

ASSET CLASSES AND FINANCIAL INSTRUMENTS

YOU LEARNED IN Chapter 1 that the process of building an investment portfolio usually begins by deciding how much money to allocate to broad classes of assets, such as safe money market securities or bank accounts, longer-term bonds, stocks, or even asset classes like real estate or precious metals. This process is called *asset allocation*. Within each class the investor then selects specific assets from a more detailed menu. This is called *security selection*.

Each broad asset class contains many specific security types, and the many variations on a theme can be overwhelming. Our goal in this chapter is to introduce you to the important features of broad classes of securities. Toward this end, we organize our tour of financial instruments according to asset class.

Financial markets are traditionally segmented into **money markets** and **capital**

markets. Money market instruments include short-term, marketable, liquid, low-risk debt securities. Money market instruments sometimes are called *cash equivalents*, or just *cash* for short. Capital markets, in contrast, include longer-term and riskier securities. Securities in the capital market are much more diverse than those found within the money market. For this reason, we will subdivide the capital market into four segments: longer-term bond markets, equity markets, and the derivative markets for options and futures.

We first describe money market instruments. We then move on to debt and equity securities. We explain the structure of various stock market indexes in this chapter because market benchmark portfolios play an important role in portfolio construction and evaluation. Finally, we survey the derivative security markets for options and futures contracts.

2.1 THE MONEY MARKET

The money market is a subsector of the fixed-income market. It consists of very short-term debt securities that usually are highly marketable. Many of these securities trade in large denominations, and so are out of the reach of individual investors. Money market funds, however, are easily accessible to small investors. These mutual funds pool the resources of many investors and purchase a wide variety of money market securities on their behalf.

Figure 2.1 is a reprint of a money rates listing from *The Wall Street Journal*. It includes the various instruments of the money market that we will describe in detail. Table 2.1 provides the outstanding volume of the major instruments of the money market.

Money Rates

January 4, 2007

International rates

	Latest	Week ago	— 52-WEEK — High	Low
Prime rates				
U.S.	8.25	8.25	8.25	7.25
Canada	6.00	6.00	6.00	5.00
Euro zone	3.50	3.50	3.50	2.25
Japan	1.625	1.625	1.625	1.375
Britain	5.00	5.00	5.00	4.50

Overnight repurchase

U.S.	5.22	5.19	5.28	4.13
U.K. (BBA)	5.080	5.047	5.150	4.100
Euro zone	3.60	3.77	3.77	2.26

U.S. government rates**Federal funds**

Effective rate	5.24	5.25	5.37	4.21
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Treasury bill auction

4 weeks	4.760	4.660	5.170	3.950
13 weeks	4.930	4.875	4.990	4.070
26 weeks	4.900	4.900	5.110	4.250

Secondary market**Freddie Mac****30-year mortgage yields**

30 days	5.92	6.06	6.71	5.81
60 days	5.93	6.07	6.75	5.82
One-year ARM	3.375	3.375	3.375	3.375

Fannie Mae**30-year mortgage yields**

30 days	6.066	6.107	6.792	5.913
60 days	6.089	6.125	6.821	5.924

Bankers acceptances

30 days	5.29	5.31	5.38	4.35
60 days	5.30	5.31	5.43	4.44
90 days	5.31	5.31	5.49	4.49

Other short-term rates

	Latest	Week ago	— 52-WEEK — High	Low
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Commercial paper

30 to 60 days	5.23
61 to 90 days	5.22
91 to 120 days	5.20

Dealer commercial paper

30 days	5.26	5.27	5.36	4.32
60 days	5.26	5.28	5.41	4.42
90 days	5.25	5.30	5.46	4.46

Euro commercial paper

30 day	3.58	3.58	3.62	2.00
Two month	3.62	3.62	3.63	2.39
Three month	3.69	3.68	3.69	2.45

London interbank offered rate, or Libor

One month	5.32000	5.3256	5.4200	4.4188
Three month	5.36000	5.3600	5.5200	4.5500

Euro Libor

One month	3.628	3.634	3.713	2.386
Three month	3.733	3.724	3.733	2.488

Euro interbank offered rate (Euribor)

One month	3.625	3.634	3.672	2.384
Three month	3.734	3.723	3.734	2.490

Asian dollars

One month	5.335	5.337	5.425	4.418
Three month	5.363	5.370	5.525	3.570

	LATEST Offer	Bid	Week ago	52-WEEK High	Low
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Eurodollars (mid rates)

One month	5.28	5.30	5.32	5.39	4.36
Two month	5.29	5.31	5.32	5.44	4.45
Three month	5.30	5.32	5.34	5.51	4.51

Treasury Bills

U.S. *Treasury bills* (T-bills, or just bills, for short) are the most marketable of all money market instruments. T-bills represent the simplest form of borrowing: The government raises money by selling bills to the public. Investors buy the bills at a discount from the stated maturity value. At the bill's maturity, the holder receives from the government a payment equal to the face value of the bill. The difference between the purchase price and ultimate maturity value constitutes the investor's earnings.

T-bills are issued with initial maturities of 28, 91, or 182 days. Individuals can purchase T-bills directly, at auction, or on the secondary market from a government securities dealer. T-bills are highly liquid; that is, they are easily converted to cash and sold at low transaction cost and with not much price risk. Unlike most other money market instruments, which sell in minimum denominations of \$100,000, T-bills sell in minimum denominations of only \$1,000. The income earned on T-bills is exempt from all state and local taxes, another characteristic distinguishing bills from other money market instruments.

Figure 2.2 is a listing of T-bill rates. Rather than providing prices of each bill, the financial press reports

FIGURE 2.1 Rates on money market securities

Source: *The Wall Street Journal*, January 5, 2007. Reprinted by permission of Dow Jones & Company, Inc. via Copyright Clearance Center, Inc. © 2007 Dow Jones & Company, Inc. All Rights Reserved Worldwide.

	\$ Billion
Repurchase agreements	\$1,150.2
Small-denomination time deposits*	1,164.4
Large-denomination time deposits*	2,155.7
Eurodollars	530.3
Treasury bills	911.5
Commercial paper	2,252.5
Savings deposits	3,874.8
Money market mutual funds	2,390.0

*Small denominations are less than \$100,000.

Sources: *Economic Report of the President*, U.S. Government Printing Office, 2007; *Flow of Funds Accounts of the United States*, Board of Governors of the Federal Reserve System, June 2007.

TABLE 2.1

Major components of the money market

yields based on those prices. You will see yields corresponding to both bid and asked prices. The **asked price** is the price you would have to pay to buy a T-bill from a securities dealer. The **bid price** is the slightly lower price you would receive if you wanted to sell a bill to a dealer. The **bid-asked spread** is the difference in these prices, which is the dealer's source of profit. (Notice in Figure 2.2 that the bid *yield* is higher than the ask yield. This is because prices and yields are inversely related.)

The first two yields in Figure 2.2 are reported using the *bank-discount method*. This means that the bill's discount from par value is "annualized" based on a 360-day year, and then reported as a percentage of par value. For example, for the highlighted bill maturing on April 5, days to maturity are 90 and the yield under the column labeled "Asked" is given as 4.90%. This means that a dealer was willing to sell the bill at a discount from par value of $4.90\% \times (90/360) = 1.225\%$. So a bill with \$10,000 par value could be purchased for $\$10,000 \times (1 - .01225) = \$9,877.50$. Similarly, based on the bid yield of 4.91%, a dealer would be willing to *purchase* the bill for $\$10,000 \times [1 - .0491 \times (90/360)] = \$9,877.25$.

The bank discount method for computing yields has a long tradition, but it is flawed for at least two reasons. First, it assumes that the year has only 360 days. Second, it computes the yield as a fraction of par value rather than of the price the investor paid to acquire the bill.¹ An investor who buys the bill for the asked price and holds it until maturity will see her investment grow over 90 days by a multiple of $\$10,000/\$9,877.50 = 1.01240$, or 1.240%. Annualizing this return using a 365-day year results in a yield of $1.240\% \times 365/90 = 5.03\%$,

Treasury Bills

MATURITY	DAYS TO		BID	ASKED	CHG	ASK YLD
	MAT					
Jan 11 07	6		4.50	4.49	-0.11	4.56
Jan 18 07	13		4.57	4.56	-0.09	4.63
Jan 25 07	20		4.61	4.60	-0.01	4.68
Feb 01 07	27		4.70	4.69	-0.06	4.77
Feb 08 07	34		4.70	4.69	+0.01	4.78
Feb 15 07	41		4.73	4.72	-0.08	4.81
Feb 22 07	48		4.79	4.78	-0.04	4.88
Mar 01 07	55		4.83	4.82	-0.02	4.92
Mar 08 07	62		4.86	4.85	+0.01	4.96
Mar 15 07	69		4.85	4.84	-0.01	4.95
Mar 22 07	76		4.88	4.87	-0.02	4.99
Mar 29 07	83		4.88	4.87	-0.02	4.99
Apr 05 07	90		4.91	4.90	-0.01	5.03
Apr 12 07	97		4.90	4.89	-0.01	5.02
Apr 19 07	104		4.90	4.89	-0.01	5.03
Apr 26 07	111		4.90	4.89	-0.01	5.03

FIGURE 2.2 Treasury bill yields

Source: Compiled from data obtained from *The Wall Street Journal Online*, January 4, 2007.

¹Both of these "errors" were dictated by computational simplicity in precomputer days. It is easier to compute percentage discounts from a round number such as par value rather than purchase price. It is also easier to annualize using a 360-day year, because 360 is an even multiple of so many numbers.

which is the value reported in the last column under “Ask Yld.” This last value is called the Treasury-bill’s *bond-equivalent yield*.

Certificates of Deposit

A **certificate of deposit**, or CD, is a time deposit with a bank. Time deposits may not be withdrawn on demand. The bank pays interest and principal to the depositor only at the end of the fixed term of the CD. CDs issued in denominations greater than \$100,000 are usually negotiable, however; that is, they can be sold to another investor if the owner needs to cash in the certificate before its maturity date. Short-term CDs are highly marketable, although the market significantly thins out for maturities of 3 months or more. CDs are treated as bank deposits by the Federal Deposit Insurance Corporation, so they are insured for up to \$100,000 in the event of a bank insolvency.

Commercial Paper

Large, well-known companies often issue their own short-term unsecured debt notes rather than borrow directly from banks. These notes are called **commercial paper**. Very often, commercial paper is backed by a bank line of credit, which gives the borrower access to cash that can be used (if needed) to pay off the paper at maturity.

Commercial paper maturities range up to 270 days; longer maturities would require registration with the Securities and Exchange Commission and so are almost never issued. Most often, commercial paper is issued with maturities of less than 1 or 2 months. Usually, it is issued in multiples of \$100,000. Therefore, small investors can invest in commercial paper only indirectly, via money market mutual funds.

Commercial paper is considered to be a fairly safe asset, because a firm’s condition presumably can be monitored and predicted over a term as short as 1 month.

While most commercial paper is issued by nonfinancial firms, in recent years there has been a sharp increase in *asset-backed commercial paper* issued by financial firms such as banks. This is short-term commercial paper typically used to raise funds for the institution to invest in other assets. These assets in turn are used as collateral for the commercial paper—hence the label “asset backed.” This practice led to many difficulties starting in the summer of 2007 when the subprime mortgages in which the banks invested performed poorly as default rates spiked. The banks found themselves unable to issue new commercial paper to refinance their positions as the old paper matured.

Bankers’ Acceptances

A **banker’s acceptance** starts as an order to a bank by a bank’s customer to pay a sum of money at a future date, typically within 6 months. At this stage, it is similar to a postdated check. When the bank endorses the order for payment as “accepted,” it assumes responsibility for ultimate payment to the holder of the acceptance. At this point, the acceptance may be traded in secondary markets like any other claim on the bank. Bankers’ acceptances are considered very safe assets because traders can substitute the bank’s credit standing for their own. They are used widely in foreign trade where the creditworthiness of one trader is unknown to the trading partner. Acceptances sell at a discount from the face value of the payment order, just as T-bills sell at a discount from par value.

Eurodollars

Eurodollars are dollar-denominated deposits at foreign banks or foreign branches of American banks. By locating outside the United States, these banks escape regulation by

the Federal Reserve. Despite the tag “Euro,” these accounts need not be in European banks, although that is where the practice of accepting dollar-denominated deposits outside the United States began.

Most Eurodollar deposits are for large sums, and most are time deposits of less than 6 months’ maturity. A variation on the Eurodollar time deposit is the Eurodollar certificate of deposit. A Eurodollar CD resembles a domestic bank CD except that it is the liability of a non-U.S. branch of a bank, typically a London branch. The advantage of Eurodollar CDs over Eurodollar time deposits is that the holder can sell the asset to realize its cash value before maturity. Eurodollar CDs are considered less liquid and riskier than domestic CDs, however, and thus offer higher yields. Firms also issue Eurodollar bonds, which are dollar-denominated bonds outside the U.S., although bonds are not a money market investment because of their long maturities.

Repos and Reverses

Dealers in government securities use **repurchase agreements**, also called “repos” or “RPs,” as a form of short-term, usually overnight, borrowing. The dealer sells government securities to an investor on an overnight basis, with an agreement to buy back those securities the next day at a slightly higher price. The increase in the price is the overnight interest. The dealer thus takes out a 1-day loan from the investor, and the securities serve as collateral.

A *term repo* is essentially an identical transaction, except that the term of the implicit loan can be 30 days or more. Repos are considered very safe in terms of credit risk because the loans are backed by the government securities. A *reverse repo* is the mirror image of a repo. Here, the dealer finds an investor holding government securities and buys them, agreeing to sell them back at a specified higher price on a future date.

Federal Funds

Just as most of us maintain deposits at banks, banks maintain deposits of their own at a Federal Reserve bank. Each member bank of the Federal Reserve System, or “the Fed,” is required to maintain a minimum balance in a reserve account with the Fed. The required balance depends on the total deposits of the bank’s customers. Funds in the bank’s reserve account are called **federal funds**, or *fed funds*. At any time, some banks have more funds than required at the Fed. Other banks, primarily big banks in New York and other financial centers, tend to have a shortage of federal funds. In the federal funds market, banks with excess funds lend to those with a shortage. These loans, which are usually overnight transactions, are arranged at a rate of interest called the federal funds rate.

Although the fed funds market arose primarily as a way for banks to transfer balances to meet reserve requirements, today the market has evolved to the point that many large banks use federal funds in a straightforward way as one component of their total sources of funding. Therefore, the fed funds rate is simply the rate of interest on very short-term loans among financial institutions. While most investors cannot participate in this market, the fed funds rate commands great interest as a key barometer of monetary policy.

Brokers’ Calls

Individuals who buy stocks on margin borrow part of the funds to pay for the stocks from their broker. The broker in turn may borrow the funds from a bank, agreeing to repay the bank immediately (on call) if the bank requests it. The rate paid on such loans is usually about 1% higher than the rate on short-term T-bills.

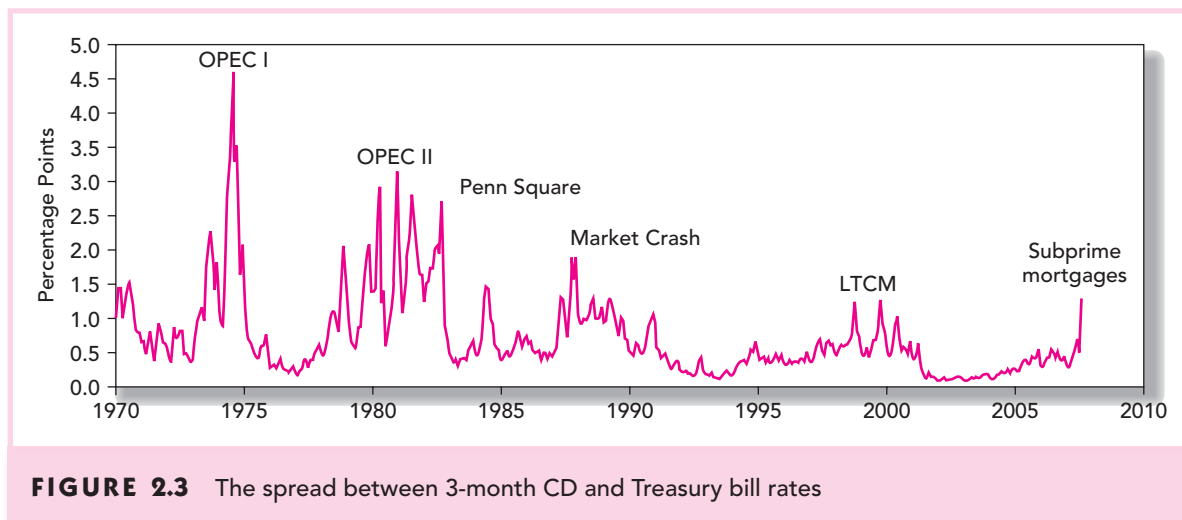


FIGURE 2.3 The spread between 3-month CD and Treasury bill rates

The LIBOR Market

The **London Interbank Offered Rate** (LIBOR) is the rate at which large banks in London are willing to lend money among themselves. This rate, which is quoted on dollar-denominated loans, has become the premier short-term interest rate quoted in the European money market, and it serves as a reference rate for a wide range of transactions. For example, a corporation might borrow at a floating rate equal to LIBOR plus 2%.

LIBOR interest rates may be tied to currencies other than the U.S. dollar. For example, LIBOR rates are widely quoted for transactions denominated in British pounds, yen, euros, and so on. There is also a similar rate called EURIBOR (European Interbank Offered Rate) at which banks in the euro zone are willing to lend euros among themselves.

Yields on Money Market Instruments

Although most money market securities are of low risk, they are not risk-free. The securities of the money market promise yields greater than those on default-free T-bills, at least in part because of greater relative riskiness. In addition, many investors require more liquidity; thus they will accept lower yields on securities such as T-bills that can be quickly and cheaply sold for cash. Figure 2.3 shows that bank CDs, for example, consistently have paid a premium over T-bills. Moreover, that premium increased with economic crises such as the energy price shocks associated with the two OPEC disturbances, the failure of Penn Square bank, the stock market crash in 1987, the collapse of Long Term Capital Management in 1998, and the virtual breakdown of the market in subprime mortgages in 2007.

2.2 THE BOND MARKET

The bond market is composed of longer-term borrowing or debt instruments than those that trade in the money market. This market includes Treasury notes and bonds, corporate bonds, municipal bonds, mortgage securities, and federal agency debt.

These instruments are sometimes said to comprise the *fixed-income capital market*, because most of them promise either a fixed stream of income or a stream of income that

is determined according to a specific formula. In practice, these formulas can result in a flow of income that is far from fixed. Therefore, the term “fixed income” is probably not fully appropriate. It is simpler and more straightforward to call these securities either debt instruments or bonds.

Treasury Notes and Bonds

The U.S. government borrows funds in large part by selling **Treasury notes** and **Treasury bonds**. T-note maturities range up to 10 years, whereas bonds are issued with maturities ranging from 10 to 30 years. Both are issued in denominations of \$1,000 or more. Both notes and bonds make semiannual interest payments called *coupon payments*, a name derived from precomputer days, when investors would literally clip coupons attached to the bond and present a coupon to receive the interest payment.

Figure 2.4 is a listing of Treasury issues. Notice the highlighted note that matures in February 2014. The coupon income, or interest, paid by the note is 4% of par value, meaning that a \$1,000 face-value note pays \$40 in annual interest in two semiannual installments of \$20 each. The numbers to the right of the colon in the bid and asked prices represent units of $\frac{1}{32}$ of a point.

The bid price of the note is $96\frac{9}{32}$, or 96.281. The asked price is $96\frac{10}{32}$, or 96.3125. Although notes and bonds are sold in denominations of \$1,000 par value, the prices are quoted as a percentage of par value. Thus the bid price of 96.281 should be interpreted as 96.281% of par, or \$962.81, for the \$1,000 par value security. Similarly, the note could be bought from a dealer for \$963.125. The +10 change means the closing price on this day rose $\frac{10}{32}$ (as a percentage of par value) from the previous day’s closing price. Finally, the yield to maturity on the note based on the asked price is 4.61%.

The **yield to maturity** reported in the financial pages is calculated by determining the semiannual yield and then doubling it, rather than compounding it for two half-year periods. This use of a simple interest technique to annualize means that the yield is quoted on an annual percentage rate (APR) basis rather than as an effective annual yield. The APR method in this context is also called the *bond equivalent yield*. We discuss the yield to maturity in more detail in Part Four.

CONCEPT CHECK 1

What were the bid price, asked price, and yield to maturity of the $4\frac{3}{4}\%$ May 2014 Treasury note displayed in Figure 2.4? What was its asked price the previous day?

U.S. Government Bonds and Notes

Maturity						Maturity					
Rate	MO/YR	BID	ASKED	CHG	ASK YLD	Rate	MO/YR	BID	ASKED	CHG	ASK YLD
3.375	Jan 07i	99:28	99:29	....	6.72	4.250	Nov 13n	97:29	97:30	+10	4.60
3.125	Jan 07n	99:27	99:28	....	4.62	2.000	Jan 14i	97:16	97:17	+1	2.38
2.250	Feb 07n	99:21	99:22	....	4.89	4.000	Feb 14n	96:09	96:10	+10	4.61
6.250	Feb 07n	100:04	100:05	....	4.73	4.750	May 14n	100:26	100:27	+9	4.61
3.375	Feb 07n	99:23	99:24	....	4.90	13.250	May 14	119:02	119:03	+4	4.61
3.750	Mar 07n	99:21	99:22	....	4.99	2.000	Jul 14i	97:14	97:15	....	2.37
3.875	Feb 13n	96:06	96:07	+8	4.59	4.250	Aug 14n	97:21	97:22	+10	4.61
3.625	May 13n	94:23	94:24	+8	4.58	12.500	Aug 14	119:04	119:05	+4	4.62
1.875	Jul 13i	97:00	97:01	+1	2.37	11.750	Nov 14	118:30	118:31	+6	4.59
4.250	Aug 13n	98:00	98:01	+9	4.60	4.250	Nov 14n	97:19	97:20	+9	4.61
12.000	Aug 13	111:04	111:05	+2	4.71	1.625	Jan 15i	94:18	94:19	+1	2.37

FIGURE 2.4 Listing of Treasury issues

Source: Compiled from data obtained from the online edition of *The Wall Street Journal*, January 5, 2007.

Inflation-Protected Treasury Bonds

The best place to start building an investment portfolio is at the least risky end of the spectrum. Around the world, governments of many countries, including the United States, have issued bonds that are linked to an index of the cost of living in order to provide their citizens with an effective way to hedge inflation risk. See the E-Investments box on inflation-protected bonds around the world at the end of this chapter.

In the United States inflation-protected Treasury bonds are called TIPS (Treasury Inflation-Protected Securities). The principal amount on these bonds is adjusted in proportion

to increases in the Consumer Price Index. Therefore, they provide a constant stream of income in real (inflation-adjusted) dollars. An i following the bond's maturity date in Figure 2.4 denotes that the bond is an inflation-indexed TIPS bond, and you will see that the reported yields on these bonds are lower than those on surrounding conventional Treasuries. Compare, for example, the reported yield on the July 14*i* bond, 2.37%, to the 4.61% yield on the August bond that follows it. The yields on TIPS bonds should be interpreted as real or inflation-adjusted interest rates. We return to TIPS bonds in more detail in Chapter 14.

Federal Agency Debt

Some government agencies issue their own securities to finance their activities. These agencies usually are formed to channel credit to a particular sector of the economy that Congress believes might not receive adequate credit through normal private sources.

The major mortgage-related agencies are the Federal Home Loan Bank (FHLB), the Federal National Mortgage Association (FNMA, or Fannie Mae), the Government National Mortgage Association (GNMA, or Ginnie Mae), and the Federal Home Loan Mortgage Corporation (FHLMC, or Freddie Mac). The FHLB borrows money by issuing securities and lends this money to savings and loan institutions to be lent in turn to individuals borrowing for home mortgages.

Freddie Mac and Ginnie Mae were organized to provide liquidity to the mortgage market. Until the pass-through securities sponsored by these agencies were established (see the discussion of mortgages and mortgage-backed securities later in this section), the lack of a secondary market in mortgages hampered the flow of investment funds into mortgages and made mortgage markets dependent on local, rather than national, credit availability.

Some of these agencies are government owned, and therefore can be viewed as branches of the U.S. government. Thus their debt is fully free of default risk. Ginnie Mae is an example of a government-owned agency. Other agencies, such as the farm credit agencies, the Federal Home Loan Bank, Fannie Mae, and Freddie Mac, are merely federally *sponsored*.

Although the debt of federally sponsored agencies is not explicitly insured by the federal government, it is widely assumed that the government would step in with assistance if an agency neared default. Thus these securities are considered extremely safe assets, and their yield spread above Treasury securities is usually small.

International Bonds

Many firms borrow abroad and many investors buy bonds from foreign issuers. In addition to national capital markets, there is a thriving international capital market, largely centered in London.

A *Eurobond* is a bond denominated in a currency other than that of the country in which it is issued. For example, a dollar-denominated bond sold in Britain would be called a Eurodollar bond. Similarly, investors might speak of Euroyen bonds, yen-denominated bonds sold outside Japan. Because the European currency is called the euro, the term Eurobond may be confusing. It is best to think of them simply as international bonds.

In contrast to bonds that are issued in foreign currencies, many firms issue bonds in foreign countries but in the currency of the investor. For example, a Yankee bond is a dollar-denominated bond sold in the United States by a non-U.S. issuer. Similarly, Samurai bonds are yen-denominated bonds sold in Japan by non-Japanese issuers.

Municipal Bonds

Municipal bonds are issued by state and local governments. They are similar to Treasury and corporate bonds except that their interest income is exempt from federal income

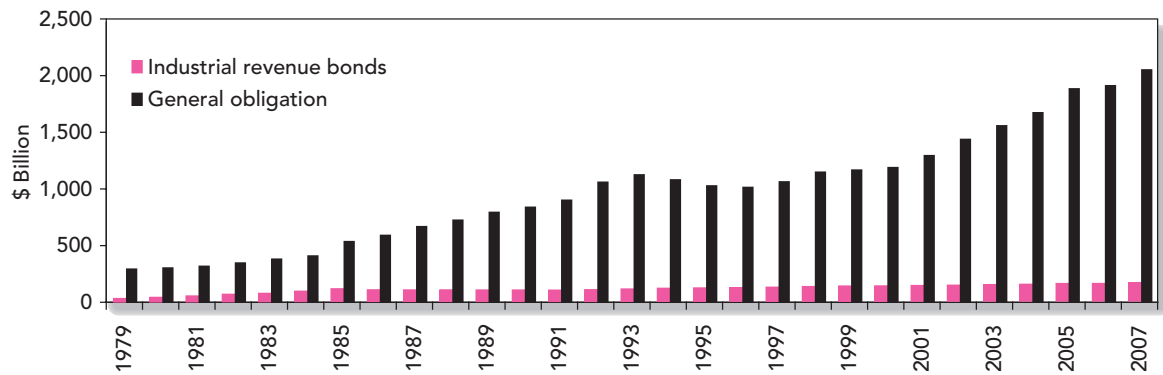


FIGURE 2.5 Tax-exempt debt outstanding

Source: *Flow of Funds Accounts of the United States*, Board of Governors of the Federal Reserve System, June 2007.

taxation. The interest income also is exempt from state and local taxation in the issuing state. Capital gains taxes, however, must be paid on “munis” when the bonds mature or if they are sold for more than the investor’s purchase price.

There are basically two types of municipal bonds. *General obligation* bonds are backed by the “full faith and credit” (i.e., the taxing power) of the issuer, while *revenue bonds* are issued to finance particular projects and are backed either by the revenues from that project or by the particular municipal agency operating the project. Typical issuers of revenue bonds are airports, hospitals, and turnpike or port authorities. Obviously, revenue bonds are riskier in terms of default than general obligation bonds. Figure 2.5 plots outstanding amounts of both types of municipal securities.

An *industrial development bond* is a revenue bond that is issued to finance commercial enterprises, such as the construction of a factory that can be operated by a private firm. In effect, these private-purpose bonds give the firm access to the municipality’s ability to borrow at tax-exempt rates, and the federal government limits the amount of these bonds that may be issued.²

Like Treasury bonds, municipal bonds vary widely in maturity. A good deal of the debt issued is in the form of short-term *tax anticipation notes*, which raise funds to pay for expenses before actual collection of taxes. Other municipal debt is long term and used to fund large capital investments. Maturities range up to 30 years.

The key feature of municipal bonds is their tax-exempt status. Because investors pay neither federal nor state taxes on the interest proceeds, they are willing to accept lower yields on these securities.

An investor choosing between taxable and tax-exempt bonds must compare after-tax returns on each bond. An exact comparison requires a computation of after-tax rates of return that explicitly accounts for taxes on income and realized capital gains. In practice, there is a simpler rule of thumb. If we let t denote the investor’s combined federal plus local marginal tax bracket and r denote the total before-tax rate of return available on taxable

²A warning, however. Although interest on industrial development bonds usually is exempt from federal tax, it can be subject to the alternative minimum tax if the bonds are used to finance projects of for-profit companies.

TABLE 2.2

Equivalent taxable yields corresponding to various tax-exempt yields

Marginal Tax Rate	Tax-Exempt Yield				
	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

bonds, then $r(1 - t)$ is the after-tax rate available on those securities.³ If this value exceeds the rate on municipal bonds, r_m , the investor does better holding the taxable bonds. Otherwise, the tax-exempt municipals provide higher after-tax returns.

One way to compare bonds is to determine the interest rate on taxable bonds that would be necessary to provide an after-tax return equal to that of municipals. To derive this value, we set after-tax yields equal, and solve for the **equivalent taxable yield** of the tax-exempt bond. This is the rate a taxable bond must offer to match the after-tax yield on the tax-free municipal.

$$r(1 - t) = r_m \quad (2.1)$$

or

$$r = r_m / (1 - t) \quad (2.2)$$

Thus the equivalent taxable yield is simply the tax-free rate divided by $1 - t$. Table 2.2 presents equivalent taxable yields for several municipal yields and tax rates.

This table frequently appears in the marketing literature for tax-exempt mutual bond funds because it demonstrates to high-tax-bracket investors that municipal bonds offer highly attractive equivalent taxable yields. Each entry is calculated from Equation 2.2. If the equivalent taxable yield exceeds the actual yields offered on taxable bonds, the investor is better off after taxes holding municipal bonds. Notice that the equivalent taxable interest rate increases with the investor's tax bracket; the higher the bracket, the more valuable the tax-exempt feature of municipals. Thus high-tax-bracket investors tend to hold municipals.

We also can use Equation 2.1 or 2.2 to find the tax bracket at which investors are indifferent between taxable and tax-exempt bonds. The cutoff tax bracket is given by solving Equation 2.2 for the tax bracket at which after-tax yields are equal. Doing so, we find that

$$t = 1 - \frac{r_m}{r} \quad (2.3)$$

Thus the yield ratio r_m/r is a key determinant of the attractiveness of municipal bonds. The higher the yield ratio, the lower the cutoff tax bracket, and the more individuals will prefer to hold municipal debt. Figure 2.6 graphs the yield ratio since 1955.

CONCEPT CHECK
2

Suppose your tax bracket is 30%. Would you prefer to earn a 6% taxable return or a 4% tax-free return? What is the equivalent taxable yield of the 4% tax-free yield?

³An approximation to the combined federal plus local tax rate is just the sum of the two rates. For example, if your federal tax rate is 28% and your state rate is 5%, your combined tax rate would be approximately 33%. A more precise approach would recognize that state taxes are deductible at the federal level. You owe federal taxes only on income net of state taxes. Therefore, for every dollar of income, your after-tax proceeds would be $(1 - t_{\text{federal}}) \times (1 - t_{\text{state}})$. In our example, your after-tax proceeds on each dollar earned would be $(1 - .28) \times (1 - .05) = .684$, which implies a combined tax rate of $1 - .684 = .316$, or 31.6%.

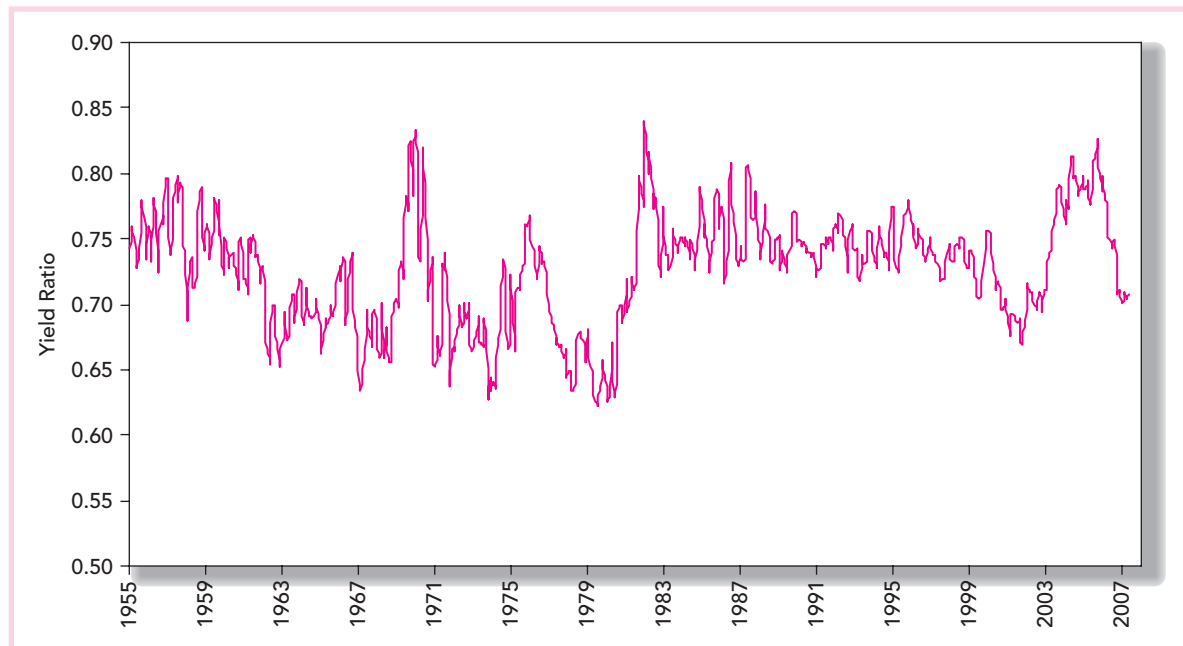
EXAMPLE 2.1 Taxable versus Tax-Exempt Yields

Figure 2.6 shows that in recent years, the ratio of tax-exempt to taxable yields has fluctuated around .75. What does this imply about the cutoff tax bracket above which tax exempt bonds provide higher after-tax yields? Equation 2.3 shows that an investor whose tax bracket (federal plus local) exceeds $1 - .75 = .25$, or 25%, will derive a greater after-tax yield from municipals. Note, however, that it is difficult to control precisely for differences in the risks of these bonds, so the cutoff tax bracket must be taken as approximate.

Corporate Bonds

Corporate bonds are the means by which private firms borrow money directly from the public. These bonds are similar in structure to Treasury issues—they typically pay semiannual coupons over their lives and return the face value to the bondholder at maturity. They differ most importantly from Treasury bonds in degree of risk. Default risk is a real consideration in the purchase of corporate bonds, and Chapter 14 discusses this issue in considerable detail. For now, we distinguish only among *secured bonds*, which have specific collateral backing them in the event of firm bankruptcy; *unsecured bonds*, called *debentures*, which have no collateral; and *subordinated debentures*, which have a lower-priority claim to the firm's assets in the event of bankruptcy.

Corporate bonds sometimes come with options attached. *Callable bonds* give the firm the option to repurchase the bond from the holder at a stipulated call price. *Convertible bonds* give the bondholder the option to convert each bond into a stipulated number of shares of stock. These options are treated in more detail in Chapter 14.

**FIGURE 2.6** Ratio of yields on tax-exempt to taxable bonds

Source: Authors' calculators, using data from Moody's Investors Service and Mergent Municipal and Government Manual.

Mortgages and Mortgage-Backed Securities

An investments text of 30 years ago probably would not have included a section on mortgage loans, because investors could not invest in these loans. Now, because of the explosion in mortgage-backed securities, almost anyone can invest in a portfolio of mortgage loans, and these securities have become a major component of the fixed-income market.

Until the 1970s, almost all home mortgages were written for a long term (15- to 30-year maturity), with a fixed interest rate over the life of the loan, and with equal fixed monthly payments. These so-called conventional mortgages are still the most popular, but a diverse set of alternative mortgage designs has developed.

Fixed-rate mortgages have posed difficulties to lenders in years of increasing interest rates. Because banks and thrift institutions traditionally issued short-term liabilities (the deposits of their customers) and held long-term assets such as fixed-rate mortgages, they suffered losses when interest rates increased and the rates paid on deposits increased while mortgage income remained fixed.

The *adjustable-rate mortgage* was a response to this interest rate risk. These mortgages require the borrower to pay an interest rate that varies with some measure of the current market interest rate. For example, the interest rate might be set at 2 percentage points above the current rate on 1-year Treasury bills and might be adjusted once a year. Usually, the contract sets a limit, or cap, on the maximum size of an interest rate change within a year and over the life of the contract. The adjustable-rate contract shifts much of the risk of fluctuations in interest rates from the lender to the borrower. Because of the shifting of interest rate risk to their customers, lenders are willing to offer lower rates on adjustable-rate mortgages than on conventional fixed-rate mortgages.

A *mortgage-backed security* is either an ownership claim in a pool of mortgages or an obligation that is secured by such a pool. These claims represent securitization of mortgage loans. Mortgage lenders originate loans and then sell packages of these loans in the secondary market. Specifically, they sell their claim to the cash inflows from the mortgages as those loans are paid off. The mortgage originator continues to service the loan, collecting principal and interest payments, and passes these payments along to the purchaser of the mortgage. For this reason, these mortgage-backed securities are called *pass-throughs*.

Mortgage-backed pass-through securities were first introduced by the Government National Mortgage Association (GNMA, or Ginnie Mae) in 1970. GNMA pass-throughs carry a guarantee from the U.S. government that ensures timely payment of principal and interest, even if the borrower defaults on the mortgage. This guarantee increases the marketability of the pass-through. Thus investors can buy or sell GNMA securities like any other bond.

Other mortgage pass-throughs have since become popular. These are sponsored by FNMA (Federal National Mortgage Association, or Fannie Mae) and FHLMC (Federal Home Loan Mortgage Corporation, or Freddie Mac). As of 2007, roughly \$3.8 trillion of mortgages were securitized into mortgage-backed securities. This makes the mortgage-backed securities market bigger than the \$3.1 trillion corporate bond market and more than three-quarters the size of the \$4.6 trillion market in Treasury securities. Figure 2.7 illustrates the explosive growth of mortgage-backed securities since 1979.

Although mortgage pass-through securities often guarantee payment of interest and principal, they do not guarantee the rate of return. Holders of mortgage pass-throughs therefore can be severely disappointed in their returns in years when interest rates drop

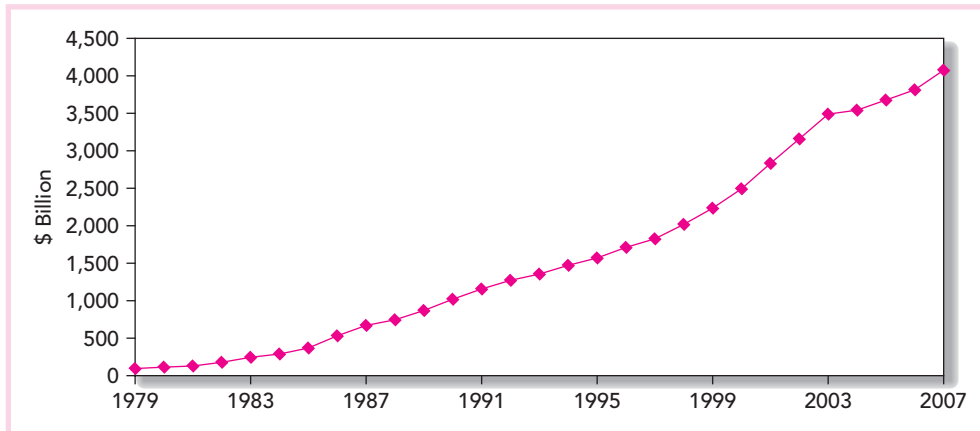


FIGURE 2.7 Mortgage-backed securities outstanding, 1979–2007

Source: *Flow of Funds Accounts of the United States*, Board of Governors of the Federal Reserve System, June 2007.

significantly. This is because homeowners usually have an option to prepay, or pay ahead of schedule, the remaining principal outstanding on their mortgages.

Most pass-throughs are comprised of *conforming mortgages*, which means that the loans meet underwriting guidelines required for Fannie Mae or Freddie Mac to purchase them. More recently, private banks have begun to purchase *subprime mortgages* (which do not meet these underwriting guidelines) and to sell pools of these riskier mortgages to investors. These investments turned out to be disastrous investments in the summer of 2007, with losses exceeding \$100 billion spread among several investment banks, hedge funds, and other investors.

The tremendous growth in mortgage-backed pass-throughs has encouraged introduction of pass-through securities backed by other assets. Figure 1.2 of the previous chapter documented the rapid development of the market in asset-backed securities.

2.3 EQUITY SECURITIES

Common Stock as Ownership Shares

Common stocks, also known as *equity securities* or **equities**, represent ownership shares in a corporation. Each share of common stock entitles its owner to one vote on any matters of corporate governance that are put to a vote at the corporation's annual meeting and to a share in the financial benefits of ownership.⁴

The corporation is controlled by a board of directors elected by the shareholders. The board, which meets only a few times each year, selects managers who actually run the

⁴A corporation sometimes issues two classes of common stock, one bearing the right to vote, the other not. Because of its restricted rights, the nonvoting stock might sell for a lower price.

corporation on a day-to-day basis. Managers have the authority to make most business decisions without the board's specific approval. The board's mandate is to oversee the management to ensure that it acts in the best interests of shareholders.

The members of the board are elected at the annual meeting. Shareholders who do not attend the annual meeting can vote by *proxy*, empowering another party to vote in their name. Management usually solicits the proxies of shareholders and normally gets a vast majority of these proxy votes. Thus, management usually has considerable discretion to run the firm as it sees fit—without daily oversight from the equityholders who actually own the firm.

We noted in Chapter 1 that such separation of ownership and control can give rise to “agency problems,” in which managers pursue goals not in the best interests of shareholders. However, there are several mechanisms that alleviate these agency problems. Among these are compensation schemes that link the success of the manager to that of the firm; oversight by the board of directors as well as outsiders such as security analysts, creditors, or large institutional investors; the threat of a proxy contest in which unhappy shareholders attempt to replace the current management team; or the threat of a takeover by another firm.

The common stock of most large corporations can be bought or sold freely on one or more stock exchanges. A corporation whose stock is not publicly traded is said to be closely held. In most closely held corporations, the owners of the firm also take an active role in its management. Therefore, takeovers are generally not an issue.

Characteristics of Common Stock

The two most important characteristics of common stock as an investment are its **residual claim** and **limited liability** features.

Residual claim means that stockholders are the last in line of all those who have a claim on the assets and income of the corporation. In a liquidation of the firm's assets the shareholders have a claim to what is left after all other claimants such as the tax authorities, employees, suppliers, bondholders, and other creditors have been paid. For a firm not in liquidation, shareholders have claim to the part of operating income left over after interest and taxes have been paid. Management can either pay this residual as cash dividends to shareholders or reinvest it in the business to increase the value of the shares.

Limited liability means that the most shareholders can lose in the event of failure of the corporation is their original investment. Unlike owners of unincorporated businesses, whose creditors can lay claim to the personal assets of the owner (house, car, furniture), corporate shareholders may at worst have worthless stock. They are not personally liable for the firm's obligations.

CONCEPT CHECK

3

- If you buy 100 shares of IBM stock, to what are you entitled?
- What is the most money you can make on this investment over the next year?
- If you pay \$80 per share, what is the most money you could lose over the year?

Stock Market Listings

Figure 2.8 presents key trading data for a small sample of stocks traded on the New York Stock Exchange. The NYSE is one of several markets in which investors may buy or sell shares of stock. We will examine these markets in detail in Chapter 3.

To interpret Figure 2.8, consider the highlighted listing for General Electric. The table provides the ticker symbol (GE), the closing price of the stock (\$37.56), and its change (−\$.19) from the previous trading day. About 26.9 million shares of GE traded on this day. The listing also provides the highest and lowest price at which GE has traded in the last 52 weeks. The 1.12 value in the Dividend column means that the last quarterly dividend payment was \$.28 per share, which is consistent with annual dividend payments of $$.28 \times 4 = \1.12 . This corresponds to an annual dividend yield (i.e., annual dividend per dollar paid for the stock) of $1.12/37.56 = .030$, or 3.0%.

The dividend yield is only part of the return on a stock investment. It ignores prospective **capital gains** (i.e., price increases) or losses. Low dividend firms presumably offer greater prospects for capital gains, or investors would not be willing to hold these stocks in their portfolios. If you scan Figure 2.8, you will see that dividend yields vary widely across companies.

The P/E ratio, or **price–earnings ratio**, is the ratio of the current stock price to last year’s earnings per share. The P/E ratio tells us how much stock purchasers must pay per dollar of earnings that the firm generates. For GE, the ratio of price to earnings is 23. The P/E ratio also varies widely across firms. Where the dividend yield and P/E ratio are not reported in Figure 2.8, the firms have zero dividends, or zero or negative earnings. We shall have much to say about P/E ratios in Chapter 18. Finally, we see that GE’s stock price has increased by 0.9% since the beginning of the year.

Preferred Stock

Preferred stock has features similar to both equity and debt. Like a bond, it promises to pay to its holder a fixed amount of income each year. In this sense preferred stock is similar to an infinite-maturity bond, that is, a perpetuity. It also resembles a bond in that it does not convey voting power regarding the management of the firm. Preferred stock is an equity investment, however. The firm retains discretion to make the dividend payments to the preferred stockholders; it has no contractual obligation to pay those dividends. Instead, preferred dividends are usually *cumulative*; that is, unpaid dividends cumulate and must be paid in full before any dividends may be paid to holders of common stock. In contrast, the firm does have a contractual obligation to make the interest payments on the debt. Failure to make these payments sets off corporate bankruptcy proceedings.

Preferred stock also differs from bonds in terms of its tax treatment for the firm. Because preferred stock payments are treated as dividends rather than interest, they are

NAME	SYMBOL	CLOSE	NET CHG	VOLUME	52 WK HIGH	52 WK LOW	DIV	YIELD	P/E	YTD% CHG
Gencorp	GY	13.59	−0.29	491,300	20.75	12.02	....	....	dd	−3.1
Genentech	DNA	83.68	−0.35	3,986,300	94.46	75.58	....	....	49	3.1
General Cable	BGC	42.67	−1.11	679,700	45.41	20.3	....	....	23	−2.4
General Dynamics	GD	74.59	0.17	1,497,300	77.98	56.68	0.92	1.2	16	0.3
General Electric	GE	37.56	−0.19	26,907,700	38.49	32.06	1.12	3	23	0.9
General Gwth Prop	GGP	51.51	−0.8	1,308,200	56.14	41.92	1.8	3.5	215	−1.4
General Maritime	GMR	34.56	−0.83	597,400	40.64	30.34	4.8	13.9	5	−1.8
General Mills	GIS	56.97	−0.42	1,355,600	59.23	47.05	1.48	2.6	18	−1.1
General Motors	GM	30.24	0.6	10,477,600	36.56	19	1	3.3	dd	−1.6
Genesco Inc	GCO	36.75	−0.9	127,900	43.72	25.5	....	....	15	−1.5
Genesee & Wyoming	GWR	25.86	−0.5	364,500	36.75	21	....	....	9	−1.4
Genesis Lease	GIS	23.6	0.1	298,500	24.4	23	....	....	....	0.4
Genuine Paris co.	GPC	46.86	−0.51	384,400	48.34	40	1.35	2.9	17	−1.2
Genworth Financial	GNW	33.79	−0.32	1,414,900	36.47	31	0.36	1.1	13	−1.2
Geo Group Inc	GEO	37.57	−1.53	157,500	40.3	14.69	....	....	35	0.1
Georgia Gulf	GGC	18.69	−0.38	479,000	34.65	18.36	0.32	1.7	6	−3.2
Gerber Scientific	GRB	12.32	−0.07	243,200	16.8	9	....	....	27	−1.9
Gerdau Ameristeel	GNA	8.59	−0.04	446,200	11.02	5.85	0.08	0.9	7	−3.7
Gerdau S.A. Ads	GGB	15.57	−0.56	1,729,100	18.16	11.27	0.58	3.7	....	−2.7

FIGURE 2.8 Listing of stocks traded on the New York Stock Exchange

Source: Compiled from data from *The Wall Street Journal Online*, January 9, 2007.

not tax-deductible expenses for the firm. This disadvantage is somewhat offset by the fact that corporations may exclude 70% of dividends received from domestic corporations in the computation of their taxable income. Preferred stocks therefore make desirable fixed-income investments for some corporations.

Even though preferred stock ranks after bonds in terms of the priority of its claims to the assets of the firm in the event of corporate bankruptcy, preferred stock often sells at lower yields than do corporate bonds. Presumably, this reflects the value of the dividend exclusion, because the higher risk of preferred would tend to result in higher yields than those offered by bonds. Individual investors, who cannot use the 70% tax exclusion, generally will find preferred stock yields unattractive relative to those on other available assets.

Preferred stock is issued in variations similar to those of corporate bonds. It may be callable by the issuing firm, in which case it is said to be *redeemable*. It also may be convertible into common stock at some specified conversion ratio. Adjustable-rate preferred stock is another variation that, like adjustable-rate bonds, ties the dividend to current market interest rates.

Depository Receipts

American Depository Receipts, or ADRs, are certificates traded in U.S. markets that represent ownership in shares of a foreign company. Each ADR may correspond to ownership of a fraction of a foreign share, one share, or several shares of the foreign corporation. ADRs were created to make it easier for foreign firms to satisfy U.S. security registration requirements. They are the most common way for U.S. investors to invest in and trade the shares of foreign corporations.

2.4 STOCK AND BOND MARKET INDEXES

Stock Market Indexes

The daily performance of the Dow Jones Industrial Average is a staple portion of the evening news report. Although the Dow is the best-known measure of the performance of the stock market, it is only one of several indicators. Other more broadly based indexes are computed and published daily. In addition, several indexes of bond market performance are widely available.

The ever-increasing role of international trade and investments has made indexes of foreign financial markets part of the general news as well. Thus foreign stock exchange indexes such as the Nikkei Average of Tokyo and the Financial Times index of London are fast becoming household names.

Dow Jones Averages

The Dow Jones Industrial Average (DJIA) of 30 large, “blue-chip” corporations has been computed since 1896. Its long history probably accounts for its preeminence in the public mind. (The average covered only 20 stocks until 1928.)

Originally, the DJIA was calculated as the simple average of the stocks included in the index. Thus, one would add up the prices of the 30 stocks in the index and divide by 30. The percentage change in the DJIA would then be the percentage change in the average price of the 30 shares.

This procedure means that the percentage change in the DJIA measures the return (excluding dividends) on a portfolio that invests one share in each of the 30 stocks in the index. The value of such a portfolio (holding one share of each stock in the index) is the sum of the 30 prices. Because the percentage change in the *average* of the 30 prices is the same as the percentage change in the *sum* of the 30 prices, the index and the portfolio have the same percentage change each day.

Because the Dow corresponds to a portfolio that holds one share of each component stock, the investment in each company in that portfolio is proportional to the company's share price. Therefore, the Dow is called as **price-weighted average**.

EXAMPLE 2.2 Price-Weighted Average

Consider the data in Table 2.3 for a hypothetical two-stock version of the Dow Jones Average. Let's compare the changes in the value of the portfolio holding one share of each firm and the price-weighted index. Stock ABC starts at \$25 a share and increases to \$30. Stock XYZ starts at \$100, but falls to \$90.

Portfolio:	Initial value = \$25 + \$100 = \$125
	Final value = \$30 + \$90 = \$120
	Percentage change in portfolio value = $5/125 = -.04 = -4\%$
Index:	Initial index value = $(25 + 100)/2 = 62.5$
	Final index value = $(30 + 90)/2 = 60$
	Percentage change in index = $-2.5/62.5 = -.04 = -4\%$

The portfolio and the index have identical 4% declines in value.

Notice that price-weighted averages give higher-priced shares more weight in determining performance of the index. For example, although ABC increased by 20%, while XYZ fell by only 10%, the index dropped in value. This is because the 20% increase in ABC represented a smaller price gain (\$5 per share) than the 10% decrease in XYZ (\$10 per share). The "Dow portfolio" has XYZ's price is four times that of ABC. Therefore, XYZ dominates the average. We conclude that a high-price stock can dominate a price-weighted average.

Stock	Initial Price	Final Price	Shares (million)	Initial Value of Outstanding Stock (\$ million)	Final Value of Outstanding Stock (\$ million)
ABC	\$25	\$30	20	\$500	\$600
XYZ	100	90	1	100	90
Total				\$600	\$690

TABLE 2.3

Data to construct stock price indexes

You might wonder why the DJIA is now (in early 2008) at a level of about 13,000 if it is supposed to be the average price of the 30 stocks in the index. The DJIA no longer equals the average price of the 30 stocks because the averaging procedure is adjusted whenever a stock splits or pays a stock dividend of more than 10%, or when one company in the group of 30 industrial firms is replaced by another. When these events occur, the divisor used to compute the “average price” is adjusted so as to leave the index unaffected by the event.

EXAMPLE 2.3 Splits and Price-Weighted Averages

Suppose XYZ were to split two for one so that its share price fell to \$50. We would not want the average to fall, as that would incorrectly indicate a fall in the general level of market prices. Following a split, the divisor must be reduced to a value that leaves the average unaffected. Table 2.4 illustrates this point. The initial share price of XYZ, which was \$100 in Table 2.3, falls to \$50 if the stock splits at the beginning of the period. Notice that the number of shares outstanding doubles, leaving the market value of the total shares unaffected.

We find the new divisor as follows. The index value before the stock split = $125/2 = 62.5$. We must find a new divisor, d , that leaves the index unchanged after XYZ splits and its price falls to \$50. Therefore, we solve for d in the following equation:

$$\frac{\text{Price of ABC} + \text{Price of XYZ}}{d} = \frac{25 + 50}{d} = 62.5$$

which implies that the divisor must fall from its original value of 2.0 to a new value of 1.20.

Because the split changes the price of stock XYZ, it also changes the relative weights of the two stocks in the price-weighted average. Therefore, the return of the index is affected by the split.

At period-end, ABC will sell for \$30, while XYZ will sell for \$45, representing the same negative 10% return it was assumed to earn in Table 2.3. The new value of the price-weighted average is $(30 + 45)/1.20 = 62.5$, the same as its value at the start of the year; therefore, the rate of return is zero, rather than the -4% return that we calculated in the absence of a split.

The split reduces the relative weight of XYZ because its initial price is lower; because XYZ is the poorer-performing stock, the performance of the average is higher. This example illustrates that the implicit weighting scheme of a price-weighted average is somewhat arbitrary, being determined by the prices rather than by the outstanding market values (price per share times number of shares) of the shares in the average.

TABLE 2.4

Data to construct stock price indexes after a stock split

Stock	Initial Price	Final Price	Shares (million)	Initial Value of Outstanding Stock (\$ million)	Final Value of Outstanding Stock (\$ million)
ABC	\$25	\$30	20	\$500	\$600
XYZ	50	45	2	100	90
Total				\$600	\$690

HOW THE 30 STOCKS IN THE DOW JONES INDUSTRIAL AVERAGE HAVE CHANGED SINCE OCT. 1, 1928

Oct. 1, 1928	1929	1930s	1940s	1950s	1960s	1970s	1980s	1990s	April 8, 2004
Wright Aeronautical	Curtiss-Wright ('29)	Hudson Motor ('30) Coca-Cola ('32) National Steel ('35)	Aluminum Co. of America ('59)					Alcoa*	Alcoa
Allied Chemical & Dye							Allied Signal* ('85)	Honeywell*	Honeywell [‡]
North American		Johns-Manville ('30)					Amer. Express ('82)		American Express
Victor Talking Machine	Natl Cash Register ('29)	IBM ('32) AT&T ('39)							AI Group
International Nickel					Inco Ltd.* ('76)		Boeing ('87)		Boeing
International Harvester							Navistar* ('86)	Caterpillar ('91)	Caterpillar
Westinghouse Electric								Travelers Group ('97)	Citigroup*
Texas Gulf Sulphur		Intl. Shoe ('32) United Aircraft ('33) National Distillers ('34)	Owens-Illinois ('59)				Coca-Cola ('87)		Coca-Cola
American Sugar		Borden ('30) DuPont ('35)							DuPont
American Tobacco (B)		Eastman Kodak ('30)							Pfizer
Standard Oil (N.J.)							Exxon* ('72)	ExxonMobil*	ExxonMobil
General Electric									General Electric
General Motors									General Motors
Texas Corp.			Texaco* ('59)					Hewlett-Packard ('97)	Hewlett-Packard
Sears Roebuck								Home Depot	Home Depot
Chrysler				IBM ('79)					IBM
Atlantic Refining		Goodyear ('30)						Intel	Intel
Paramount Publix		Loew's ('32)	Intl. Paper ('56)						Verizon
Bethlehem Steel								Johnson & Johnson ('97)	Johnson & Johnson
General Railway Signal		Liggett & Myers ('30) Amer. Tobacco ('32)					McDonald's ('85)		McDonald's
Mack Trucks		Drug Inc. ('32) Corn Products ('33)	Swift & Co. ('59)	Esmark* ('73) Merck ('79)					Merck
Union Carbide								Microsoft	Microsoft
American Smelting			Anaconda ('59)	Minn. Mining ('76)					Minn. Mining (3M)
American Can							Primerica* ('87)	J.P. Morgan ('91)	J.P. Morgan
Postum Inc.	General Foods* ('29)						Philip Morris ('85)		Altria Group [‡]
Nash Motors		United Air Trans. ('30) Procter & Gamble ('32)							Procter & Gamble
Goodrich		Standard Oil (Calif) ('30)					Chevron* ('84)	SBC Communications	SBC Communications
Radio Corp.		Nash Motors ('32) United Aircraft ('39)			United Tech.* ('75)				United Technologies
Woolworth								Wal-Mart Stores ('97)	Wal-Mart
U.S. Steel							USX Corp.* ('86)	Walt Disney ('91)	Walt Disney

Notes: Year of change shown in (); * denotes name change, in some cases following a takeover or merger. To track changes in the components, begin in the column for 1928 and work across. For instance, American Sugar was replaced by Borden in 1930, which in turn was replaced by Du Pont in 1935. [‡]This table does not reflect the change in index components occurring on February 19, 2008, when Bank of America and Chevron replaced Honeywell International and Altria Group.

Source: *The Wall Street Journal*, October 27, 1999. Reprinted by permission of Dow Jones & Company, Inc. via Copyright Clearance Center, Inc. © 1999. Dow Jones & Company, Inc. All Rights Reserved Worldwide. Updated by authors.

Because the Dow Jones Averages are based on small numbers of firms, care must be taken to ensure that they are representative of the broad market. As a result, the composition of the average is changed every so often to reflect changes in the economy. The last change took place on February 19, 2008, when Bank of America and Chevron replaced Altria Group and Honeywell International in the index. The nearby box presents the history of the firms in the index since 1928. The fate of many companies once considered “the bluest of the blue chips” is striking evidence of the changes in the U.S. economy in the last eight decades.

In the same way that the divisor is updated for stock splits, if one firm is dropped from the average and another firm with a different price is added, the divisor has to be updated to leave the average unchanged by the substitution. By 2008, the divisor for the Dow Jones Industrial Average had fallen to a value of about .123.

Dow Jones & Company also computes a Transportation Average of 20 airline, trucking, and railroad stocks; a Public Utility Average of 15 electric and natural gas utilities; and a Composite Average combining the 65 firms of the three separate averages. Each is a price weighted average, and thus overweights the performance of high-priced stocks.

CONCEPT CHECK

4

Suppose XYZ in Table 2.3 increases in price to \$110, while ABC falls to \$20. Find the percentage change in the price-weighted average of these two stocks. Compare that to the percentage return of a portfolio that holds one share in each company.

Standard & Poor's Indexes

The Standard & Poor's Composite 500 (S&P 500) stock index represents an improvement over the Dow Jones Averages in two ways. First, it is a more broadly based index of 500 firms. Second, it is a **market-value-weighted index**. In the case of the firms XYZ and ABC in Example 2.2, the S&P 500 would give ABC five times the weight given to XYZ because the market value of its outstanding equity is five times larger, \$500 million versus \$100 million.

The S&P 500 is computed by calculating the total market value of the 500 firms in the index and the total market value of those firms on the previous day of trading. The percentage increase in the total market value from one day to the next represents the increase in the index. The rate of return of the index equals the rate of return that would be earned by an investor holding a portfolio of all 500 firms in the index in proportion to their market values, except that the index does not reflect cash dividends paid by those firms.

Actually, most indexes today use a modified version of market-value weights. Rather than weighting by total market value, they weight by the market value of *free float*, that is, by the value of shares that are freely tradable among investors. For example, this procedure does not count shares held by founding families or governments. These shares are effectively not available for investors to purchase. The distinction is more important in Japan and Europe, where a higher fraction of shares are held in such nontraded portfolios.

EXAMPLE 2.4 Value-Weighted Indexes

To illustrate how value-weighted indexes are computed, look again at Table 2.3. The final value of all outstanding stock in our two-stock universe is \$690 million. The initial value was \$600 million. Therefore, if the initial level of a market-value-weighted index of stocks

ABC and XYZ were set equal to an arbitrarily chosen starting value such as 100, the index value at year-end would be $100 \times (690/600) = 115$. The increase in the index reflects the 15% return earned on a portfolio consisting of those two stocks held in proportion to outstanding market values.

Unlike the price-weighted index, the value-weighted index gives more weight to ABC. Whereas the price-weighted index fell because it was dominated by higher-price XYZ, the value-weighted index rises because it gives more weight to ABC, the stock with the higher total market value.

Note also from Tables 2.3 and 2.4 that market-value-weighted indexes are unaffected by stock splits. The total market value of the outstanding XYZ stock decreases from \$100 million to \$90 million regardless of the stock split, thereby rendering the split irrelevant to the performance of the index.

CONCEPT CHECK 5

Reconsider companies XYZ and ABC from Concept Check 4. Calculate the percentage change in the market-value-weighted index. Compare that to the rate of return of a portfolio that holds \$500 of ABC stock for every \$100 of XYZ stock (i.e., an index portfolio).

A nice feature of both market-value-weighted and price-weighted indexes is that they reflect the returns to straightforward portfolio strategies. If one were to buy shares in each component firm in the index in proportion to its outstanding market value, the value-weighted index would perfectly track capital gains on the underlying portfolio. Similarly, a price-weighted index tracks the returns on a portfolio comprised of an equal number of shares of each firm.

Investors today can easily buy market indexes for their portfolios. One way is to purchase shares in mutual funds that hold shares in proportion to their representation in the S&P 500 or another index. These **index funds** yield a return equal to that of the index and so provide a low-cost passive investment strategy for equity investors. Another approach is to purchase an *exchange-traded fund* or ETF, which is a portfolio of shares that can be bought or sold as a unit, just as one can buy or sell a single share of stock. Available ETFs range from portfolios that track extremely broad global market indexes all the way to narrow industry indexes. We discuss both mutual funds and ETFs in detail in Chapter 4.

Standard & Poor's also publishes a 400-stock Industrial Index, a 20-stock Transportation Index, a 40-stock Utility Index, and a 40-stock Financial Index.

Other U.S. Market-Value Indexes

The New York Stock Exchange publishes a market-value-weighted composite index of all NYSE-listed stocks, in addition to subindexes for industrial, utility, transportation, and financial stocks. These indexes are even more broadly based than the S&P 500. The National Association of Securities Dealers publishes an index of more than 3,000 firms traded on the NASDAQ market.

The ultimate U.S. equity index so far computed is the Wilshire 5000 index of the market value of all NYSE and American Stock Exchange (Amex) stocks plus actively traded NASDAQ stocks. Despite its name, the index actually includes about 6,000 stocks. The performance of many of these indexes appears daily in *The Wall Street Journal*.

Figure 2.9 shows the performance of the S&P 500, Dow Jones Industrial Average, and NASDAQ composite over a 6-year period. Usually, the indexes move closely together, as in this figure. Occasionally though, they diverge. For example, during the Internet boom

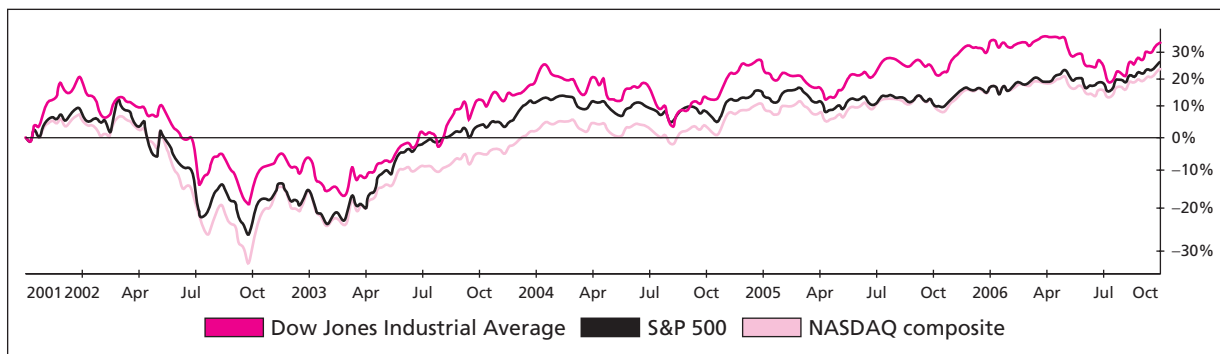


FIGURE 2.9 Comparative performance of several stock market indexes, 2001–2006

and bust of 1999–2002, the NASDAQ index, which is dominated by the technology sector, first greatly outperformed, and then underperformed, the S&P 500.

Equally Weighted Indexes

Market performance is sometimes measured by an equally weighted average of the returns of each stock in an index. Such an averaging technique, by placing equal weight on each return, corresponds to an implicit portfolio strategy that places equal dollar values on each stock. This is in contrast to both price weighting (which requires equal numbers of shares of each stock) and market value weighting (which requires investments in proportion to outstanding value).

Unlike price- or market-value-weighted indexes, equally weighted indexes do not correspond to buy-and-hold portfolio strategies. Suppose that you start with equal dollar investments in the two stocks of Table 2.3, ABC and XYZ. Because ABC increases in value by 20% over the year while XYZ decreases by 10%, your portfolio no longer is equally weighted. It is now more heavily invested in ABC. To reset the portfolio to equal weights, you would need to rebalance: sell off some ABC stock and/or purchase more XYZ stock. Such rebalancing would be necessary to align the return on your portfolio with that on the equally weighted index.

Foreign and International Stock Market Indexes

Development in financial markets worldwide includes the construction of indexes for these markets. Among these are the Nikkei (Japan), FTSE (U.K.; pronounced “footsie”), DAX (Germany), Hang Seng (Hong Kong), and TSX (Canada).

A leader in the construction of international indexes has been MSCI (Morgan Stanley Capital International), which computes over 50 country indexes and several regional indexes. Table 2.5 presents many of the indexes computed by MSCI.

Bond Market Indicators

Just as stock market indexes provide guidance concerning the performance of the overall stock market, several bond market indicators measure the performance of various categories of bonds. The three most well-known groups of indexes are those of Merrill Lynch, Lehman Brothers, and Salomon Smith Barney (now part of Citigroup). Table 2.6 lists the components of the bond market in 2007.

Regional Indexes		Countries	
Developed Markets	Emerging Markets	Developed Markets	Emerging Markets
EAFE (Europe, Australia, Far East)	Emerging Markets (EM)	Australia	Argentina
EASEA (EAFE excluding Japan)	EM Asia	Austria	Brazil
Europe	EM Far East	Belgium	Chile
European Monetary Union (EMU)	EM Latin America	Canada	China
Far East	Emerging Markets Free (EMF)	Denmark	Colombia
Kokusai (World excluding Japan)	EMF Asia	Finland	Czech Republic
Nordic Countries	EMF Eastern Europe	France	Egypt
North America	EMF Europe	Germany	Hungary
Pacific	EMF Europe & Middle East	Greece	India
The World Index	EMF Far East	Hong Kong	Indonesia
G7 countries	EMF Latin America	Ireland	Israel
World excluding U.S.		Italy	Jordan
		Japan	Korea
		Netherlands	Malaysia
		New Zealand	Mexico
		Norway	Morocco
		Portugal	Pakistan
		Singapore	Peru
		Spain	Philippines
		Sweden	Poland
		Switzerland	Russia
		U.K.	South Africa
		U.S.	Sri Lanka
			Taiwan
			Thailand
			Turkey
			Venezuela

TABLE 2.5

Sample of MSCI stock indexes

Source: www.msibarra.com.

Sector	Size (\$ billion)	% of Market
Treasury	\$4,554.4	25.0%
Government sponsored enterprise	2,686.1	14.7
Corporate	3,111.4	17.1
Tax-exempt*	2,090.4	11.5
Mortgage-backed	3,818.3	20.9
Asset-backed	1,985.8	10.9
<i>Total</i>	<i>\$18,246.4</i>	<i>100.0%</i>

*Includes private-purpose tax-exempt debt.

Source: *Flow of Funds Accounts of the United States: Flows & Outstandings*, Board of Governors of the Federal Reserve System, June 2007.**TABLE 2.6**

The U.S. bond market

The major problem with bond market indexes is that true rates of return on many bonds are difficult to compute because the infrequency with which the bonds trade make reliable up-to-date prices difficult to obtain. In practice, some prices must be estimated from bond-valuation models. These “matrix” prices may differ from true market values.

2.5 DERIVATIVE MARKETS

One of the most significant developments in financial markets in recent years has been the growth of futures, options, and related derivatives markets. These instruments provide payoffs that depend on the values of other assets such as commodity prices, bond and stock prices, or market index values. For this reason these instruments sometimes are called **derivative assets**, or **contingent claims**. Their values derive from or are contingent on the values of other assets.

Options

A **call option** gives its holder the right to purchase an asset for a specified price, called the **exercise** or **strike price**, on or before a specified expiration date. For example, a December call option on General Electric stock with an exercise price of \$35 entitles its owner to purchase GE stock for a price of \$35 at any time up to and including the expiration date in December. Each option contract is for the purchase of 100 shares. However, quotations are made on a per-share basis. The holder of the call need not exercise the option; it will be profitable to exercise only if the market value of the asset that may be purchased exceeds the exercise price.

When the market price exceeds the exercise price, the option holder may “call away” the asset for the exercise price and reap a payoff equal to the difference between the stock price and the exercise price. Otherwise, the option will be left unexercised. If not exercised before the expiration date of the contract, the option simply expires and no longer has value. Calls therefore provide greater profits when stock prices increase and thus represent bullish investment vehicles.

In contrast, a **put option** gives its holder the right to sell an asset for a specified exercise price on or before a specified expiration date. A December put on GE with an exercise price of \$35 thus entitles its owner to sell GE stock to the put writer at a price of \$35 at any time before expiration in December, even if the market price of GE is lower than \$35. Whereas profits on call options increase when the asset increases in value, profits on put options increase when the asset value falls. The put is exercised only if its holder can deliver an asset worth less than the exercise price in return for the exercise price.

Figure 2.10 presents options quotations for GE. The price of GE shares on this date was \$41.10. The first two columns give the expiration month and exercise (or strike) price for each option. We have included listings for call and put options with exercise prices ranging from \$37.50 to \$42.50 per share, and with expiration dates in October, November, December 2007 and March 2008.

The next columns provide the closing prices, trading volume, and open interest (outstanding contracts) of each option. For example, 4,823 contracts traded on the October 2007 expiration call with exercise price of \$40. The last trade was at \$1.68, meaning that an option to purchase one share of GE at an exercise price of \$40 sold for \$1.68. Each option *contract* (on 100 shares) therefore costs \$168.

Notice that the prices of call options decrease as the exercise price increases. For example, the October expiration call with exercise price \$42.50 costs only \$.38. This makes

Gen EI (GE)		Underlying stock price: 41.10					
Expiration	Strike	Call			Put		
		Last	Volume	Open Interest	Last	Volume	Open Interest
Oct 2007	37.50	3.90	110	10411	0.12	394	20014
Nov 2007	37.50	4.23	112	2	0.27	236	140
Dec 2007	37.50	4.45	257	27876	0.49	507	33731
Mar 2008	37.50	...	...	5721	1.07	272	11931
Oct 2007	40.00	1.68	4823	46175	0.45	1659	17500
Nov 2007	40.00	2.14	897	135	0.70	170	163
Dec 2007	40.00	2.49	700	136176	1.06	356	36470
Mar 2008	40.00	3.35	113	13141	1.78	49	18901
Oct 2007	42.50	0.38	4525	66631	1.64	2838	5784
Nov 2007	42.50	0.72	1439	1996	1.83	67	269
Dec 2007	42.50	1.07	540	31560	2.13	805	10872
Mar 2008	42.50	1.90	74	9767	2.98	50	4054

FIGURE 2.10 Trading data on General Electric options

Source: Compiled from data downloaded from *The Wall Street Journal Online*, September 25, 2007.

sense, because the right to purchase a share at a higher exercise price is less valuable. Conversely, put prices increase with the exercise price. The right to sell a share of GE at a price of \$40 in October costs \$.45 while the right to sell at \$42.50 costs \$1.64.

Option prices also increase with time until expiration. Clearly, one would rather have the right to buy GE for \$40 at any time until December rather than at any time until October. Not surprisingly, this shows up in a higher price for the December expiration options. For example, the call with exercise price \$40 expiring in December sells for \$2.49, compared to only \$1.68 for the October call.

CONCEPT CHECK

6

What would be the profit or loss per share of stock to an investor who bought the October expiration GE call option with exercise price \$40 if the stock price at the expiration date is \$42? What about a purchaser of the put option with the same exercise price and expiration?

Futures Contracts

A **futures contract** calls for delivery of an asset (or in some cases, its cash value) at a specified delivery or maturity date for an agreed-upon price, called the futures price, to be paid at contract maturity. The *long position* is held by the trader who commits to purchasing the asset on the delivery date. The trader who takes the *short position* commits to delivering the asset at contract maturity.

Figure 2.11 illustrates the listing of several futures contracts. The top line in boldface type gives the contract name, the exchange on which the futures contract is traded (in parentheses), and the contract size. Thus, the first contract listed is for corn traded on the Chicago Board of Trade (CBT). Each contract calls for delivery of 5,000 bushels of corn.

The next several rows detail prices for contracts expiring on various dates. The March maturity contract opened during the day at a futures price of \$3.71 per bushel. The highest

Agriculture Futures						Currency Futures							
	OPEN	HIGH	LOW	SETTLE	CHG	OPEN INT							
Corn (CBT) -5,000 bu.; cents per bu.						Japanese Yen (CME) -¥12,500,000; \$ per 100¥							
March	371.00	372.50	360.50	362.25	-8.25	591,430	March	.8456	.8485	.8447	.8479	.0016	275,282
Dec	361.75	366.00	357.00	359.00	-3.00	311,690	June	.8561	.8579	.8545	.8577	.0016	5,119
Oats (CBT) -5,000 bu.; cents per bu.						British Pound (CME) -£62,500; \$ per £							
March	261.75	265.75	258.25	261.25	-.75	8,823	March	1.9516	1.9537	1.9403	1.9448	-.0063	136,995
Dec	233.00	234.25	232.50	233.75	.75	3,907	June	1.9446	1.9531	1.9402	1.9443	-.0063	191
Soybeans (CBT) -5,000 bu.; cents per bu.						Index Futures							
Jan	667.00	675.00	659.75	662.75	-6.50	9,947	DJ Industrial Average (CBT) -\$10 x index						
March	681.00	687.75	672.50	675.50	-6.50	220,362	March	12543	12575	12470	12549	19	64,555
						S&P 500 Index (CME) -\$250 x index							
						June							
						March							
						June							
						1425.20 1431.50 1417.00 1427.50 2.70 601,655							
						1432.00 1444.50 1430.50 1440.10 2.60 13,287							

FIGURE 2.11 Listing of selected futures contracts

Source: *The Wall Street Journal*, January 5, 2007. Reprinted by permission of Dow Jones & Company, Inc. via Copyright Clearance Center, Inc. © 2007 Dow Jones & Company, Inc. All Rights Reserved Worldwide.

futures price during the day was \$3.725, the lowest was \$3.605, and the settlement price (a representative trading price during the last few minutes of trading) was \$3.6225. The settlement price decreased by \$.0825 from the previous trading day. Finally, open interest, or the number of outstanding contracts, was 591,430. Corresponding information is given for each maturity date.

The trader holding the long position profits from price increases. Suppose that at contract maturity, corn is selling for \$3.8225 per bushel. The long position trader who entered the contract at the futures price of \$3.6225 on January 4 would pay the previously agreed-upon \$3.6225 for each unit of the index, which at contract maturity would be worth \$3.8225.

Because each contract calls for delivery of 5,000 bushels, the profit to the long position, would equal $5,000 \times (\$3.8225 - \$3.6225) = \$1,000$. Conversely, the short position must deliver 5,000 bushels for the previously agreed-upon futures price. The short position's loss equals the long position's profit.

The right to purchase the asset at an agreed-upon price, as opposed to the obligation, distinguishes call options from long positions in futures contracts. A futures contract *obliges* the long position to purchase the asset at the futures price; the call option, in contrast, *conveys the right* to purchase the asset at the exercise price. The purchase will be made only if it yields a profit.

Clearly, a holder of a call has a better position than the holder of a long position on a futures contract with a futures price equal to the option's exercise price. This advantage, of course, comes only at a price. Call options must be purchased; futures contracts may be entered into without cost. The purchase price of an option is called the *premium*. It represents the compensation the purchaser of the call must pay for the ability to exercise the option only when it is profitable to do so. Similarly, the difference between a put option and a short futures position is the right, as opposed to the obligation, to sell an asset at an agreed-upon price.

1. Money market securities are very short-term debt obligations. They are usually highly marketable and have relatively low credit risk. Their low maturities and low credit risk ensure minimal capital gains or losses. These securities trade in large denominations, but they may be purchased indirectly through money market funds.
2. Much of U.S. government borrowing is in the form of Treasury bonds and notes. These are coupon-paying bonds usually issued at or near par value. Treasury notes and bonds are similar in design to coupon-paying corporate bonds.
3. Municipal bonds are distinguished largely by their tax-exempt status. Interest payments (but not capital gains) on these securities are exempt from federal income taxes. The equivalent taxable yield offered by a municipal bond equals $r_m/(1 - t)$, where r_m is the municipal yield and t is the investor's tax bracket.
4. Mortgage pass-through securities are pools of mortgages sold in one package. Owners of pass-throughs receive the principal and interest payments made by the borrowers. The originator that issued the mortgage merely services it, simply "passing through" the payments to the purchasers of the mortgage. A federal agency may guarantee the payment of interest and principal on mortgages pooled into these pass-through securities.
5. Common stock is an ownership share in a corporation. Each share entitles its owner to one vote on matters of corporate governance and to a prorated share of the dividends paid to shareholders. Stock, or equity, owners are the residual claimants on the income earned by the firm.
6. Preferred stock usually pays fixed dividends for the life of the firm; it is a perpetuity. A firm's failure to pay the dividend due on preferred stock, however, does not precipitate corporate bankruptcy. Instead, unpaid dividends simply cumulate. Newer varieties of preferred stock include convertible and adjustable-rate issues.
7. Many stock market indexes measure the performance of the overall market. The Dow Jones Averages, the oldest and best-known indicators, are price-weighted indexes. Today, many broad-based, market-value-weighted indexes are computed daily. These include the Standard & Poor's 500 stock index, the NYSE index, the NASDAQ index, the Wilshire 5000 index, and indexes of many non-U.S. stock markets.
8. A call option is a right to purchase an asset at a stipulated exercise price on or before an expiration date. A put option is the right to sell an asset at some exercise price. Calls increase in value while puts decrease in value as the price of the underlying asset increases.
9. A futures contract is an obligation to buy or sell an asset at a stipulated futures price on a maturity date. The long position, which commits to purchasing, gains if the asset value increases while the short position, which commits to purchasing, loses.

SUMMARY

Related Web sites for this chapter are available at www.mhhe.com/bkm

money market
capital markets
asked price
bid price
bid-asked spread
certificate of deposit
commercial paper
banker's acceptance
Eurodollars
repurchase agreements
federal funds

London Interbank Offered
Rate
Treasury notes
Treasury bonds
yield to maturity
municipal bonds
equivalent taxable yield
equities
residual claim
limited liability
capital gains

price-earnings ratio
preferred stock
price-weighted average
market-value-weighted index
index funds
derivative assets
contingent claims
call option
exercise (strike) price
put option
futures contract

KEY TERMS

PROBLEM SETS

Quiz

Problems

- In what ways is preferred stock like long-term debt? In what ways is it like equity?
- Why are money market securities sometimes referred to as “cash equivalents”?
- What would you expect to happen to the spread between yields on commercial paper and Treasury bills if the economy were to enter a steep recession?
- Examine the first 50 stocks listed in the stock market listings for NYSE stocks in your local newspaper. For how many of these stocks is the 52-week high price at least 50% greater than the 52-week low price? What do you conclude about the volatility of prices on individual stocks?
- Turn back to Figure 2.4 and look at the first Treasury note maturing in November 2014.
 - How much would you have to pay to purchase one of these notes?
 - What is its coupon rate?
 - What is the current yield of the note?
- Suppose investors can earn a return of 2% per 6 months on a Treasury note with 6 months remaining until maturity. What price would you expect a 6-month maturity Treasury bill to sell for?
- 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.
- Turn to Figure 2.8 and look at the listing for General Dynamics.
 - What was the firm’s closing price yesterday?
 - How many shares could you buy for \$5,000?
 - What would be your annual dividend income from those shares?
 - What must be its earnings per share?
- Consider the three stocks in the following table. P_t represents price at time t , and Q_t represents shares outstanding at time t . Stock C splits two for one in the last period.

	P_0	Q_0	P_1	Q_1	P_2	Q_2
A	90	100	95	100	95	100
B	50	200	45	200	45	200
C	100	200	110	200	55	400

- Calculate the rate of return on a price-weighted index of the three stocks for the first period ($t = 0$ to $t = 1$).
 - What must happen to the divisor for the price-weighted index in year 2?
 - Calculate the rate of return for the second period ($t = 1$ to $t = 2$).
- Using the data in Problem 9, calculate the first-period rates of return on the following indexes of the three stocks:
 - A market-value-weighted index.
 - An equally weighted index.
 - An investor is in a 30% tax bracket. If corporate bonds offer 9% yields, what must municipals offer for the investor to prefer them to corporate bonds?
 - Find the equivalent taxable yield of a short-term municipal bond currently offering yields of 4% for tax brackets of zero, 10%, 20%, and 30%.
 - Which security should sell at a greater price?
 - A 10-year Treasury bond with a 9% coupon rate versus a 10-year T-bond with a 10% coupon.

- b. A 3-month maturity call option with an exercise price of \$40 versus a 3-month call on the same stock with an exercise price of \$35.
 - c. A put option on a stock selling at \$50, or a put option on another stock selling at \$60 (all other relevant features of the stocks and options may be assumed to be identical).
14. Look at the futures listings for the S&P 500 index in Figure 2.11.
 - a. Suppose you buy one contract for March delivery. If the contract closes in March at a level of 1300, what will your profit be?
 - b. How many March maturity contracts are outstanding?
 15. Turn back to Figure 2.10 and look at the GE options. Suppose you buy a November expiration call option with exercise price \$40.
 - a. Suppose the stock price in November is \$42. Will you exercise your call? What are the profit and rate of return on your position?
 - b. What if you had bought the November call with exercise price \$42.50?
 - c. What if you had bought a November put with exercise price \$42.50?
 16. Why do call options with exercise prices greater than the price of the underlying stock sell for positive prices?
 17. Both a call and a put currently are traded on stock XYZ; both have strike prices of \$50 and expirations of 6 months. What will be the profit to an investor who buys the call for \$4 in the following scenarios for stock prices in 6 months? What will be the profit in each scenario to an investor who buys the put for \$6?
 - a. \$40
 - b. \$45
 - c. \$50
 - d. \$55
 - e. \$60
 18. Explain the difference between a put option and a short position in a futures contract.
 19. Explain the difference between a call option and a long position in a futures contract.

Challenge Problems

1. A firm's preferred stock often sells at yields below its bonds because
 - a. Preferred stock generally carries a higher agency rating.
 - b. Owners of preferred stock have a prior claim on the firm's earnings.
 - c. Owners of preferred stock have a prior claim on a firm's assets in the event of liquidation.
 - d. Corporations owning stock may exclude from income taxes most of the dividend income they receive.
2. A municipal bond carries a coupon of $6\frac{3}{4}\%$ and is trading at par. What is the equivalent taxable yield to a taxpayer in a combined federal plus state 34% tax bracket?
3. Which is the *most risky* transaction to undertake in the stock index option markets if the stock market is expected to increase substantially after the transaction is completed?
 - a. Write a call option.
 - b. Write a put option.
 - c. Buy a call option.
 - d. Buy a put option.
4. Short-term municipal bonds currently offer yields of 4%, while comparable taxable bonds pay 5%. Which gives you the higher after-tax yield if your tax bracket is:
 - a. Zero
 - b. 10%



- c. 20%
 - d. 30%
5. The coupon rate on a tax-exempt bond is 5.6%, and the rate on a taxable bond is 8%. Both bonds sell at par. At what tax bracket (marginal tax rate) would an investor be indifferent between the two bonds?

Go to www.mhhe.com/edumarketinsight. Select the *Company* tab and enter ticker symbol DIS. Click on the EDGAR section and find the link for Disney's most recent annual report (10-K).

When you click on the link the entire filing will appear. Use the Edit, Find (on this page) menu to search for the words "commercial paper." Repeat the search as many times as necessary to answer the following questions.

1. What is the total amount of the net change in Disney's commercial paper borrowing as of the date of this statement?
2. How does Disney plan to use its commercial paper?
3. What are the net amounts of the company's commercial paper borrowings for the last 3 years?
4. What is the effective interest rate on Disney's commercial paper during the most recent year?

Now return to the main page and look in the S&P Stock Reports section for the Wall Street Consensus report. Answer the following questions based on the information in the report.

5. What is the Wall Street Consensus Opinion on Disney stock?
6. Has the opinion changed recently?
7. How many analysts follow this stock?
8. What are the average earnings estimates for the current year and for next year?
9. What growth rate in earnings is expected?

STANDARD
& POOR'S

Inflation-Protected Bonds around the World

Barclays maintains a Web site at <https://ecommerce.barcap.com/inflation/index.shtml> with information about inflation around the world and tools to help issuers and investors understand the inflation-linked asset class. Inflation-linked bonds were issued by a number of countries after 1945, including Israel, Argentina, Brazil, and Iceland. However, the modern market is generally deemed to have been born in 1981, when the first index-linked gilts were issued in the U.K. The other large markets adopted somewhat different calculations to those used by the U.K., mostly copying the more straightforward model first employed by Canada in 1991. In chronological order, the markets are the U.K. (1981), Australia (1985), Canada (1991), Sweden (1994), the United States (1997), France (1998), Italy (2003), and Japan (2004).

E-Investments

SOLUTIONS TO CONCEPT CHECKS

1. The bond sells for 100:26 bid which is a price of 100.813% of par, or \$1008.13, and 100:27 ask, or \$1,008.438. This ask price corresponds to a yield of 4.61%. The ask price rose $\frac{1}{32}$ from its level yesterday, so the ask price then must have been 100:18, or \$1,005.625.
2. A 6% taxable return is equivalent to an after-tax return of $6(1 - .30) = 4.2\%$. Therefore, you would be better off in the taxable bond. The equivalent taxable yield of the tax-free bond is $4/(1 - .30) = 5.71\%$. So a taxable bond would have to pay a 5.71% yield to provide the same after-tax return as a tax-free bond offering a 4% yield.
3.
 - a. You are entitled to a prorated share of IBM's dividend payments and to vote in any of IBM's stockholder meetings.
 - b. Your potential gain is unlimited because IBM's stock price has no upper bound.
 - c. Your outlay was $\$80 \times 100 = \$8,000$. Because of limited liability, this is the most you can lose.
4. The price-weighted index increases from 62.5 [i.e., $(100 + 25)/2$] to 65 [i.e., $(110 + 20)/2$], a gain of 4%. An investment of one share in each company requires an outlay of \$125 that would increase in value to \$130, for a return of 4% (i.e., $5/125$), which equals the return to the price-weighted index.
5. The market-value-weighted index return is calculated by computing the increase in the value of the stock portfolio. The portfolio of the two stocks starts with an initial value of \$100 million + \$500 million = \$600 million and falls in value to \$110 million + \$400 million = \$510 million, a loss of $90/600 = .15$, or 15%. The index portfolio return is a weighted average of the returns on each stock with weights of $\frac{1}{6}$ on XYZ and $\frac{5}{6}$ on ABC (weights proportional to relative investments). Because the return on XYZ is 10%, while that on ABC is -20% , the index portfolio return is $\frac{1}{6} \times 10\% + \frac{5}{6} \times (-20\%) = -15\%$, equal to the return on the market-value-weighted index.
6. The payoff to the call option is \$2 per share at maturity. The option cost is \$1.68 per share. The dollar profit is therefore \$0.32. The put option expires worthless. Therefore, the investor's loss is the cost of the put, or \$.45.