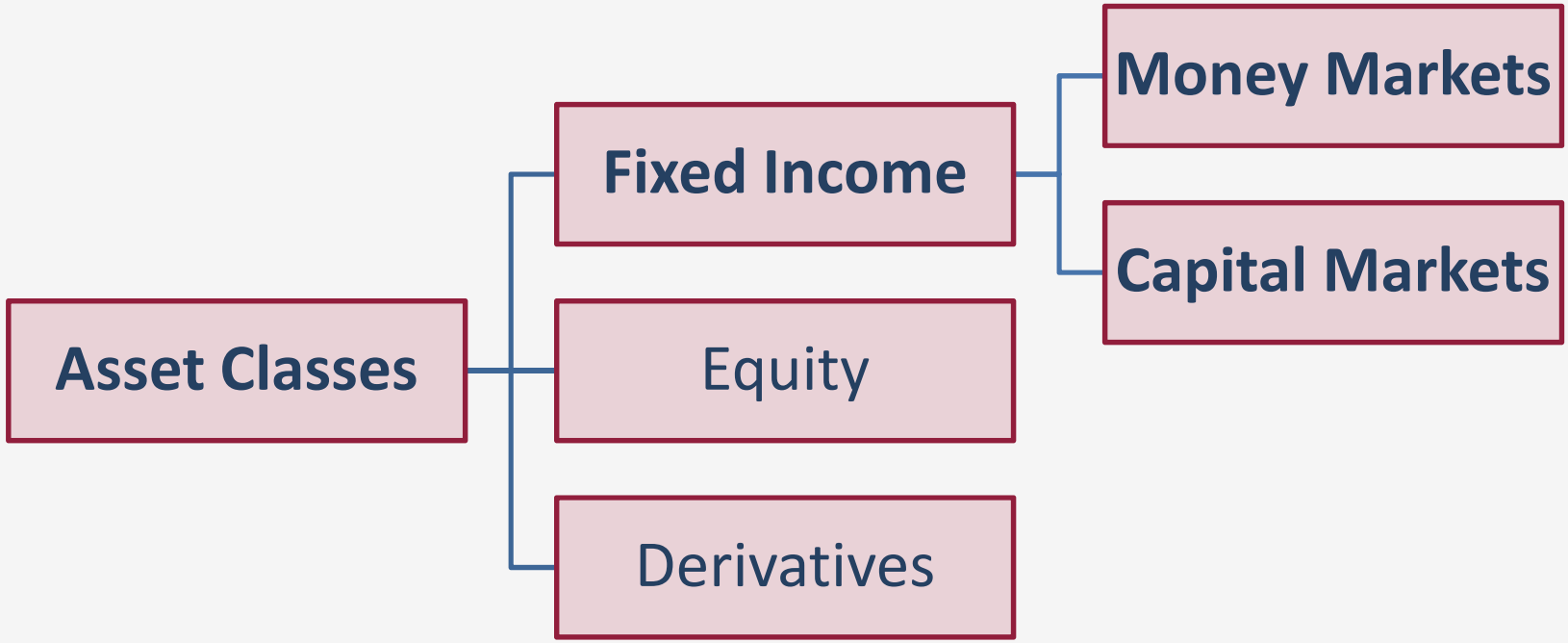
Chapter Two

Asset Classes and Financial Instruments

Chapter Overview



Fixed Income



The Money Market

- Subsector of the fixed-income market
  - Short-term
  - Liquid
  - Low risk
  - Often have large denominations

Major Components of the Money Market

Table 2.1

Major components of the money market

	$ Billion
Federal funds and repurchase agreements	$3,748
Small-denomination time deposits and savings deposits*	8,991
Large-denomination time deposits†	1,865
Treasury bills	1,527
Commercial paper	1,120
Money market mutual funds	2,716

*Small-denomination time deposits are less than $100,000.
†Large-denomination time deposits are greater than $100,000.
Sources: *Flow of Funds Accounts of the United States,* Board of Governors of the Federal Reserve System, March 2016.

Money Market Securities
(1 of 2)

- Treasury bills:
  - Bid and asked price
  - Bank discount method
- Certificates of deposit:
- Commercial paper:

Money Market Securities
(2 of 2)

- Bankers' Acceptances:
- Eurodollars:
- Repos and reverses:
- Federal funds:

Yields on Money Market Instruments

- Money market securities are not free of default risk

- The premium on bank CDs and the TED spread have often become greater during periods of financial crisis

Spread between 3-month CD and Treasury Bills

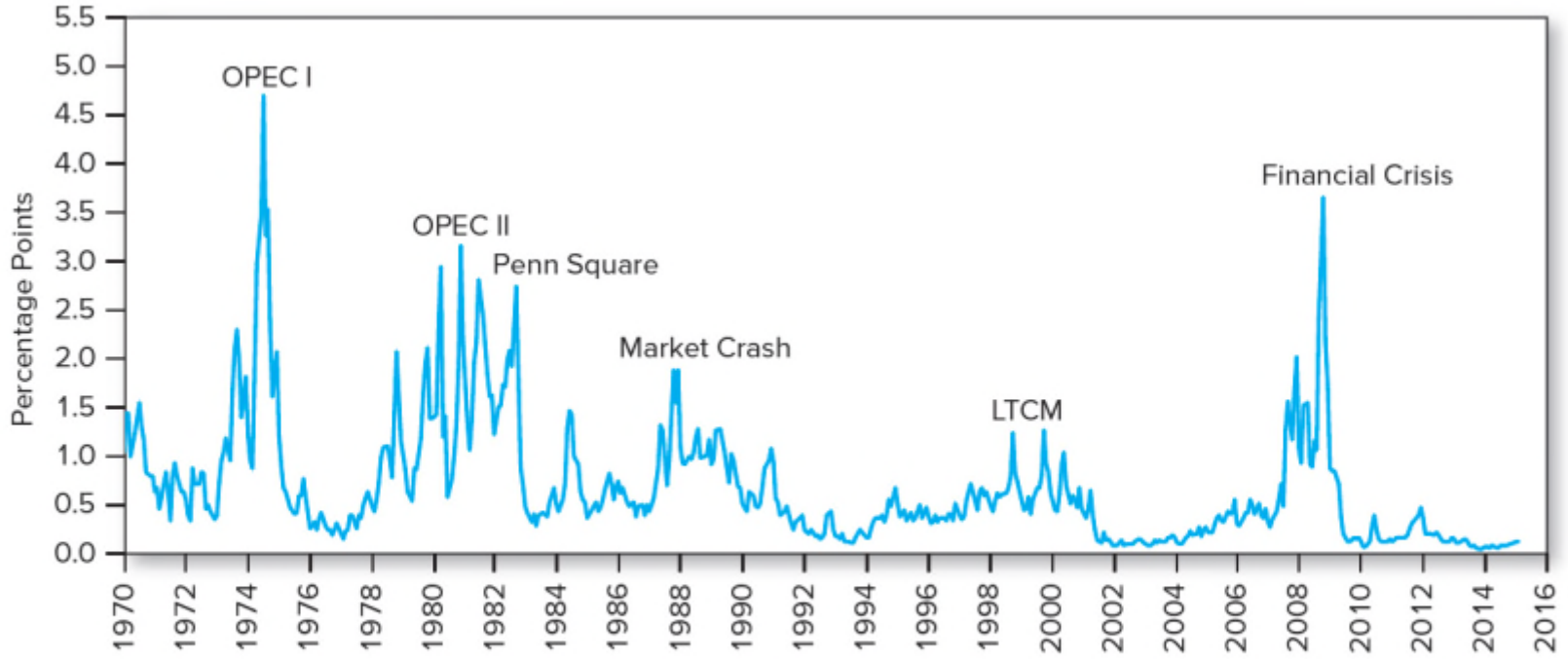


Figure 2.2 The spread between 3-month CD and Treasury bill rates

The Capital Market
(1 of 2)

The Capital Market
(2 of 2)

- Subsector of the fixed-income market
  - Long-Term
  - Liquid
  - Low risk (but not as low as the Money Market)

Capital Market: Treasury Notes and Bonds

- Treasury Notes and Bonds
  - Maturities
    - Notes –
    - Bonds –
  - Par Value — $1,000
  - Interest paid semiannually
  - Quotes — Percentage of par

Capital Market Securities

- Inflation-Protected Treasury Bonds
  - TIPS:
- Federal Agency Debt
  - Fannie Mae
  - Freddie Mac
  - Others
- International Bonds
  - Eurobonds and Yankee bonds

Capital Market: Municipal Bonds

- Municipal Bonds
  - Issued by state and local governments
  - Interest is exempt from federal income tax and sometimes from state and local tax
  - Types
    - General obligation bonds:
    - Revenue bonds:

Tax-Exempt Debt Outstanding

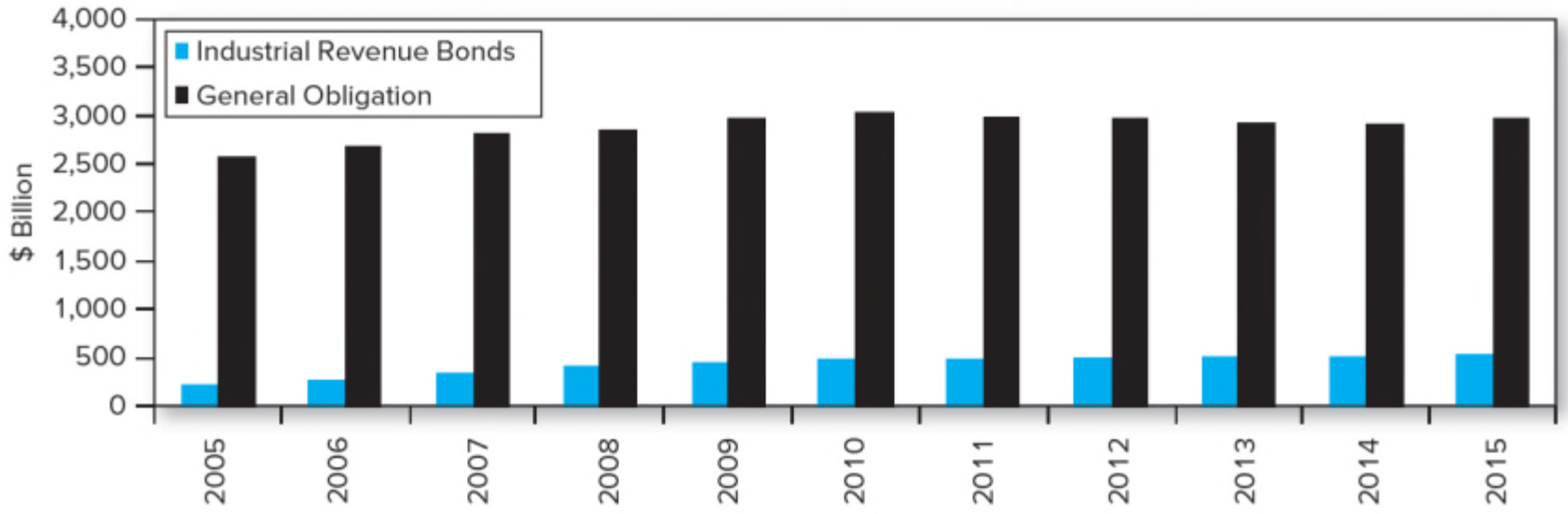


Figure 2.4 Tax-exempt debt outstanding

Source: *Flow of Funds Accounts of the United States*, Board of Governors of the Federal Reserve System, March, 2016.

Municipal Bond Yields
Taxable vs. Tax-Exempt Bonds

- Compare after-tax returns on each bond
  - Let t = investor's marginal tax bracket
  - Let r = the before-tax return on the taxable bond
  - Let r_m = the municipal bond rate
  - If

$$r \times (1 - t) > r_m$$

then the taxable bond gives a higher return; otherwise, the municipal bond is preferred

Tax-Exempt Yield Table

	Tax-Exempt Yield				
Marginal Tax Rate	**1%**	**2%**	**3%**	**4%**	**5%**
20%	1.25%	2.50%	3.75%	5.00%	6.25%
30	1.43	2.86	4.29	5.71	7.14
40	1.67	3.33	5.00	6.67	8.33
50	2.00	4.00	6.00	8.00	10.00

Table 2.2

Equivalent taxable yields corresponding to various tax-exempt yields

Capital Market: Corporate Bonds

- Corporate Bonds
  - Issued by private firms
  - Semi-annual interest payments
  - Larger default risk than government securities
  - Options in corporate bonds
    - Callable
    - Convertible

Capital Markets: Mortgage Backed Securities

- Mortgage-Backed Securities
  - Proportional ownership of a mortgage pool or a specified obligation secured by a pool
  - Produced by securitizing mortgages
  - Most were issued by Fannie Mae and Freddie Mac

Bond Market Securities

- Mortgage-Backed Securities
  - Traditionally *conforming mortgages*
  - Later, “private-label” issuers securitized large amounts of *subprime mortgages*
  - Fannie and Freddie were allowed and even encouraged to buy subprime mortgage securities

Mortgage-Backed Securities Outstanding

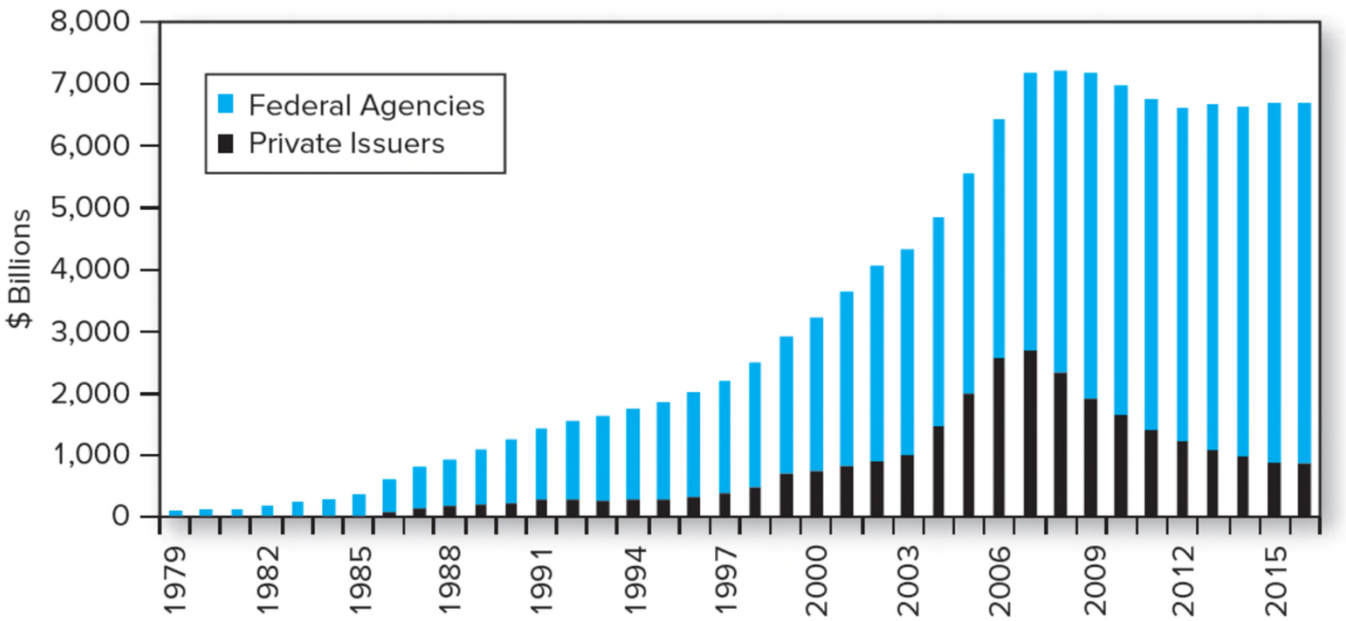


Figure 2.6 Mortgage-backed securities outstanding

Source: *Flow of Funds Accounts of the United States,* Board of Governors of the Federal Reserve System, March 2016.

U.S. Fixed-Income Market

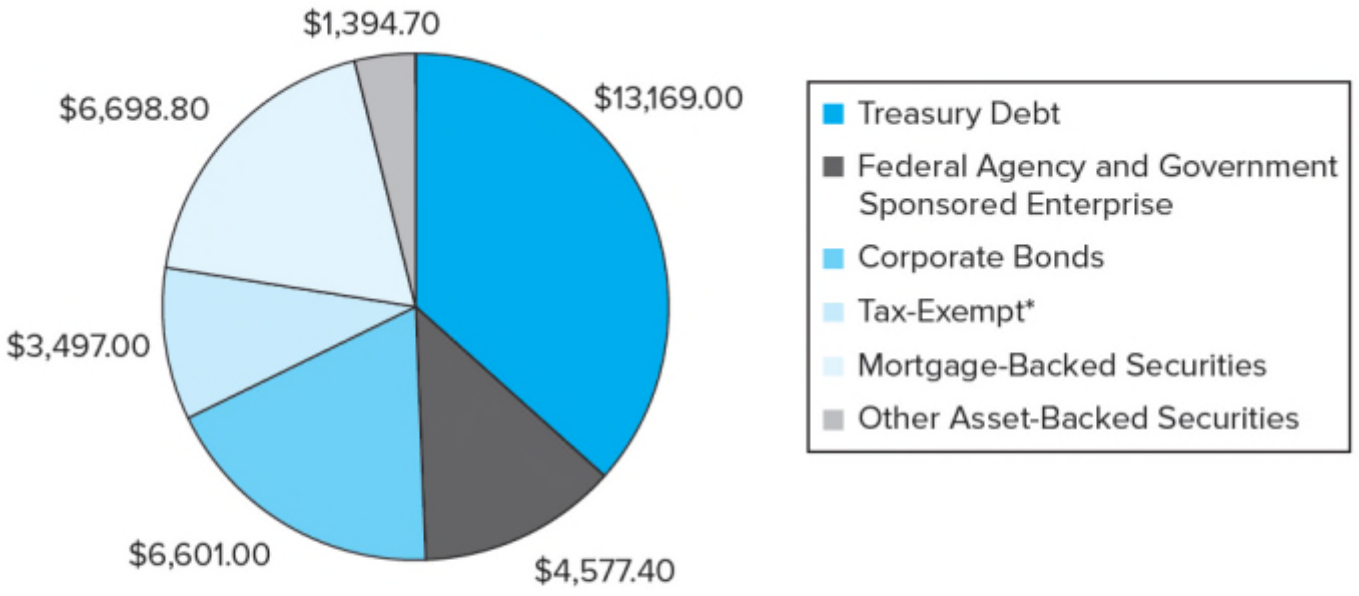
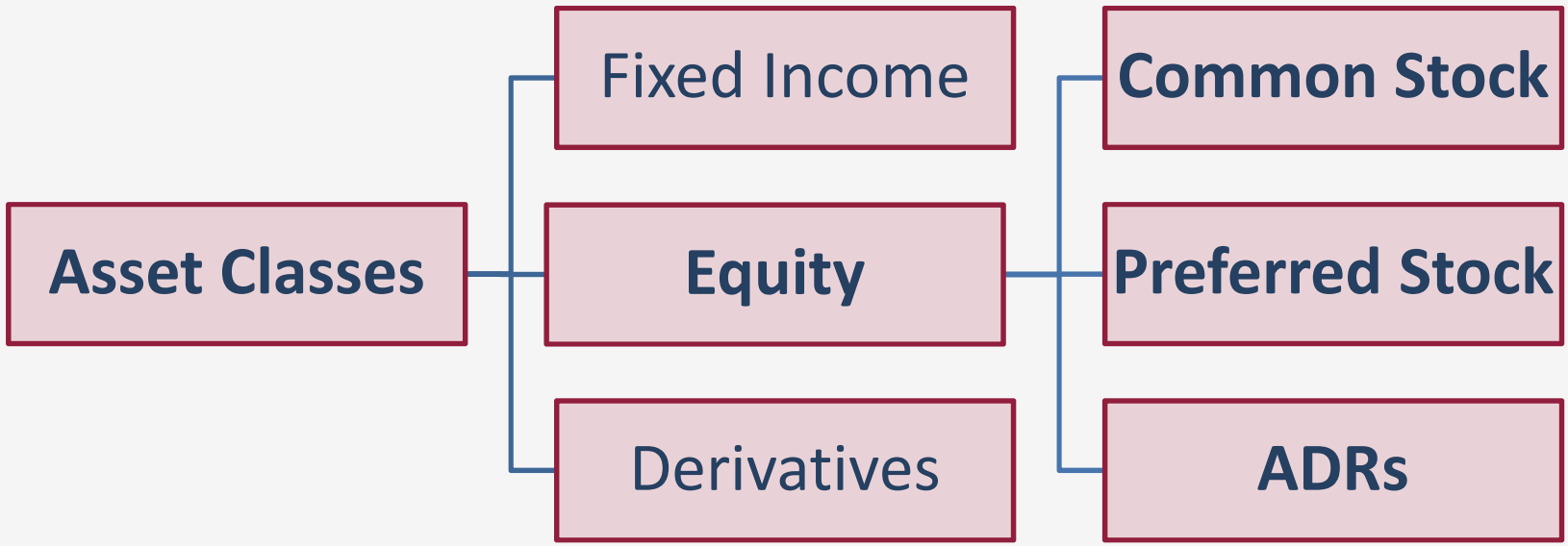


Figure 2.9 The U.S. fixed-income market (values in $ billions)

Source: *Flow of Funds Accounts of the United States: Flows & Outstandings*, Board of Governors of the Federal Reserve System, March 2016.

Equity



Equity Securities: Common Stock

- Common stock
  - Ownership
  - Residual claim
  - Limited liability

Equity Securities: Preferred Stock

- Preferred stock:
  - Perpetuity
  - Fixed dividends
  - Priority over common
  - Tax treatment

Equity Securities: ADR

- American Depository Receipts (ADR)
  - Certificates traded in U.S. markets that represent ownership in shares of a foreign company

Stock Basics

- Dividend Yield:
- Capital Gains:
- P/E Ratio:

Stock Market Indices

- Dow Jones Industrial Average
  - Includes 30 large blue-chip corporations
  - Computed since 1896
  - Price-Weighted Index
- S&P 500
  - Broad based index of 500 firms
  - Market-Value-Weighted Index

Stock Market Indexes

- Investors can base their portfolios on an index
  - Buy an index mutual fund
  - Buy exchange-traded funds (ETFs)

Other Indices

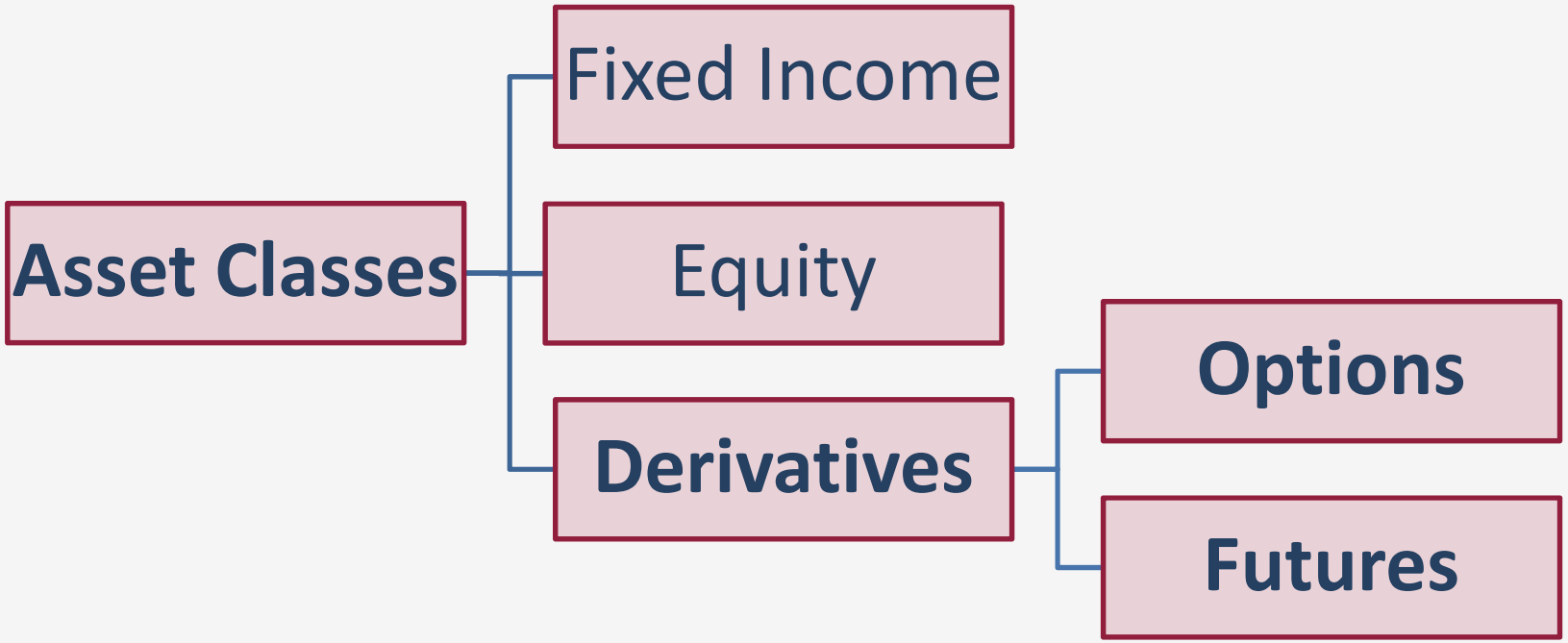
U.S. Indexes

- NYSE Composite
- NASDAQ Composite
- Wilshire 5000

Foreign Indexes

- Nikkei (Japan)
- FTSE (U.K.; pronounced "footsie")
- DAX (Germany),
- Hang Seng (Hong Kong)
- TSX (Canada)

Derivatives



- A derivative is a security that gets its value from the value of another asset, such as commodity prices, bond and stock prices, or market index values

Derivatives Markets: Options

- *Call Option*:
  - Right to buy underlying asset at the strike price
  - Value of calls decreases as strike price increases
- *Put Option*:
  - Right to sell underlying asset at the strike price
  - Value of puts increase with strike price
- Both calls and puts increases with time until expiration

Derivatives Markets: Futures

- Futures Contracts:
  - *Long position:*
  - *Short position:*

Comparison

Option

- Right, but not obligation, to buy or sell
- Option is exercised only when it is profitable
- Options must be purchased
- The *premium* is the price of the option itself

Futures Contract

- Obliged to make or take delivery
- Long (short) position must buy (sell) at the futures price
- Futures contracts are entered into without cost