Essentials of Investments 10th edition Bodie Solutions Manual

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CHAPTER 2
ASSET CLASSES AND FINANCIAL INSTRUMENTS

1. Common stock is an ownership share in a publicly held corporation. Common shareholders have voting rights and may receive dividends. Preferred stock represents nonvoting shares in a corporation, usually paying a fixed stream of dividends. While corporate bonds are long-term debt issued by corporations, the bonds typically pay semi-annual coupons and return the face value of the bond at maturity.

2. While the DJIA has 30 large corporations in the index, it does not represent the overall market nearly as well as the more than 5000 stocks contained in The Wilshire index. The DJIA is simply too small.

3. Money market securities are short-term, relatively low risk, and highly liquid. Also, their unit value almost never changes.

4. The major components of the money market are Treasury bills, certificates of deposit, commercial paper, bankers' acceptances, Eurodollars, repos, reserves, federal funds, and brokers' calls.

5. American Depositary Receipts, or ADRs, are certificates traded in U.S. markets that represent ownership in shares of a foreign company. Investors may also purchase shares of foreign companies on foreign exchanges. Lastly, investors may use international mutual funds to own shares indirectly.

6. The coupons paid by municipal bonds are exempt from federal income tax and from state tax in many states. Therefore, the higher the tax bracket that the investor is in, the more valuable the tax-exempt feature to the investor.

7. The London Interbank Offer Rate (LIBOR)—a key reference rate in the money market—is the rate at which large banks in London are willing to lend money among themselves. The Fed funds rate is the rate of interest on very short-term loans among financial institutions in the U.S.

8. General obligation bonds are backed by the taxing power of the local governments, while revenue bonds have proceeds attached to specific projects. A revenue bond has fewer guarantees, it is riskier in terms of default, and, therefore, you expect it to have a higher yield.

9. Corporations may exclude 70% of dividends received from domestic corporations in the computation of their taxable income.

10. Limited liability means that the most shareholders can lose in event of the failure of the corporation is their original investment.

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11. (a) A repurchase agreement is the sale of a security with a commitment to repurchase the same security at a specified future date and a designated price.

12. Money market securities are referred to as "cash equivalents" because of their great 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.

13. Equivalent taxable yield = $\frac{\text{Rate on municipal bond}}{1 - \text{Tax rate}} = \frac{r_m}{1 - t} = \frac{.0675}{1 - 0.35} = .1038$ or 10.38%

14. After-tax yield = Rate on the taxable bond x (1 - Tax rate)

    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 4% yield on the municipal bond.

    b. The taxable bond. The after-tax yield for the taxable bond is: 0.05 x (1 – 0.10) = 0.045 or 4.50%.

    c. Neither. The after-tax yield for the taxable bond is: 0.05 x (1 – 0.20) = 0.4 or 4%. The after-tax yield of taxable bond is the same as that of the municipal bond.

    d. The municipal bond. The after-tax yield for the taxable bond is: 0.05 x (1 – 0.30) = 0.035 or 3.5%. The municipal bond offers the higher after-tax yield for investors in tax brackets above 20%.

15. The after-tax yield on the corporate bonds is: 0.09 x (1 – 0.30) = 0.063 or 6.3%. Therefore, the municipals must offer at least 6.3% yields.

16. Using the formula of Equivalent taxable yield (r) = $\frac{r_m}{1 - t}$, we get:

    a. $r = \frac{0.04}{1 - 0} = 0.04$ or 4.00%

    b. $r = \frac{0.04}{1 - 0.10} = 0.0444$ or 4.44%

    c. $r = \frac{0.04}{1 - 0.20} = 0.05$ or 5.00%

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d. $r = \dfrac{0.04}{1 - 0.30} = 0.0571$ or 5.71%

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17.

a. You would have to pay the asked price of:
121.41 = 121.41% of par = $1,214.14

b. The coupon rate is 4.50%, implying coupon payments of $45.00 annually or, more precisely, $22.50 (= 45.00/2) semiannually.

c. Given the asked price and coupon rate, we can calculate current yield with the formula:

$$\text{Current yield} = \frac{\text{Annual coupon income}}{\text{Price}} = 4.50/121.14 = 0.0371 = 3.71\%$$

18.

a. The closing price today is $127.75, which is $0.90 above yesterday's price.
Therefore, yesterday's closing price was: $127.75 - $0.90 = $126.85.

b. You would buy 39 shares: $5,000/$127.75 = 39.14.

c. Your annual dividend income on 39 shares would be 39 x $2.48 = $96.72.

d. Earnings per share can be derived from the price-earnings (PE) ratio:
Given price/Earnings = 19.30 and Price = $127.75, we know that Earnings per Share = $127.75/19.30 = $6.62.

19.

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 = 83.33
The rate of return is: $\frac{V_1}{V_0} - 1 = (83.33/80) - 1 = 0.0417$ or 4.17%

b. In the absence of a split, stock C would sell for $110, and the value of the index would be the average price of the individual stocks included in the index: ($95 + $45 + $110)/3 = $83.33.

After the split, stock C sells at $55; however, the value of the index should not be affected by the split. We need to set the divisor (d) such that:
83.33 = ($95 + $45 + $55)/d
d = 2.34

c. The rate of return is zero. The value of the index remains unchanged since the return on each stock separately equals zero.

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20.

a. Total market value at $t = 0$ is:
($90 x 100) + ($50 x 200) + ($200 x 100) = $39,000

Total market value at $t = 1$ is:
($95 x 100) + ($45 x 200) + ($110 x 100) = $40,500

Rate of return = $\frac{V_1}{V_0}$ - 1 = ($40,500/$39,000) – 1 = 0.0385 or 3.85%

b. The return on each stock is as follows:

$R_A = \frac{V_1}{V_0}$ - 1 = ($95/$90) – 1 = 0.0556 or 5.56%

$R_B = \frac{V_1}{V_0}$ - 1 = ($45/$50) – 1 = –0.10 or –10.00%

$R_C = \frac{V_1}{V_0}$ - 1 = ($110/$100) – 1 = 0.10 or 10.00%

The equally-weighted average is: [5.56% + (–10.00%) + 10.00%]/3 = 1.85%

21. The fund would require constant readjustment since every change in the price of a stock would bring the fund asset allocation out of balance.

22. In this case, the value of the divisor will increase by an amount necessary to maintain the index value on the day of the change. For example, if the index was comprised of only one stock, it would increase by 2.06 points: ($180 – $34) / $34 = 4.29.

23. Bank discount of 87 days: $0.034 \times \frac{87 \text{ days}}{360 \text{ days}} = 0.008217$

a. Price: $10,000 x (1 – 0.008217) = $9,917.83

b. Bond equivalent yield = $\frac{\text{Face value} - \text{Purchase price}}{\text{Purchase price x T}}$

$$= \frac{\$10{,}000 - \$9{,}917.83}{\$9{,}917.83 \times \frac{87 \text{ days}}{365 \text{ days}}} = 0.0348 \text{ or } 3.48\%$$

24.

a. The higher coupon bond: The 10-year T-bond with a 10% coupon
b. The call with the lower exercise price: The call with the exercise price of $35
c. The put option on the lower priced stock: The put on the stock selling at $50

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25.

a. The December maturity futures price is $3.88 per bushel. If the contract closes at $3.95 per bushel in December, your profit / loss on each contract (for delivery of 5,000 bushels of corn) will be: ($3.95 – $3.88) x 5000 = $ 337.50 gain.

b. There are 99,741 contracts outstanding, representing 498,705,000 bushels of corn.

26.

a. Yes. As long as the stock price at expiration exceeds the exercise price, it makes sense to exercise the call.
Gross profit is: ($102 – $100) x 100 shares = $200
Net profit = ($2 – $2.62) x 100 shares = $62 loss
Rate of return = –$.62/$2.62 = –0.2366 or 23.66% loss

b. Yes, exercise.
Gross profit is: ($102 – $95) x 100 shares = $700
Net profit = ($7 – $6.35) x 100 shares = $65 gain
Rate of return = $65/$6.35 = 0.1024 or 10.24 % gain

c. A put with an exercise price of $100 would expire worthless for any stock price equal to or greater than $100. An investment in such a put would have a rate of return over the holding period of –100%.

27.

a. Long call
b. Long put
c. Short put
d. Short call

28. There is always a chance that the option will expire in the money. Investors will pay something for this chance of a positive payoff.

29. Long call for $4:

	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

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Long put for $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

30. The spread will widen. Deterioration of the economy increases credit risk, that is, the likelihood of default. Investors will demand a greater premium on debt securities subject to default risk.

31. Six stocks have a 52-week high at least 40% above the 52-week low. It can be concluded that individual stocks are much more volatile than a group of stocks.

52-wk high	52-wk low	Price ratio (High-Low)/Low
46.84	36.13	0.30
76.82	56.57	0.36
32.44	14.02	1.31
37.39	25.5	0.47
69.87	45.27	0.54
14.07	12.12	0.16
19.77	15.01	0.32
62.5	39.01	0.60
34.61	20.21	0.71
128.34	83.61	0.53
28.09	23.5	0.20

32. The total before-tax income is $4. The corporations may exclude 70% of dividends received from domestic corporations in the computation of their taxable income; the taxable income is therefore: $4 x 30% = $1.20.
Income tax in the 30% tax bracket: $1.2 x 30% = $0.36
After-tax income = $4 – $0.36 = $3.64
After-tax rate of return = $3.64/$40 = 0.091 or 9.10%

33. 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.

34. 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.

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CFA 1

Answer: c. Taxation

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CHAPTER TWO
ASSET CLASSES AND FINANCIAL INSTRUMENTS

CHAPTER OVERVIEW

One of the early investment decisions that must be made in building a portfolio is asset allocation. This chapter introduces some of the major features of different asset classes and some of the instruments within each asset class. The chapter first covers money market securities. Money markets are the markets for securities with an original issue maturity of one year or less. These securities are typically marketable, liquid, low-risk debt securities. These instruments are sometimes called "cash" instruments or "cash equivalents," because they earn little, and have little principal risk. After covering money markets, the chapter discusses the major capital market instruments. The capital market discussion is divided into three parts, long-term debt, equity and derivatives. The construction and purpose of indexes is also covered in the capital markets section.

LEARNING OBJECTIVES

Upon completion of this chapter the student should have an understanding of the various financial instruments available to the potential investor. Readers should understand the differences between discount yields and bond-equivalent yields and some money-market-rate-quote conventions. 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. Finally, the student should have a basic understanding of options and futures contracts.

CHAPTER OUTLINE

PPT 2-2

The major classes of financial assets or securities are presented in PPT slide 2. This material can be used to discuss the chapter outline and the purposes of these markets. Instruments may be classified by whether they represent money market instruments, which are primarily used for savings, or capital market instruments. Savings may be defined as short-term investments that pay a low rate of return but do not risk the principal invested. Capital market investments will entail chance of loss of some or even all of the principal invested but promise higher rates of return that allow significant growth in portfolio value.

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1. Money Market Instruments

PPT 2-3 through PPT 2-11

The major money market instruments that are discussed in the text are presented in PPT 2-4 through PPT 2-11. Treasury bills, certificates of deposit (CDs) and commercial paper are covered in the most detail. The issuer, typical or maximum maturity, denomination, liquidity, default risk, interest type and tax status are presented for these instruments. The majority of undergraduate students will have very little knowledge of the workings of these investments and this is very useful information for them. Generally less detail is provided for bankers' acceptances, Eurodollars, federal funds, LIBOR, repos and the call money rate but the main features of these instruments are covered. PPT slides 2-10 through 2-12 give data on money market rates, the amounts of the different security types and spreads between CDs and T-bills. Notice the big run up in spreads during the financial crisis. Make sure students understand the meaning of credit spreads as this is a major predictor of market conditions. You may wish to reference the following online article: "A Warning From the Bond Market", Heard on the Street, By Justin LaHart, Wall Street Journal Online, April 9, 2009.

Money Market Mutual Funds (MMMF) and the Credit Crisis of 2008:

PPT 2-12 shows that between 2005 and 2008 money market mutual funds (MMMFs) grew by 88%. Why? After years of declining growth rates, MMMF inflows accelerated rapidly as investors fled risky assets during the crisis and sought safety in money funds. However, MMMFs had their own crisis in 2008 after Lehman Brothers filed for bankruptcy on September 15 because some money funds had invested heavily in Lehman commercial paper. On Sept. 16 a MMMF, the Reserve Primary Fund, "broke the buck." What does this mean? MMMF shares normally have a value of $1.00 plus any accrued interest, but fund shares are never supposed to fall below $1.00. Some investors use these funds to pay bills as most have a checking feature and count on the shares maintaining their value. Reserve Primary Fund shares fell below $1.00 as the fund's losses mounted. A run on money market funds ensued. The U.S. Treasury temporarily offered to insure all money funds (for an insurance fee) to stop the run. Assets in these funds total about $3.4 trillion.

Money Market Yields:

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PPT 2-13 through PPT 2-19

Money market yield sample calculations are presented and illustrated in this set of slides. The bank discount rate r_{BD} is compared to the bond equivalent yield r_{BEY} and the effective annual yield r_{EAY}.

r_{BD} is calculated as a return as a percentage of the face value or par value of the instrument and is quoted as annualized without compounding using a 360 day year. r_{BEY} is calculated as a return as a percentage of the initial price of the instrument and is quoted as annualized without compounding using a 365-day year:

$$r_{BD} = \frac{Par - Price}{Par} \times \frac{360}{n} \qquad r_{BEY} = \frac{Par - Price}{Price} \times \frac{365}{n}; \qquad n = \text{maturity in days}$$

The r_{EAY} = holding period return as a percent of price but is annualized with compounding using a 365 day year.

$$r_{EAY} = \left[\left(1 + \frac{Par - Price}{Price}\right)^{365/n}\right] - 1$$

Examples are included with the slides. Note that the following relationship will normally hold: $r_{EAY} > r_{BEY} > r_{BD}$ ceteris paribus.

Money Market Instruments and Yield Type

• Treasury bills	Discount
• Certificates of deposit	BEY*
• Commercial Paper	Discount
• Bankers Acceptances	Discount
• Eurodollars	BEY*
• Federal Funds	BEY*
• Repurchase Agreements (RPs) and Reverse RPs	Discount

* Note that CDs, Euro$ and Federal Funds all use add-on quotes which are not quite the same as BEY, since the add on uses a 360-day year. However, "add ons" are not covered in the text. To convert from add on to BEY use the following: BEY = $r_{add\ on}$ * (365/360)

2. The Bond Market

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PPT 2-20 through PPT 2-29

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

Fixed-income securities have a defined stream of payments or coupons. Treasury notes have a maturity up to and including 10 years; bonds mature beyond 10 years. The minimum denomination is $100, but most have a $1,000 denomination, although many Treasuries are now packaged and sold in multiples of $1,000. Treasury bonds pay interest semiannually with principal repaid at maturity (non-amortizing). Most are callable after an initial call-protection period. Investors pay federal taxes on capital gains and interest income, but interest income is exempt from state and local taxes.

Agency issues have either explicit or implicit backing by the Federal Government and their securities normally carry an interest rate only a few basis points over a comparable-maturity Treasury instrument. Federal agencies have different charters but are generally charged with assisting socially deserving sectors of the economy in obtaining credit. The major example is housing, although farm lending and small business loans are other good examples. However, the major agencies are home-mortgage related, and include the Federal National Mortgage Association (FNMA or Fannie Mae); the Federal Home Loan Mortgage Corporation (FHLMC or Freddie Mac); the Government National Mortgage Association (GNMA or Ginnie Mae); and the Federal Home Loan Banks. GNMA has always been a government agency. GNMA backs pools of FHA- and VA- insured mortgages (for a fee) created by private pool of organizers. FNMA was originally a government agency that provided financing to originators of FHA and VA mortgages, but was privatized in 1968. FHLMC was created in 1972 to assist in financing of conventional mortgages. In September 2008, the federal government took over FNMA and FHLMC and created a new regulator, the Federal Housing Financing Authority. FNMA and FHLMC together finance or back about $6 trillion in home mortgages. This represents about 50% of the U.S. market.

Municipal bonds are issued by state and local governments. Interest on municipal bonds is not taxed at the federal level and is usually not subject to state and local taxes if the investor purchases a bond issued by an entity in their state of residence. To compare corporate yields with municipal yields you must calculate the taxable equivalent yield. The conversion formula is:

$$r_{\text{Tax Exempt}} = r_{\text{Taxable}} \times (1 - \text{Tax Rate})$$

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Municipal bonds may be general obligation (G.O.) or revenue bonds. G.O. bonds are backed by the full taxing power of the issuing municipality, whereas revenue bond payments are collateralized only by the revenue of a specific project and tend to be riskier. Industrial development bonds are municipal issues where the money is used for industrial development in the local municipality. This may involve using the money to assist a specific business to encourage that firm to locate a facility in the municipality.

Private Issues:
Private issues include corporate debt and equity issues and asset-backed securities, including mortgage- backed securities. 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 a call feature which allows an existing corporation to repurchase the bond from issuers when rates have fallen. Some bonds are convertible which allows the bond investor to convert the bond to a set number of shares of common stock. Most bonds are rated by one or more of the major ratings agencies approved by the federal government. The major agencies are Standard & Poors, Moody's and Fitch. The rating measures default risk. The higher the rating the lower the interest rate required to issue the bonds. The two major classes of bonds with respect to default risk are investment grade and speculative grade. Investment grade bonds are much more marketable and carry significantly lower interest rates than speculative grade bonds. Speculative grade bonds are euphemistically called 'junk' bonds. Spreads on junk bonds reached record highs in 2008 and 2009.

The **mortgage market** is now larger than the corporate bond market. Securities backed by mortgages have also grown to compose a major element of the overall bond market. A pass-through security represents a proportional (pro-rata) share of a pool of mortgages. The mortgage-backed market has grown rapidly in recent years as shown in Text Figure 2.6. Originally only **"conforming mortgages"** were securitized and used to back mortgage securities. Conforming mortgages met traditional creditworthiness standards such as a maximum 80% loan-to-value ratio; maximum debt-to-income ratio of around 30%; and a quality-credit score. Until about 2006, Fannie and Freddie only underwrote or guaranteed conforming mortgages. Under political pressure to make housing available to low-income families however, Fannie and Freddie began securitizing and backing subprime mortgages (mortgages to households with insufficient income to qualify for a standard mortgage) and so called "Alt-A" mortgages which lie between conforming and subprime in terms of credit risk. Most of the mortgages in the lower-quality categories originated since 2006 have deteriorated in value. The term "underwater" means the homeowners owe more than the market value of their home, creating an incentive to default. Foreclosures depress local home prices, and add to the credit problems of banks and thrifts that supply mortgage credit, hence the government's efforts to limit the number of foreclosures.

3. Equity Securities

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PPT 2-30 through PPT 2-33

Several key points are relevant in the discussion of equity instruments. First, common stock owners have a residual claim on the earnings (dividends) of the firm. Debt holders and preferred stockholders have priority over common stockholders in the event of distress or bankruptcy. Stockholders do have limited liability and a shareholder cannot lose more than their initial investment. Common stockholders typically have the right to vote on the board of directors and the board can hire and fire managers. Even though stockholders have the right to vote it may be difficult to effect change because of a low concentration of stock holdings among many small investors. For instance in the April 2009 shareholder meeting of Citicorp shareholders all existing directors were reelected even though many shareholders were very vocal in their disapproval of Citicorp's performance (Citicorp had abysmal performance in 2008 and had to be bailed out by the government; most shareholder value was destroyed). Michael Jacobs, a former Treasury official, wrote in The Wall Street Journal that Citicorp had few directors with experience in the financial markets and GE had only one director with experience in a financial institution even though GE Capital is a major component of the firm. Problems at GE Capital led to a loss of GE's AAA credit rating.[1]

Preferred shareholders have a priority claim to income in the form of dividends. Ordinary 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. Preferred and common dividends are not tax deductible to the issuing firm. Corporations are given a tax exemption on 70% of preferred dividends earned.

Capital gains and dividend yields

You buy a share of stock for $50, hold it for one year, collect a $1.00 dividend and sell the stock for $54. What were your dividend yield, capital gain yield and total return? (Ignore taxes)

- Dividend yield: = Dividend / P_{buy} or $1.00 / $50 = 2%
- Capital gain yield: = ($P_{sell} - P_{buy}$)/ P_{buy} or ($54 - $50) / $50 = 8%
- Total return: = Dividend yield + Capital gain yield

2% + 8% = 10%

4. Stock and Bond Market Indexes

[1] "How Business Schools Have Failed Business: Why Not More Education on the Responsibility of Boards?" by Michael Jacobs, The Wall Street Journal Online, April 24, 2009.

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PPT 2-33 through PPT 2-40

Stock indexes are used to track average returns, compare investment managers' performance to an index and as a base for derivative instruments. Key factors to consider in constructing an index include a) what the index is supposed to measure, b) whether a representative sample of firms can be used or whether all firms must be included, c) how the index should be constructed. The examples of domestic indexes displayed in the PPT slides illustrate the diversity of indexes in use. The Wilshire, being the broadest of the indexes, captures the overall domestic market. The DJIA captures the returns from the 'bluest of blue chips' or a sample of very large well-known firms. The sample of domestic indexes also fit well with discussion of uses of the index. If the index will be used to assess the performance of a manager that invests in Small-Cap firms, the DJIA would not be as appropriate a benchmark as the NASDAQ Composite.

The creator of an index must decide how to weight the securities included in the index. Price-weighted indexes use the stock's price as the weight for that security. Price-weighted averages are probably the poorest form of index because high price stocks have a bigger weight in the index (there is no theoretical reason for this) and stock splits arbitrarily reduce that weight. The other choices are market-value weighted (most common) and equal-value weighted. Which of these two is better depends on your objectives. In a value-weighted index the amount invested in each stock in the index is proportional to the market value of the firm. The market value of the firm is the weight for each stock. Changes in the value of larger firms affect the index more than changes in the value of the stock of a firm with smaller market capitalization. Value-weighted indexes are more common and are probably a better indicator of the overall change in stocks' value. The theoretical market portfolio of all risky assets is value weighted. In constructing an equal-weighted index, an equal amount of money is assumed to be invested in each stock. Changes in the value of small firm and large firm stocks affect the index value identically. While not as commonly used in many published indexes, the equal-weighted method is commonly used in research. This method is important in describing results of empirical examinations on market efficiency discussed in later chapters. Also if an investor actually does put equal dollar amounts into various stocks then an equal-weighted index is probably the better benchmark. The PPT slides contain sample calculations of price-weighted, value-weighted and equal-weighted indexes for a simple three-stock index.

5. Derivative Securities

PPT 2-41 through PPT 2-49

Listed call options are explained and illustrated on slides 41 through 49. Calls and puts are

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defined and Text Figure 2.10 is used to illustrate option quotes and very basic option positions. The effect of exercise price and time to expiration on a call and a put are illustrated with this figure. A very basic definition of a futures contract is provided on PPT slide 45. Figure 2.11 is used to illustrate how to read a futures price quote for a corn futures contract.

The main point to emphasize in the option and futures discussion is that futures entail a commitment to a future purchase or sale whereas options give the holder the right to buy (with a call) or sell (with a put) the underlying commodity. The instructor should be aware that options and futures markets are highly competitive. On the whole many futures markets are cheaper and more liquid than options markets. The "right" associated with the option is more expensive.

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Suppose that short-term municipal bonds currently offer y while comparable taxable bonds pay 5%. Which gives you after-tax yield?

ST municipal bond yield	
Taxable bond yield	

Solution

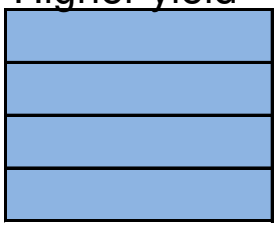
After-Tax Yield = Rate on the Taxable Bond x (1 − Tax Rate)

	Tax bracket	After tax yield on taxable bond
a.		0.00%
b.		0.00%
c.		0.00%
d.		0.00%

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ields of 4%,
the higher

Higher yield



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Turn to Figure 2.8 (listed below) and look at the listing fo
a. What was the firm's closing price yesterday?
b. How many shares could you buy for $5,000?
c. What would be your annual dividend income from tho
d. What must be General Dynamics' earnings per share?

Close	
Net Chg	
Div	
Yield	
PE	
Funds	

Solution

a. Yesterday's closing price = $ -

b. Shares purchased = #DIV/0! rounde

c. Annual dividend = #DIV/0!

d. EPS = #DIV/0!

G	SYMBOL	CLOSE	NET CHG	VOLUME	52 WEEK HIGH	52 WEEK LOW	DIV
Gap	GPS	44.12	0.09	2,696,353	46.84	36.13	0.88
Gartner	IT	76.36	0.02	372,214	76.82	56.57	....
GasLog	GLOG	24.91	1.11	1,291,997	32.44	14.02	0.48
GasLog Partners	GLOP	31.59	1.24	34,738	37.39	25.50	....
GATX	GMT	64.10	0.83	259,151	69.87	45.27	1.32

Gazit-Globe	GZT	12.61	0.26	7,478	14.07	12.12	....
GenCorp	GY	17.31	−0.01	451,629	19.77	15.01	....
Generac Holdings	GNRC	42.72	−0.53	651,462	62.50	39.01	....
General Cable	BGC	20.47	−0.16	983,060	34.61	20.21	0.72
General Dynamics	GD	127.75	0.90	1,244,284	128.34	83.61	2.48
General Electric	GE	26.21	0.29	27,026,512	28.09	23.50	0.88

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or General Dynamics.

se shares?
?

d to the lower share



	YIELD	PE	YTD % CHG
	1.99	15.99	12.90
	....	36.71	7.47
	1.93	40.84	45.76
	....	0.04	20.99
	2.06	14.54	22.87

·	....	1.69	−5.97
·	....	7.58	−3.94
·	....	15.82	−24.58
2	3.52	....dd	−30.40
3	1.94	19.30	33.70
3	3.36	18.23	−6.49

Turn back to Figure 2.10 (listed below) and look at
Suppose you buy an October expiration call option
$100.
a. If the stock price in October is $102, will you exe
are the profit and rate of return on your position?
b. What if you had bought the October call with exe
c. What if you had bought an October put with exer

	Call			P
	Strike	Last	Volume	Last
August				
August				
August				

August stock price

Solution

a.	Gross profit	$	-
	Cost of options	$	-
	Net Profit	$	-
	Rate of return		#DIV/0!
b.	Gross profit	$	-
	Cost of options	$	-
	Net Profit	$	-
	Rate of return		#DIV/0!
c.	Gross profit	$	-

Cost of options	$	-
Net Profit	$	-

Rate of return #DIV/0!

Apple (AAPL)		Underlying stock price = $10	
Expiration	**Strike**	**Call**	**Put**
September	95	6.20	0.21
October	95	6.35	0.33
September	100	2.20	1.18
October	100	2.62	1.55
September	105	0.36	4.35
October	105	0.66	4.75

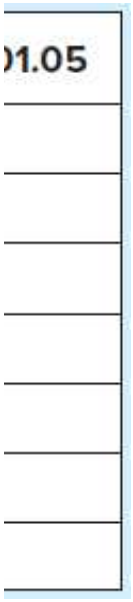
the Apple options.
with exercise price

rcise your call? What

ercise price $95?
rcise price $100?

ut

Volume


01.05

Find the after-tax return to a corporation that buys a share of preferred stock at $40, sells it at year-end at $40, and receives a $4 year-end dividend. The firm is in the 30% tax bracket.

Preferred stock purchase price	
Preferred stock sales price	
Dividend	
Tax bracket	

Solution

Before tax income	$ -
Taxable income	$ -
Income taxes	$ -
After tax income	$ -
After tax rate of return	#DIV/0!

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Chapter

2

Asset Classes and Financial Instruments

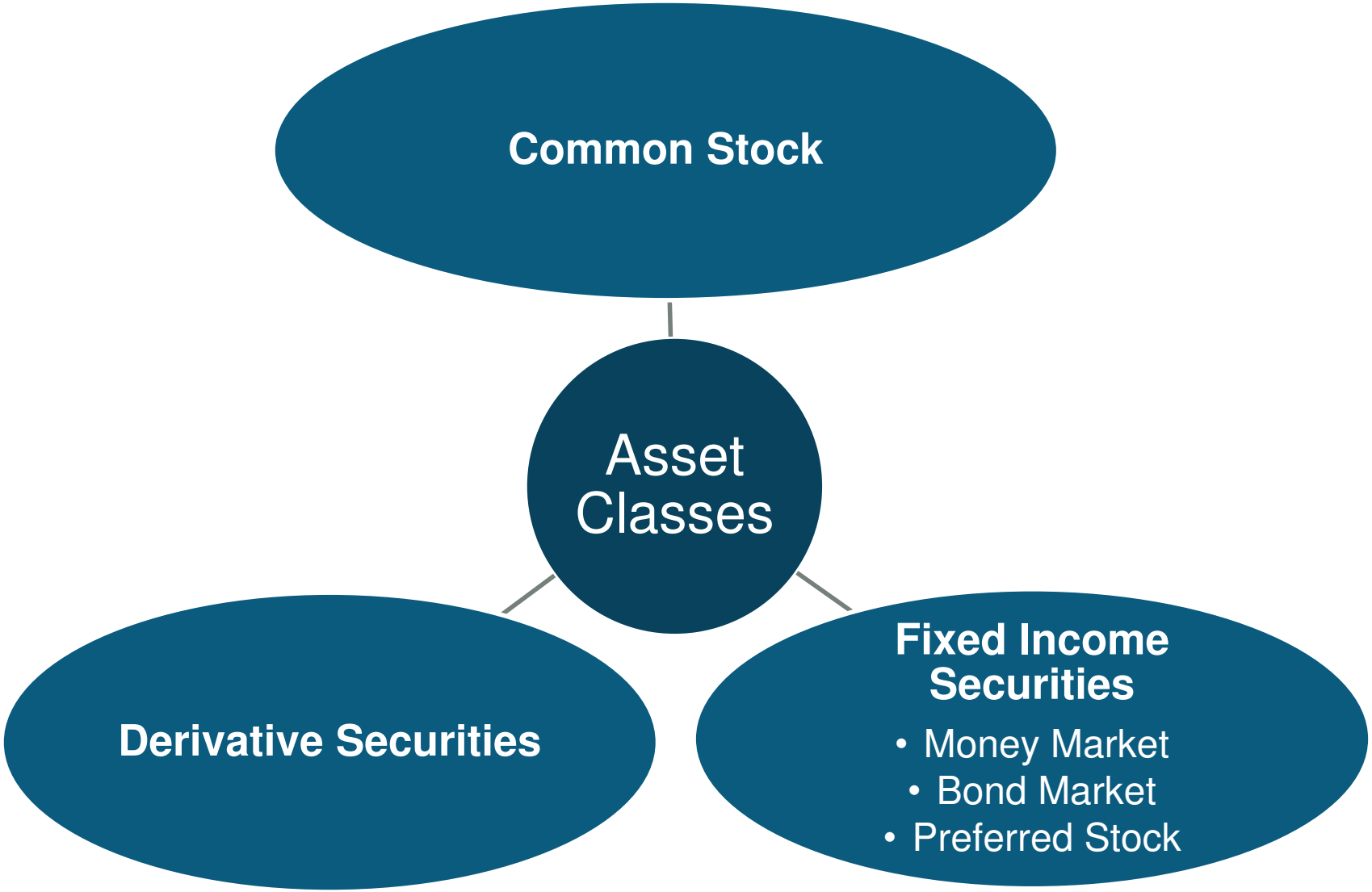
Bodie, Kane, and Marcus

Essentials of Investments

Tenth Edition

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2.1 Asset Classes



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2.1 The Money Market: Instruments

- Treasury Bills
- Certificates of Deposit
- Commercial Paper
- Bankers' Acceptances
- Eurodollars

- Repos and Reverses
- Brokers' Funds
- Federal Funds
- LIBOR (London Interbank Offer Rate)

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2.1 The Money Market: Treasury Bills

	Treasury Bills
Issuer:	Federal Government
Denomination:	Commonly $10,000; $1,000
Maturity:	4, 13, 26 or 52 Weeks
Liquidity:	High
Default Risk:	None
Interest Type:	Discount
Taxation:	Owed: Federal; Exempt: State, Local

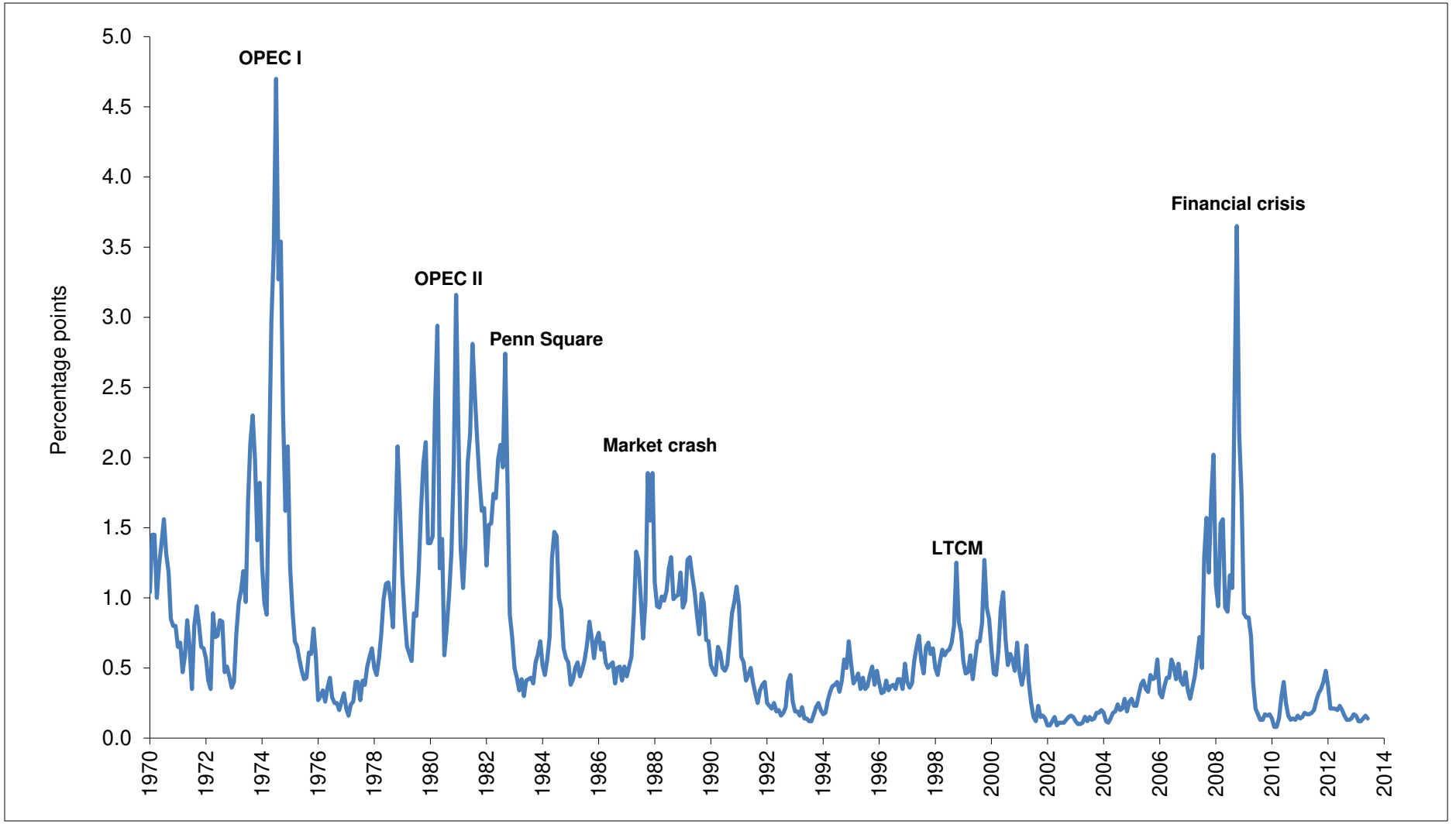
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2.1 The Money Market: Certificates of Deposit (CDs)

	Certificates of Deposit
Issuer:	Depository Institutions
Denomination:	Any, $100,000 or more marketable
Maturity:	Varies, Typically 14-day Minimum
Liquidity:	High for CDs <3 months, if marketable
Default Risk:	First $250,000 FDIC insured
Interest Type:	Add on
Taxation:	Owed: Federal, State, Local

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Figure 2.2 Spreads on CDs and Treasury Bills



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2.1 The Money Market: Commercial Paper

	Certificates of Deposit
Issuer:	Large creditworthy corps.; financial institutions
Denomination:	Minimum $100,000
Maturity:	Maximum 270 days, usually 1-2 months
Liquidity:	CP < 3 months liquid if marketable
Default Risk:	Unsecured, rated, mostly high quality
Interest Type:	Discount
Taxation:	Owed: Federal, State, Local

- New Innovation: Asset-backed commercial paper

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2.1 The Money Market

- Bankers' Acceptances
  - Purchaser authorizes a bank to pay a seller for goods at later date (time draft)
  - When purchaser's bank "accepts" draft, it becomes contingent liability of the bank (and marketable)

- Eurodollars
  - Dollar-denominated time deposits held outside U.S.
  - Pay higher interest rate than U.S. deposits

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2.1 The Money Market

- Federal Funds
  - Trading in reserves held at the Federal Reserve *
  - Key interest rate for economy

- LIBOR (London Interbank Offer Rate)
  - Rate at which large banks in London (and elsewhere) lend to each other
  - Base rate for many loans and derivatives

* Depository institutions must maintain deposits with Federal Reserve Bank

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2.1 The Money Market: Repurchase Agreements

- Repurchase Agreements (RPs)
  - Short-term sales of securities with promise to repurchase at higher price
  - RP is a collateralized loan
  - Many RPs are overnight; “Term” RPs may have a 1-month maturity
- Reverse RPs
  - Lending money; obtaining security title as collateral
  - “Haircuts” may be required depending on collateral

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2.1 The Money Market

- Brokers' Calls
  - Call money rate applies for investors buying stock on margin
  - Loan may be "called in" by broker

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2.1 The Money Market: Credit Crisis

- MMMF and the Credit Crisis of 2008
  - 2005-2008: Money market mutual funds (MMMFs) grew 88%
  - MMMFs had their own crisis in 2008: Lehman Brothers
  - Reserve Primary Fund “broke the buck”
  - Run on money market funds ensued
  - U.S. Treasury temporarily offered to insure all money funds

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2.1 The Money Market: Instrument Yields

- Yields on money market instruments not always directly comparable

- Factors influencing "quoted" yields
  - Par value vs. investment value
  - 360 vs. 365 days assumed in a year (366 leap year)
  - Simple vs. compound interest

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Figure 2.1 Treasury Bills (T-Bills)

Treasury Bills					
MATURITY	DAYS TO MATURITY	BID	ASKED	CHG	ASKED YIELD
28-Nov-2014	73	0.010	0.005	-0.005	0.005
2-Jan-2015	108	0.015	0.010	0.000	0.010
12-Mar-2015	**177**	**0.045**	**0.040**	**0.000**	**0.041**
28-May-2015	254	0.045	0.040	-0.005	0.041
23-Jul-2015	310	0.080	0.075	0.000	0.076

Source: *The Wall Street Journal Online,* September 14, 2014.

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2.1 The Money Market

- Bank Discount Rate (T-bill quotes)

$$r_{BD} = \frac{\$10{,}000 - P}{\$10{,}000} \times \frac{360}{n}$$

$10,000 = Par

r_{BD} = bank discount rate

P = market price of the T-bill

n = number of days to maturity

- Example: 90-day T-bill, $P = \$9{,}875$

$$r_{BD} = \frac{\$10{,}000 - \$9{,}875}{\$10{,}000} \times \frac{360}{90} = 5\%$$

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2.1 The Money Market

- Bond Equivalent Yield
  - Can't compare T-bill directly to bond
    - 360 vs. 365 days
    - Return is figured in par vs. price paid
  - Adjust bank discount rate to make it comparable

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2.1 The Money Market: Bond Equivalent Yield

- Bond Equivalent Yield

P = price of the T-bill

n = number of days to maturity

$$r_{BD} = 5\%$$

$$r_{BEY} = \frac{10{,}000 - P}{P} \times \frac{365}{n}$$

- Example Using Sample T-Bill

$$r_{BEY} = \frac{10{,}000 - 9{,}875}{9{,}875} \times \frac{365}{90}$$

$$r_{BEY} = .0127 \times 4.0556 = .0513 = 5.13\%$$

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2.1 The Money Market: Effective Annual Yield

- Effective Annual Yield

$$r_{EAY} = \left(1 + \frac{\$10{,}000 - P}{P}\right)^{\frac{365}{n}} - 1$$

P = price of the T-bill

n = number of days to maturity

Compare:

r_{BD} = 5%

r_{BEY} = 5.13%

r_{EAY} = 5.23%

- Example Using Sample T-Bill

$$r_{EAY} = \left(1 + \frac{\$10{,}000 - \$9{,}875}{\$9{,}875}\right)^{\frac{365}{90}} - 1$$

$$r_{EAY} = 5.23\%$$

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2.1 The Money Market: Instrument Yield

Money Market Instrument	Instrument Yield
Treasury Bills	Discount
Certificates of Deposit	Bond Equivalent Yield
Commercial Paper	Discount
Bankers' Acceptances	Discount
Eurodollars	Bond Equivalent Yield
Federal Funds	Bond Equivalent Yield
Repurchase Agreements	Discount
Reverse RPs	Discount

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2.2 The Bond Market

- Capital Market—Fixed-Income Instruments

- Government Issues—U.S. Treasury Bonds and Notes
  - Bonds vs. notes
  - Denomination
  - Interest type
  - Risk? Taxation?

- Treasury Inflation Protected Securities (TIPS)
  - Principal adjusted for changes in the Consumer Price Index
  - Marked with a trailing “i” in quote sheets

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Figure 2.3 Listing of Treasury Issues

MATURITY	COUPON	BID	ASKED	CHG	ASKED YLD TO MATURITY
15-Feb-2015	4.000	101.6250	101.6328	-0.0078	0.046
15-May-2017	**4.500**	**109.3516**	**109.3750**	**0.0234**	**0.927**
15-Feb-2020	3.625	108.8906	108.9375	0.0938	1.880
15-Feb-2025	7.625	146.1719	146.2500	0.2031	2.541
15-May-2030	6.250	141.3125	141.3906	0.2734	2.934
15-Feb-2036	4.500	121.3359	121.4141	0.2578	3.121
15-Aug-2044	3.125	95.9297	95.9922	0.1875	3.338

Source: Compiled from data from *The Wall Street Journal Online,* September 16, 2014.

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2.2 The Bond Market: Agency Issues

- Agency issues (federal government)
  - Most are home-mortgage-related: FNMA, FHLMC, GNMA, Federal Home Loan Banks
  - Risks of these securities?
    - Implied backing by the government
    - In September 2008, federal government took over FNMA and FHLMC

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2.2 The Bond Market: Municipal Bonds

- Municipal bonds
  - Issuer?
  - Differ from treasuries and agencies?
    - Risk?
      - G.O. vs. revenue
      - Industrial development
    - Taxation?

$$r_{\text{tax exempt}} = r_{\text{taxable}} \times (1 - \text{Tax rate})$$

r = Interest rate

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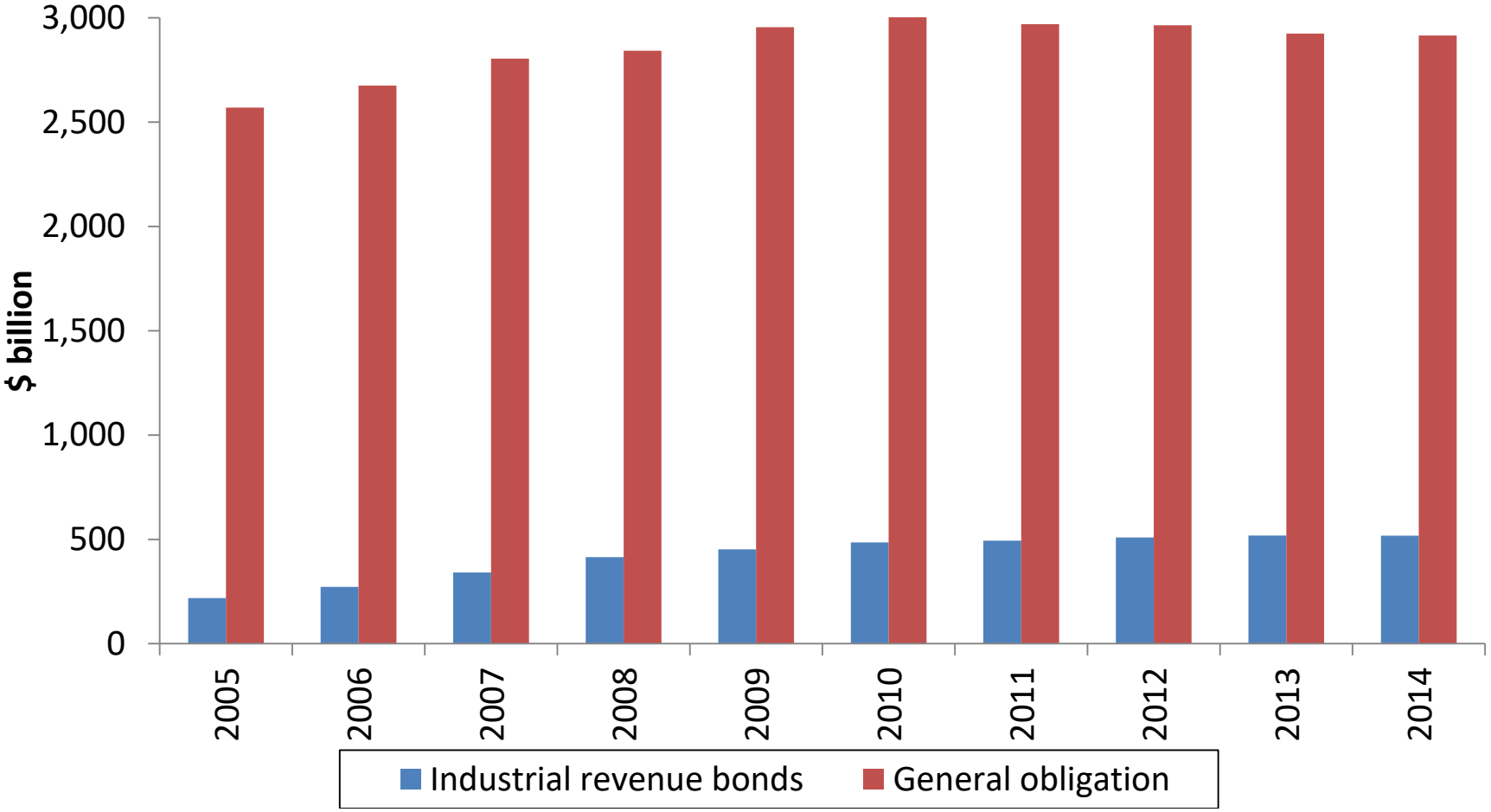
Table 2.2 Equivalent Taxable Yields

	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

$$r_{\text{tax exempt}} = r_{\text{taxable}} \times (1 - \text{Tax rate})$$

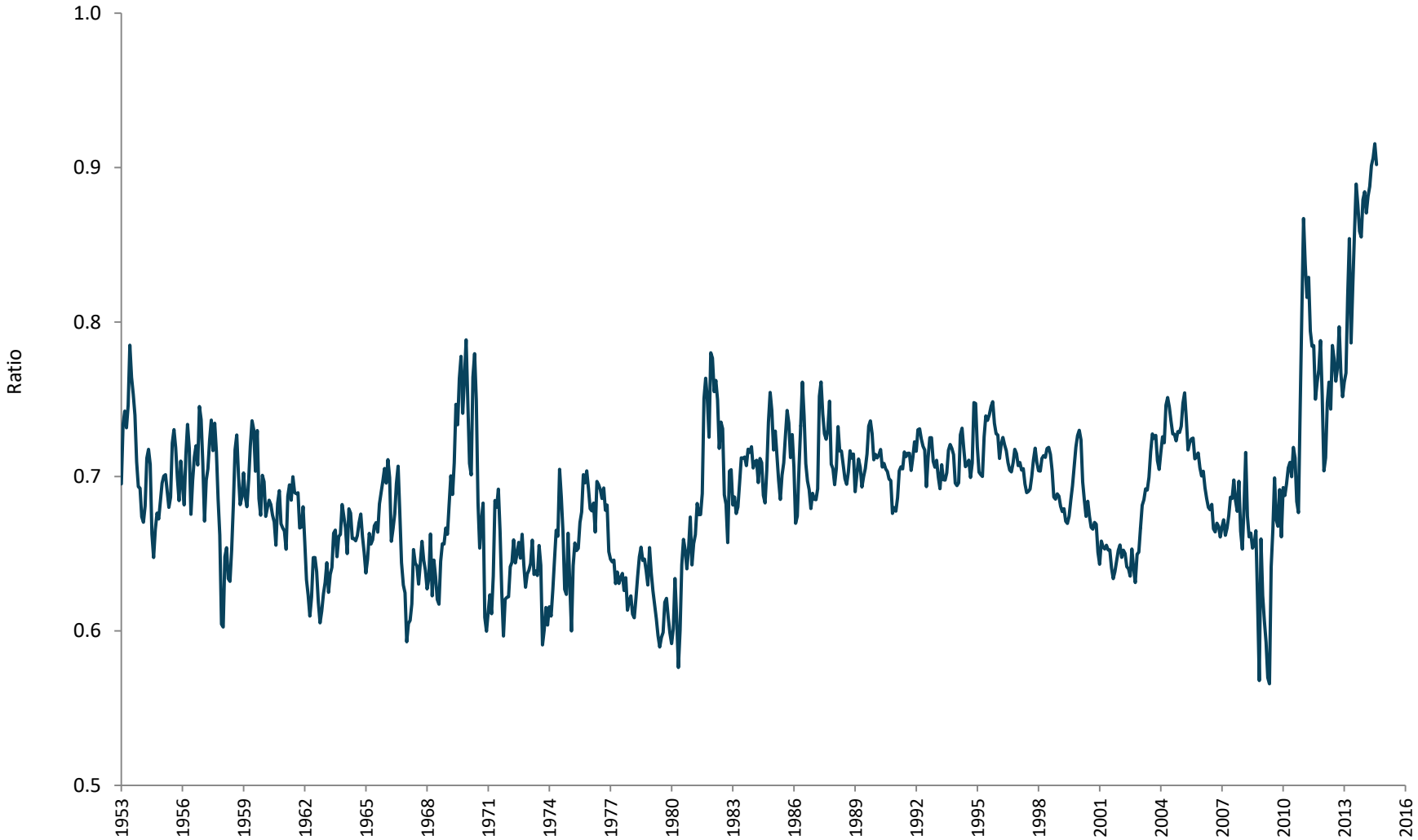
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Figure 2.4 Outstanding Tax-Exempt Debt



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Figure 2.5 Yield Ratio: Tax-Exempt to Taxable Bonds



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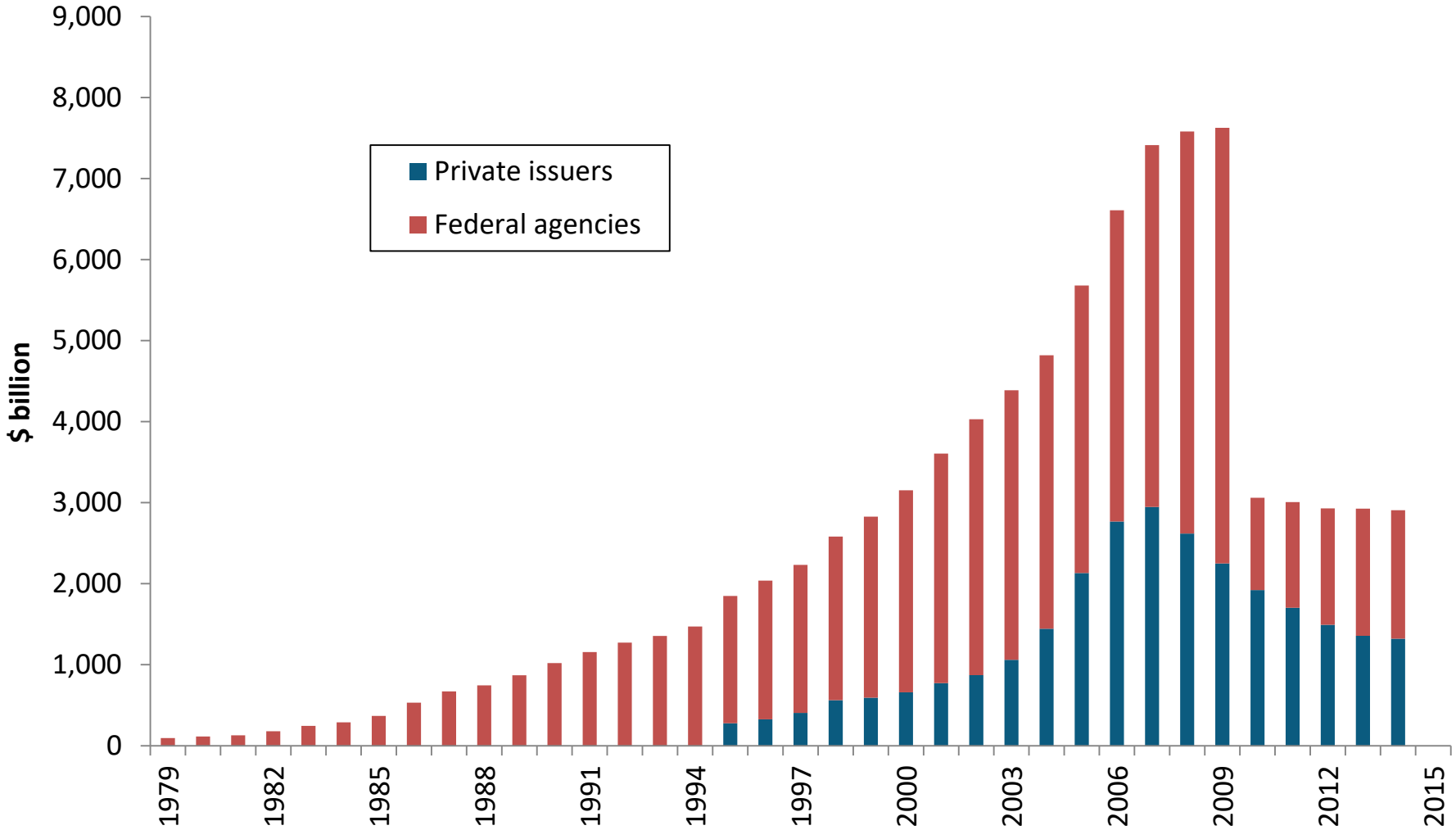
2.2 The Bond Market: Private Issue

- Corporate Bonds
  - Investment grade vs. speculative grade

- Mortgage-Backed Securities
  - Backed by pool of mortgages with “pass-through” of monthly payments; covers defaults
  - Collateral
    - Traditionally all mortgages conform, since 2006 Alt-A and subprime mortgages are included in pools
  - Private banks purchased and sold pools of subprime mortgages
  - Issuers assumed housing prices would continue to rise

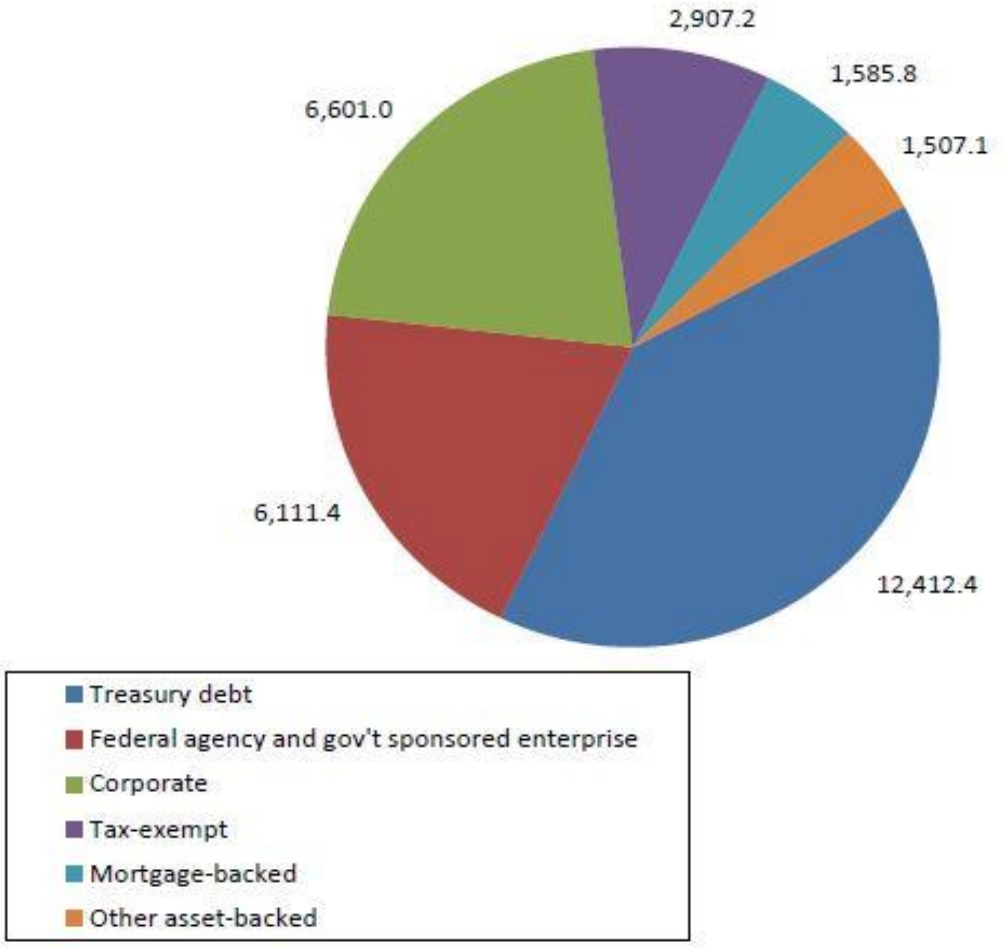
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Figure 2.6 Mortgage-Backed Securities Outstanding



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Figure 2.9 The U.S. Fixed-Income Market



Values in $ billion

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2.3 Equity Securities

- Capital Market-Equity
  - Common stock
    - Residual claim
    - Limited liability
  - Preferred stock
    - Fixed dividends: Limited gains, nonvoting
    - Priority over common
    - Tax treatment: Preferred/common dividends not tax-deductible to issuing firm; corporate tax exclusions on 70% of dividends earned

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2.3 Equity Securities

- Capital Market-Equity
  - Depository receipts
    - American Depositary Receipts (ADRs), also called American Depositary Shares (ADSs)
    - Certificates traded in the U.S. representing ownership in foreign security

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2.3 Equity Securities

- Capital Market-Equity
  - Capital gains and dividend yields
    - Buy a share of stock for $50, hold for 1 year, collect $1 dividend, and sell stock for $54
    - What were dividend yield, capital gain yield, and total return? (Ignore taxes)
    - Dividend yield = Dividend / P_{buy} = $1/$50 = 2%
    - Capital gain yield = (P_{sell} – P_{buy}) / P_{buy} = ($54 – $50)/$50 = 8%
    - Total return = Dividend yield + Capital gain yield = 2% + 8% = 10%

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2.4 Stock and Bond Market Indexes

- Uses
  - Track average returns
  - Compare performance of managers
  - Base of derivatives
- Factors in constructing/using index
  - Representative?
  - Broad/narrow?
  - How is it constructed?

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2.4 Stock and Bond Market Indexes

- Construction of Indexes
  - How are stocks weighted?
    - Price weighted (DJIA)
    - Market value weighted (S&P 500, NASDAQ)
    - Equally weighted (Value Line Index)
  - How much money do you put in each stock in the index?

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2.4 Stock and Bond Market Indexes

- Constructing Market Indexes
  - Weighting schemes
    - Price-weighted average: Computed by adding prices of stocks and dividing by “divisor”
    - Market value-weighted index: Return equals weighted average of returns of each component security, with weights proportional to outstanding market value
    - Equally weighted index: Computed from simple average of returns

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2.4 Stock and Bond Market Indexes

Price-Weighted Series

Stock	Price_B	Quantity_B	P_1	Q_1
A	$10	40	$15	40
B	50	80	25	160
C	140	50	150	50

- Time 0 index value: (10 + 50 + 140)/3 = 200/3 = 66.7
- Time 1 index value: (10 + **25** + 140)/Denom = 66.67
- Denominator = 2.624869
- Time 1 index value: (15 + 25 + 150)/2.624869 = 72.38
- Other problems:
  - Similar % change movements in higher-price stocks cause proportionally larger changes in the index
  - Splits arbitrarily reduce weights of stocks that split in index

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2.4 Stock and Bond Market Indexes

Stock	Price_B	Quantity_B	P_1	Q_1
A	$10	40	$15	40
B	50	80	25	160
C	140	50	150	50

- Value-Weighted Series

$$Index_V = \frac{(15\times 40)+(25\times 160)+(150\times 50)}{(10\times 40)+(50\times 80)+(140\times 50)}\times 100 = 106.14$$

- Equal-Weighted Series
  - wlog invest $300 in each

$$Index_E = \frac{(15\times 30)+(25\times 12)+(150\times 2.143)}{(10\times 30)+(50\times 6)+(140\times 2.143)}\times 100 = 119.05$$

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2.4 Stock and Bond Market Indexes

			Case 1		Case 2	
Stock	P_B	Q_B	P_1	Q_1	P_1	Q_1
A	$10	40	$12	40	$10	40
B	100	80	100	80	100	80
C	50	200	50	200	60	200

- Why do the two differ?
  - Case 1: 20% change in price of small-cap firm

$$Index_V = \frac{(12\times 40)+(100\times 80)+(50\times 200)}{(10\times 40)+(100\times 80)+(50\times 200)}\times 100 = 100.43$$

  - wlog invest $100 in each stock

$$Index_E = \frac{(12\times 10)+(100\times 1)+(50\times 2)}{(10\times 10)+(100\times 1)+(50\times 2)}\times 100 = 106.67$$

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2.4 Stock and Bond Market Indexes

			Case 1		Case 2	
Stock	P_B	Q_B	P_1	Q_1	P_1	Q_1
A	$10	40	$12	40	$10	40
B	100	80	100	80	100	80
C	50	200	50	200	60	200

Case 1 VW = 100.43
Case 1 EW = 106.67

- Why do the two differ?
  - Case 2: 20% change in price of large-cap firm

$$Index_V = \frac{(10\times 40)+(100\times 80)+(60\times 200)}{(10\times 40)+(100\times 80)+(50\times 200)}\times 100 = 110.86$$

  - Assume $100 investment in each stock

$$Index_E = \frac{(10\times 10)+(100\times 1)+(60\times 2)}{(10\times 10)+(100\times 1)+(50\times 2)}\times 100 = 106.67$$

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2.4 Stock and Bond Market Indexes

- Examples of Indexes—Domestic
  - Dow Jones Industrial Average (30 stocks)
  - Standard & Poor's 500 Composite
  - NASDAQ Composite (>3,000 firms)
  - Wilshire 5000 (>6,000 stocks)

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2.5 Derivative Markets

- Derivative Asset/Contingent Claim
  - Security with payoff that depends on the price of other securities
- Listed Call Option
  - Right to buy an asset at a specified price on or before a specified expiration date
- Listed Put Option
  - Right to sell an asset at a specified exercise price on or before a specified expiration date

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Figure 2.10 Stock Options on Apple

Apple (AAPL)		Underlying stock price = $101.05	
Expiration	**Strike**	**Call**	**Put**
September	95	6.20	0.21
October	95	6.35	0.33
September	100	2.20	1.18
October	100	2.62	1.55
September	105	0.36	4.35
October	105	0.66	4.75

Source: www.cboe.com, September 17, 2014

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2.5 Derivative Markets

- Using the Stock Options on Apple (Call)
  - The right to buy 100 shares of stock at a stock price of $95 using the October contract would cost $635 (ignoring commissions)
  - Is this contract “in the money”?
  - When should you buy this contract?
  - Stock price was equal to $101.05; you will make money if stock price increases above $101.05 + $6.35 = $107.40 by contract expiration
  - When should you write it?

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2.5 Derivative Markets

- Using the Stock Options on Apple (Put)
  - The right to buy 100 shares of stock at a stock price of $95 using the October contract would cost $33 (ignoring commissions)
  - Is this contract “in the money”?
  - Why do the two option prices differ?

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2.5 Derivative Markets

- Using the Stock Options on Apple
  - Look at Figure 2.10 to answer the following questions
    - How does the exercise or strike price affect the value of a call option? A put option? Why?
    - How does a greater time to contract expiration affect the value of a call option? A put option? Why?

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2.5 Derivative Markets

- Futures Contracts
  - Purchaser (long) buys specified quantity at contract expiration for set price
  - Contract seller (short) delivers underlying commodity at contract expiration for agreed-upon price
  - Futures: Future commitment to buy/sell at preset price
  - Options: Holder has future right to buy/sell

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Figure 2.11 Futures Contracts

- Corn futures prices in *The Wall Street Journal Online*, September 17, 2014

MONTH	LAST	CHG	OPEN	HIGH	LOW	VOLUME	OPEN INT
Dec '14	341'6	–2'0	343'2	344'2	339'2	74580	796121
Mar '15	354'0	–1'4	355'4	356'0	351'0	19416	201794
May '15	362'4	–1'6	364'0	364'2	359'4	6153	51800
Jul '15	369'6	–1'4	371'2	371'2	366'6	5171	76051
Sep '15	377'2	–2'0	378'0	378'0	375'0	1791	20972
Dec '15	388'2	–1'6	389'4	390'0	385'4	3876	99741

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2.5 Derivative Markets

- Corn futures prices in the Chicago Board of Trade, September 17, 2014
  - Contract size: 5,000 bushels of corn
  - Price quote for Dec. 15 contract: 388’2 translates to a price of $3.88 + 2/8 cent per bushel, or $3.88
  - If you bought the Dec. 15 contract, what are you agreeing to do?
    - Purchase 5,000 bushels of corn in December for 5,000 × $3.88 = $19,412.50
  - What is your obligation if you sell the Dec. 15 contract?
  - How does this contract differ from an option?

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2.5 Derivative Markets

Derivatives

- Options
  - Basic Positions
    - Call (Buy/Sell?)
    - Put (Buy/Sell?)
  - Terms
    - Exercise price
    - Expiration date

Securities

- Futures
  - Basic Positions
    - Long (Buy/Sell?)
    - Short (Buy/Sell?)
  - Terms
    - Delivery date
    - Deliverable item

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