

that the latter is directly placed with a lender and not offered to the public. Because this is a private transaction, the specific terms are up to the parties involved.

There are many other dimensions to long-term debt, including such things as security, call features, sinking funds, ratings, and protective covenants. The following table illustrates these features for a bond issued by the cell phone company Sprint on February 22, 2018. If some of these terms are unfamiliar, have no fear. We discuss them all presently. Many of these features will be detailed in the bond indenture, so we discuss this first.

Features of a Sprint Bond		
Term		Explanation
Amount of issue	\$1.5 billion	The company issued \$1.5 billion worth of bonds.
Date of issue	02/22/2018	The bonds were sold on 02/22/2018.
Maturity	03/01/2026	The bonds mature on 03/01/2026.
Face value	\$2,000	The denomination of the bonds is \$2,000.
Annual coupon	7.625	Each bondholder will receive \$152.50 per bond per year (7.625% of face value).
Offer price	100	The offer price will be 100% of the \$2,000 face value, or \$2,000, per bond.
Coupon payment dates	03/01, 09/01	Coupons of $\$152.50/2 = \76.25 will be paid on these dates.
Security	None	The bonds are not secured by specific assets.
Sinking fund	None	The bonds have no sinking fund.
Call provision	At any time	The bonds do not have a deferred call.
Call price	Treasury rate plus .50%	The bonds have a "make-whole" call price.
Rating	Moody's B3; S&P B	The bonds have a "junk bond" credit rating.

Textbook solutions
Q&A

Sinking fund	None	The bonds have no sinking fund.
Call provision	At any time	The bonds do not have a deferred call.
Call price	Treasury rate plus .50%	The bonds have a "make-whole" call price.
Rating	Moody's B3; S&P B	The bonds have a "junk bond" credit rating.

The Indenture

The **indenture** is the written agreement between the corporation (the borrower) and its creditors. It is sometimes referred to as the *deed of trust*.³ Usually, a trustee (a bank, perhaps) is appointed by the corporation to represent the bondholders. The trust company must (1) make sure the terms of the indenture are obeyed; (2) manage the sinking fund (described in the following pages); and (3) represent the bondholders in default, that is, if the company defaults on its payments to them.

The bond indenture is a legal document. It can run several hundred pages and generally makes for very tedious reading. It is an important document, however, because it generally includes the following provisions:

1. The basic terms of the bonds.
2. The total amount of bonds issued.
3. A description of property used as security.
4. The repayment arrangements.
5. The call provisions.
6. Details of the protective covenants.

We discuss these features next.

³The term *loan agreement* or *loan contract* is usually used for privately placed debt and term loans.

indenture

The written agreement between the corporation and the lender detailing the terms of the debt issue.

Textbook solutions

Q&A

Terms of a Bond Corporate bonds have historically had a face value (i.e., a denomination) of \$1,000, although par values of \$2,000 like the Sprint bond have become fairly common. This is called the *principal value*, and it is stated on the bond certificate. So, if a corporation wanted to borrow \$1 million, 1,000 bonds with a face value of \$1,000 would have to be sold. The par value (i.e., initial accounting value) of a bond is almost always the same as the face value, and the terms are used interchangeably in practice.

Corporate bonds are usually in **registered form**. For example, the indenture might read as follows:

Interest is payable semiannually on July 1 and January 1 of each year to the person in whose name the bond is registered at the close of business on June 15 or December 15, respectively.

registered form

The registrar of a company records who owns each bond, and bond payments are made directly to the owner of record.

This means that the company has a registrar who will record the ownership of each bond and record any changes in ownership. The company will pay the interest and principal directly to the owner of record. Long ago, corporate bonds (and other types) had attached “coupons.” To obtain an interest payment, the owner had to separate a coupon from the bond certificate and send it to the company registrar (the paying agent).

bearer form

A bond issued without record of the owner's name; payment is made to whomever holds the bond.

Alternatively, the bond could be in **bearer form**. This means that the certificate is the basic evidence of ownership, and the corporation will “pay the bearer.” Ownership is not otherwise recorded, and, as with a registered bond with attached coupons, the holder of the bond certificate detaches the coupons and sends them to the company to receive payment.

Bearer form

A bond issued without record of the owner's name; payment is made to whomever holds the bond.

Alternatively, the bond could be in bearer form. This means that the certificate is the basic evidence of ownership, and the corporation will "pay the bearer." Ownership is not otherwise recorded, and, as with a registered bond with attached coupons, the holder of the bond certificate detaches the coupons and sends them to the company to receive payment.

There are two drawbacks to bearer bonds. First, they are difficult to recover if they are lost or stolen. Second, because the company does not know who owns its bonds, it cannot notify bondholders of important events. Bearer bonds were once the dominant type, but they are now much less common (in the United States) than registered bonds.

Security Debt securities are classified according to the collateral and mortgages used to protect the bondholder.

Collateral is a general term that frequently means securities (e.g., bonds and stocks) that are pledged as security for payment of debt. For example, collateral trust bonds often involve a pledge of common stock held by the corporation. However, the term *collateral* is commonly used to refer to any asset pledged on a debt.

Mortgage securities are secured by a mortgage on the real property of the borrower. The property involved is usually real estate, for example, land or buildings. The legal document that describes the mortgage is called a *mortgage trust indenture* or *trust deed*. A "blanket" mortgage pledges all the real property owned by the company.⁴

Bonds frequently represent unsecured obligations of the company. A **debenture** is an unsecured bond, for which no specific pledge of property is made. The term **note** is generally used for such instruments if the maturity of the unsecured bond is less than 10 or so years from when the bond is originally issued. Debenture holders only have a claim on property not otherwise pledged; in other words, the property that remains after mortgages and collateral trusts are taken into account.

The terminology that we use here and elsewhere in this chapter is standard in the United States. Outside the United States, these same terms can have different meanings.

debenture

Unsecured debt, usually with a maturity of 10 years or more.

note

Unsecured debt, usually with a maturity of under 10 years.

⁴Real property includes land and things "affixed thereto." It does not include cash or inventories.

For example, bonds issued by the British government ("gilts") are called treasury "stock." Also, in the United Kingdom, a debenture is a *secured* obligation.

At the current time, almost all public bonds issued in the United States by industrial and financial companies are debentures. However, most utility and railroad bonds are secured by a pledge of assets.

Seniority In general terms, *seniority* indicates preference in position over other lenders, and debts are sometimes labeled as *senior* or *junior* to indicate seniority. Some debt is *subordinated*, as in, for example, a subordinated debenture.

In the event of default, holders of subordinated debt must give preference to other specified creditors. Usually, this means that the subordinated lenders will be paid off only after the specified creditors have been compensated. However, debt cannot be subordinated to equity.

Repayment Bonds can be repaid at maturity, at which time the bondholder will receive the stated, or face, value of the bond, or they may be repaid in part or in entirety before maturity. Early repayment in some form is more typical and often is handled through a sinking fund.

A **sinking fund** is an account managed by the bond trustee for the purpose of repaying the bonds. The company makes annual payments to the trustee, who then uses the funds to retire a portion of the debt. The trustee does this by either buying up some of the bonds in the market or calling in a fraction of the outstanding bonds. This second option is discussed in the next section.

There are many different kinds of sinking fund arrangements, and the details would be spelled out in the indenture. For example:

1. Some sinking funds start about 10 years after the initial issuance.
2. Some sinking funds establish equal payments over the life of the bond.
3. Some high-quality bond issues establish payments to the sinking fund that are insufficient to redeem the entire issue. As a consequence, there is the possibility of a

The Securities Industry and Financial Markets Association (SIFMA) website is www.sifma.org.

sinking fund
An account managed by the bond trustee for early bond redemption.

← ↻ 🏠 🔒 https://www.chegg.com/reader/9781260394719/215/ 🔍 📄 📌 📖 📄

Search keywords 🔍

☰ 📄

in the next section.

There are many different kinds of sinking fund arrangements, and the details would be spelled out in the indenture. For example:

1. Some sinking funds start about 10 years after the initial issuance.
2. Some sinking funds establish equal payments over the life of the bond.
3. Some high-quality bond issues establish payments to the sinking fund that are insufficient to redeem the entire issue. As a consequence, there is the possibility of a large "balloon payment" at maturity.

The Call Provision A **call provision** allows the company to repurchase, or "call," part or all of the bond issue at stated prices over a specific period. Corporate bonds are usually callable.

Generally, the call price is above the bond's stated value (that is, the par value). The difference between the call price and the stated value is the **call premium**. The amount of the call premium usually becomes smaller over time. One arrangement is to initially set the call premium equal to the annual coupon payment and then make it decline to zero as the call date moves closer to the time of maturity.

Call provisions are not usually operative during the first part of a bond's life. This makes the call provision less of a worry for bondholders in the bond's early years. For example, a company might be prohibited from calling its bonds for the first 10 years. This is a **deferred call provision**. During this period of prohibition, the bond is said to be **call protected**.

In the last few years, use of a new type of call provision, a "make-whole" call, has become very widespread in the corporate bond market. With such a feature, bondholders receive exactly what the bonds are worth if they are called. When bondholders don't suffer a loss in the event of a call, they are made whole.

To determine the make-whole call price, we calculate the present value of the remaining interest and principal payments at a rate specified in the indenture. For example, looking at

call provision
Agreement giving the issuer the option to repurchase a bond at a specific price prior to maturity.

call premium
The amount by which the call price exceeds the par value of the bond.

deferred call provision
Bond call provision prohibiting the company from redeeming the bond prior to a certain date.

call protected bond
Bond during period in which it cannot be redeemed by the issuer.

← ————— →

🏠 🔍 Type here to search

179 of 689

Search keywords

our Sprint issue, we see that the discount rate is "Treasury rate plus .50%." What this means is that we determine the discount rate by first finding a U.S. Treasury issue with the same maturity. We calculate the yield to maturity on the Treasury issue and then add on an additional .50 percent to get the discount rate we use.

Notice that, with a make-whole call provision, the call price is higher when interest rates are lower and vice versa (why?). Also notice that, as is common with a make-whole call, the Sprint issue does not have a deferred call feature. Why might investors not be too concerned about the absence of this feature?

protective covenant

A part of the indenture limiting certain actions that might be taken during the term of the loan, usually to protect the lender's interest.

Protective Covenants A protective covenant is that part of the indenture or loan agreement that limits certain actions a company might otherwise wish to take during the term of the loan. Protective covenants can be classified into two types: negative covenants and positive (or affirmative) covenants.

A *negative covenant* is a "thou shalt not" type of covenant. It limits or prohibits actions that the company might take. Here are some typical examples:

1. The firm must limit the amount of dividends it pays according to some formula.
2. The firm cannot pledge any assets to other lenders.
3. The firm cannot merge with another firm.
4. The firm cannot sell or lease any major assets without approval by the lender.
5. The firm cannot issue additional long-term debt.

A *positive covenant* is a "thou shalt" type of covenant. It specifies an action that the company agrees to take or a condition the company must abide by. Here are some examples:

1. The company must maintain its working capital at or above some specified minimum level.
2. The company must periodically furnish audited financial statements to the lender.
3. The firm must maintain any collateral or security in good condition.

Want detailed information on the amount and terms of the debt issued by a particular firm? Check out the firm's latest financial

Want detailed information on the amount and terms of the debt issued by a particular firm? Check out the firm's latest financial statements by searching SEC filings at www.sec.gov.

agrees to take or a condition the company must abide by. Here are some examples:

1. The company must maintain its working capital at or above some specified minimum level.
2. The company must periodically furnish audited financial statements to the lender.
3. The firm must maintain any collateral or security in good condition.

This is only a partial list of covenants; a particular indenture may feature many different ones.

CONCEPT QUESTIONS

- 6.2a What are the distinguishing features of debt as compared to equity?
- 6.2b What is the indenture? What are protective covenants? Give some examples.
- 6.2c What is a sinking fund?

6.3 BOND RATINGS

Firms frequently pay to have their debt rated. The two leading bond-rating firms are Moody's and Standard and Poor's (S&P). The debt ratings are an assessment of the creditworthiness of the corporate issuer. The definitions of creditworthiness used by Moody's and S&P are based on how likely the firm is to default and the protection creditors have in the event of a default.

It is important to recognize that bond ratings are concerned *only* with the possibility of default. Earlier, we discussed interest rate risk, which we defined as the risk of a change in

the value of a bond resulting from a change in interest rates. Bond ratings do not address this issue. As a result, the price of a highly rated bond can still be quite volatile.

Bond ratings are constructed from information supplied by the corporation. The rating classes and some information concerning them are shown in the following table.

	Investment-Quality Bond Ratings				Low-Quality, Speculative, and/or "Junk" Bond Ratings					
	High Grade		Medium Grade		Low Grade			Very Low Grade		
Standard & Poor's	AAA	AA	A	BBB	BB	B	CCC	CC	C	D
Moody's	Aaa	Aa	A	Baa	Ba	B	Caa	Ca	C	

Moody's	S&P	Description
Aaa	AAA	Debt rated Aaa and AAA has the highest rating. Capacity to pay interest and principal is extremely strong.
Aa	AA	Debt rated Aa and AA has a very strong capacity to pay interest and repay principal. Together with the highest rating, this group constitutes the high-grade bond class.
A	A	Debt rated A has a strong capacity to pay interest and repay principal, although it is somewhat more susceptible to the adverse effects of changes in circumstances and economic conditions than debt in higher-rated categories.
Baa	BBB	Debt rated Baa and BBB is regarded as having an adequate capacity to pay interest and repay principal. Whereas it normally exhibits adequate protection parameters, adverse economic conditions or changing circumstances are more likely to lead to a weakened capacity to pay interest and repay principal for debt in this category than in higher-rated categories. These bonds are medium-grade obligations.
Ba; B	BB; B	Debt rated in these categories is regarded, on balance, as predominantly speculative with respect to capacity to pay interest and repay principal in accordance with the terms of the obligation. BB and Ba indicate the lowest degree of speculation, and Ca, CC, and C the highest degree of speculation. Although such debt is likely to have some quality and protective characteristics, these are outweighed
Caa	CCC	
Ca	CC	
C	C	



principal. Whereas it normally exhibits adequate protection parameters, adverse economic conditions or changing circumstances are more likely to lead to a weakened capacity to pay interest and repay principal for debt in this category than in higher-rated categories. These bonds are medium-grade obligations.

Ba; B	BB; B
Caa	CCC
Ca	CC
C	C
D	

Debt rated in these categories is regarded, on balance, as predominantly speculative with respect to capacity to pay interest and repay principal in accordance with the terms of the obligation. BB and Ba indicate the lowest degree of speculation, and Ca, CC, and C the highest degree of speculation. Although such debt is likely to have some quality and protective characteristics, these are outweighed by large uncertainties or major risk exposures to adverse conditions. Issues rated C by Moody's are typically in default.

Debt rated D is in default, and payment of interest and/or repayment of principal is in arrears.

Note: At times, both Moody's and S&P use adjustments (called notches) to these ratings. S&P uses plus and minus signs: A+ is the strongest A rating and A- the weakest. Moody's uses a 1, 2, or 3 designation, with 1 being the highest.

The highest rating a firm's debt can have is AAA or Aaa, and such debt is judged to be the best quality and to have the lowest degree of default risk. For example, the Sprint issue we discussed earlier was rated B. The AAA rating is not awarded very often: As of 2018, only two nonfinancial U.S. companies have AAA ratings, Johnson & Johnson and Microsoft. AA or Aa ratings indicate very good quality debt and are much more common. The lowest rating is D, for debt that is in default.

Beginning in the 1980s, a growing part of corporate borrowing has taken the form of low-grade, or "junk," bonds. If these low-grade corporate bonds are rated at all, they are rated below investment grade by the major rating agencies. Investment-grade bonds are bonds rated at least BBB by S&P or Baa by Moody's.

Some bonds are called "crossover" or "SB" bonds. The reason is that they are rated triple-B (or Baa) by one rating agency and double-B (or Ba) by another, a "split rating." For example, in February 2016, India-based textile and chemical company Standard Industries sold an issue of 10-year notes rated BBB- by S&P and Ba2 by Moody's.

Want to know what criteria are commonly used to rate corporate and municipal bonds? Go to www.standardandpoors.com, www.moody.com, or www.fitchinv.com.

A bond's credit rating can change as the issuer's financial strength improves or deteriorates. For example, in January 2018, Moody's downgraded Teva Pharmaceuticals from investment grade to junk bond status. Bonds that drop into junk territory from above are called "fallen angels." Why was Teva downgraded? The reason given by Moody's was a much higher debt load because of an ill-timed acquisition and weakening sales of a major drug. Executives of the company also had been accused of collaborating with contractors to pay bribes to politicians.

Credit ratings are important because defaults really do occur, and, when they do, investors can lose heavily. For example, in 2000, AmeriServe Food Distribution, Inc., which supplied restaurants such as Burger King with everything from burgers to giveaway toys, defaulted on \$200 million in junk bonds. After the default, the bonds traded at just 18 cents on the dollar, leaving investors with a loss of more than \$160 million.

Even worse in AmeriServe's case, the bonds had been issued only four months earlier, thereby making AmeriServe an NCAA champion. While that might be a good thing for a college basketball team such as the University of Kentucky Wildcats, in the bond market it means "No Coupon At All," and it's not a good thing for investors.

CONCEPT QUESTIONS

- 6.3a What is a junk bond?
- 6.3b What does a bond rating say about the risk of fluctuations in a bond's value resulting from interest rate changes?

6.4 SOME DIFFERENT TYPES OF BONDS

Thus far, we have considered only “plain vanilla” corporate bonds. In this section, we briefly look at bonds issued by governments and also at bonds with unusual features.

Government Bonds

The biggest borrower in the world—by a wide margin—is everybody’s favorite family member, Uncle Sam. In mid-2018, the total debt of the U.S. government was more than \$21.5 trillion, or about \$64,500 per U.S. citizen (and growing rapidly). When the government wishes to borrow money for more than one year, it sells what are known as Treasury notes and bonds to the public (in fact, it does so every month). Treasury notes have original maturities ranging from 2 to 10 years, while Treasury bonds have longer maturities, extending out as far as 30 years.

Most U.S. Treasury issues are ordinary coupon bonds. There are two important things to keep in mind, however. First, U.S. Treasury issues, unlike essentially all other bonds, have no default risk because (we hope) the Treasury always can come up with the money to make the payments. Second, Treasury issues are exempt from state income taxes (though not federal income taxes). In other words, the coupons you receive on a Treasury note or bond are taxed only at the federal level.

State and local governments also borrow money by selling notes and bonds. Such issues are called *municipal* notes and bonds, or “munis.” Unlike Treasury issues, munis have varying degrees of default risk, and, in fact, they are rated much like corporate issues. Also, they

If you’re nervous about the level of debt piled up by the U.S. government, don’t go to www.publicdebt.treas.gov or to www.usdebtclock.org! Learn all about government bonds at www.newyorkfed.org.

Textbook solutions

Q&A

File Chegg eReader
https://www.chegg.com/reader/9781260394719/219/

Search keywords

are almost always callable. The most intriguing thing about munis is that their coupons are exempt from federal income taxes (and state income taxes in some cases), which makes them very attractive to high-income, high-tax-bracket investors.

Because of the enormous tax break they receive, the yields on municipal bonds are much lower than the yields on taxable bonds. For example, in the middle of 2018, long-term, high-quality corporate bonds were yielding about 4.2 percent. At the same time, long-term, high-quality munis were yielding about 2.8 percent. Suppose an investor was in a 30 percent tax bracket. All else being the same, would this investor prefer an Aa corporate bond or an Aa municipal bond?

To answer, we need to compare the *aftertax* yields on the two bonds. Ignoring state and local taxes, the muni pays 2.8 percent on both a pretax and an aftertax basis. The corporate issue pays 4.2 percent before taxes, but it only pays $.042 \times (1 - .30) = .029$, or 2.9 percent, once we account for the 30 percent tax bite. Given this, the yields are quite close.

EXAMPLE 6.4 Taxable versus Municipal Bonds

Suppose taxable bonds are currently yielding 8 percent, while at the same time, munis of comparable risk and maturity are yielding 6 percent. Which is more attractive to an investor in a 40 percent tax bracket? What is the break-even tax rate? How do you interpret this rate?

For an investor in a 40 percent tax bracket, a taxable bond yields $8 \times (1 - .40) = 4.8$ percent after taxes, so the muni is much more attractive. The break-even tax rate is the tax rate at which an investor would be indifferent between a taxable and a nontaxable issue. If we let t^* stand for the break-even tax rate, then we can solve for it as follows:

$$.08 \times (1 - t^*) = .06$$
$$1 - t^* = .06 / .08 = .75$$
$$t^* = .25 \text{ or } 25\%$$

183 of 689

Suppose taxable bonds are currently yielding 8 percent, while at the same time, munis of comparable risk and maturity are yielding 6 percent. Which is more attractive to an investor in a 40 percent tax bracket? What is the break-even tax rate? How do you interpret this rate?

For an investor in a 40 percent tax bracket, a taxable bond yields $8 \times (1 - .40) = 4.8$ percent after taxes, so the muni is much more attractive. The break-even tax rate is the tax rate at which an investor would be indifferent between a taxable and a nontaxable issue. If we let t^* stand for the break-even tax rate, then we can solve for it as follows:

$$.08 \times (1 - t^*) = .06$$

$$1 - t^* = .06 / .08 = .75$$

$$t^* = .25 \text{ or } 25\%$$

Thus, an investor in a 25 percent tax bracket would make 6 percent after taxes from either bond.

Zero Coupon Bonds

A bond that pays no coupons at all must be offered at a price that is much lower than its stated value. Such bonds are called **zero coupon bonds**, or *zeros*.⁵

Suppose the Eight-Inch Nails (EIN) Company issues a \$1,000 face value, five-year zero coupon bond. The initial price is set at \$508.35. Even though no interest payments are made on the bond, zero coupon bond calculations use semiannual periods to be consistent with coupon bond calculations. Using semiannual periods, it is straightforward to verify that, at this price, the bond yields 14 percent to maturity. The total interest paid over the life of the bond is $\$1,000 - 508.35 = \491.65 .

For tax purposes, the issuer of a zero coupon bond deducts interest every year even though no interest is actually paid. Similarly, the owner must pay taxes on interest accrued every year, even though no interest is actually received.

zero coupon bond

A bond that makes no coupon payments, and thus is initially priced at a deep discount.

TABLE 6.2

Interest expense for EIN's zeroes

Year	Beginning Value	Ending Value	Implicit Interest Expense	Straight-Line Interest Expense
1	\$508.35	\$ 582.01	\$ 73.66	\$ 98.33
2	582.01	666.34	84.33	98.33
3	666.34	762.90	96.55	98.33
4	762.90	873.44	110.54	98.33
5	873.44	1,000.00	126.56	98.33
Total			\$491.65	\$491.65

Another good bond market site is money.cnn.com.

The way in which the yearly interest on a zero coupon bond is calculated is governed by tax law. Before 1982, corporations could calculate the interest deduction on a straight-line basis. For EIN, the annual interest deduction would have been $\$491.65/5 = \98.33 per year.

Under current tax law, the implicit interest is determined by amortizing the loan. We do this by first calculating the bond's value at the beginning of each year. For example, after one year, the bond will have four years until maturity, so it will be worth $\$1,000/1.07^4 = \582.01 ; the value in two years will be $\$1,000/1.07^6 = \666.34 ; and so on. The implicit interest each year is the change in the bond's value for the year. The values and interest expenses for the EIN bond are listed in Table 6.2.

Notice that under the old rules, zero coupon bonds were more attractive for corporations because the deductions for interest expense were larger in the early years (compare the implicit interest expense with the straight-line expense).

Under current tax law, EIN could deduct \$73.66 in interest paid the first year, and the owner of the bond would pay taxes on \$73.66 of taxable income (even though no interest was actually received). This second tax feature makes taxable zero coupon bonds less attractive to individuals. However, they are still a very attractive investment for tax-exempt investors with long-term dollar-denominated liabilities such as pension funds. Because the future

penses for the EIN bond are listed in Table 6.2.

Notice that under the old rules, zero coupon bonds were more attractive for corporations because the deductions for interest expense were larger in the early years (compare the implicit interest expense with the straight-line expense).

Under current tax law, EIN could deduct \$73.66 in interest paid the first year, and the owner of the bond would pay taxes on \$73.66 of taxable income (even though no interest was actually received). This second tax feature makes taxable zero coupon bonds less attractive to individuals. However, they are still a very attractive investment for tax-exempt investors with long-term dollar-denominated liabilities, such as pension funds, because the future dollar value is known with relative certainty.

Some bonds are zero coupon bonds for only part of their lives. For example, at one time, General Motors had a debenture outstanding that matured on March 15, 2036. For the first 20 years, no coupon payments were scheduled, but 20 years into the bond's life, it was to begin paying coupons at a rate of 7.75 percent per year, payable semiannually.

Floating-Rate Bonds

The conventional bonds we have talked about in this chapter have fixed-dollar obligations because the coupon rate is set as a fixed percentage of the par value. Similarly, the principal is set equal to the par value. Under these circumstances, the coupon payment and principal are completely fixed.

With *floating-rate bonds* (*floaters*), the coupon payments are adjustable. The adjustments are tied to an interest rate index such as the Treasury bill interest rate or the 30-year Treasury bond rate. The value of a floating-rate bond depends on exactly how the coupon payment adjustments are defined. In most cases, the coupon adjusts with a lag to some base rate. Suppose a coupon rate adjustment is made on June 1. The adjustment might be based on the simple average of Treasury bond yields during the previous three months.



File Chegg eReader
https://www.chegg.com/reader/9781260394719/221/

Search keywords

CHAPTER 6 Interest Rates and Bond Valuation 185

In addition, the majority of floaters have the following features:

1. The holder has the right to redeem the note at par on the coupon payment date after some specified amount of time. This is called a *put* provision, and it is discussed in the following section.
2. The coupon rate has a floor and a ceiling, meaning that the coupon is subject to a minimum and a maximum. In this case, the coupon rate is said to be "capped," and the upper and lower rates are sometimes called the *collar*.

Official information on U.S. inflation-indexed bonds is at www.treasurydirect.gov.

A particularly interesting type of floating-rate bond is an *inflation-linked* bond. Such bonds have coupons that are adjusted according to the rate of inflation (the principal amount may be adjusted as well). The U.S. Treasury began issuing such bonds in January of 1997. The issues are sometimes called "TIPS," or Treasury Inflation-Protected Securities. Other countries, including Canada, Israel, and Britain, have issued similar securities.

Other Types of Bonds

Many bonds have unusual, or exotic, features. Unfortunately, there are far too many variations for us to cover in detail here. We therefore focus on only a few of the more common types.

Structured notes are bonds that are based on stocks, bonds, commodities, or currencies. One particular type of structured note has a return based on a stock market index. At expiration, if the stock index has declined, the bond returns the principal. However, if the stock index has increased, the bond will return a portion of the stock index return, say 80 percent. Another type of structured note will return twice the stock index return, but with the potential for loss of principal.

A *convertible bond* can be swapped for a fixed number of shares of stock anytime before maturity at the holder's option. Convertibles are relatively common, but the number has been decreasing in recent years.

A *put bond* allows the *holder* to force the issuer to buy the bond back at a stated price.

Type here to search 185 of 689

File x Chegg eReader x +

https://www.chegg.com/reader/9781260394719/221/

Search keywords

Structured notes are bonds that are based on stocks, bonds, commodities, or currencies. One particular type of structured note has a return based on a stock market index. At expiration, if the stock index has declined, the bond returns the principal. However, if the stock index has increased, the bond will return a portion of the stock index return, say 80 percent. Another type of structured note will return twice the stock index return, but with the potential for loss of principal.

A *convertible bond* can be swapped for a fixed number of shares of stock anytime before maturity at the holder's option. Convertibles are relatively common, but the number has been decreasing in recent years.

A *put bond* allows the *holder* to force the issuer to buy the bond back at a stated price. The put feature is therefore the reverse of the call provision and is a relatively new development.

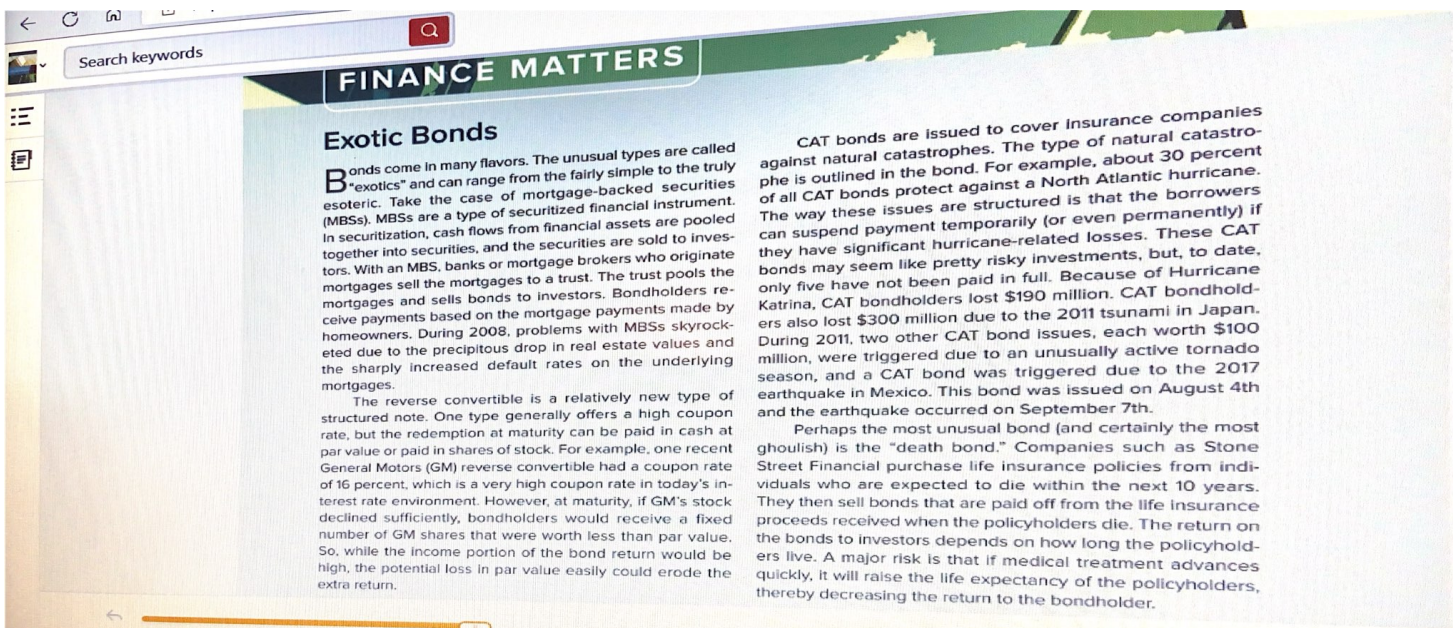
A given bond may have many unusual features. For example, two exotic bonds include CoCo bonds, which have a coupon payment, and NoNo bonds, which are zero coupon bonds. CoCo and NoNo bonds are contingent convertible, puttable, callable, subordinated bonds. The contingent convertible clause is similar to the normal conversion feature, except the contingency feature must be met. For example, a contingency feature may require that the company stock trade at 110 percent of the conversion price for 20 out of 30 days. Valuing a bond of this sort can be quite complex, and the yield to maturity calculation is often meaningless. The nearby *Finance Matters* box provides some more examples of exotic bonds.

CONCEPT QUESTIONS

6.4a What do you think would be the effect of a call provision on a bond's coupon? Why might an investor want to buy a callable bond?

6.4b What do you think would be the effect of a put feature on a bond's coupon? How about a convertibility feature? Why?

185 of 689



FINANCE MATTERS

Exotic Bonds

Bonds come in many flavors. The unusual types are called "exotics" and can range from the fairly simple to the truly esoteric. Take the case of mortgage-backed securities (MBSs). MBSs are a type of securitized financial instrument. In securitization, cash flows from financial assets are pooled together into securities, and the securities are sold to investors. With an MBS, banks or mortgage brokers who originate the mortgages sell the mortgages to a trust. The trust pools the mortgages and sells bonds to investors. Bondholders receive payments based on the mortgage payments made by homeowners. During 2008, problems with MBSs skyrocketed due to the precipitous drop in real estate values and the sharply increased default rates on the underlying mortgages.

The reverse convertible is a relatively new type of structured note. One type generally offers a high coupon rate, but the redemption at maturity can be paid in cash at par value or paid in shares of stock. For example, one recent General Motors (GM) reverse convertible had a coupon rate of 16 percent, which is a very high coupon rate in today's interest rate environment. However, at maturity, if GM's stock declined sufficiently, bondholders would receive a fixed number of GM shares that were worth less than par value. So, while the income portion of the bond return would be high, the potential loss in par value easily could erode the extra return.

CAT bonds are issued to cover insurance companies against natural catastrophes. The type of natural catastrophe is outlined in the bond. For example, about 30 percent of all CAT bonds protect against a North Atlantic hurricane. The way these issues are structured is that the borrowers can suspend payment temporarily (or even permanently) if they have significant hurricane-related losses. These CAT bonds may seem like pretty risky investments, but, to date, only five have not been paid in full. Because of Hurricane Katrina, CAT bondholders lost \$190 million. CAT bondholders also lost \$300 million due to the 2011 tsunami in Japan. During 2011, two other CAT bond issues, each worth \$100 million, were triggered due to an unusually active tornado season, and a CAT bond was triggered due to the 2017 earthquake in Mexico. This bond was issued on August 4th and the earthquake occurred on September 7th.

Perhaps the most unusual bond (and certainly the most ghoulish) is the "death bond." Companies such as Stone Street Financial purchase life insurance policies from individuals who are expected to die within the next 10 years. They then sell bonds that are paid off from the life insurance proceeds received when the policyholders die. The return on the bonds to investors depends on how long the policyholders live. A major risk is that if medical treatment advances quickly, it will raise the life expectancy of the policyholders, thereby decreasing the return to the bondholder.

6.5 BOND MARKETS



Bonds are bought and sold in enormous quantities every day. You may be surprised to learn that the trading volume in bonds on a typical day is many, many times larger than the trading volume in stocks (by trading volume, we mean the amount of money that changes hands). Here is a finance trivia question: What is the largest securities market in the world? Most people would guess the New York Stock Exchange. In fact, the largest securities market in the world in terms of trading volume is the U.S. Treasury market.

How Bonds Are Bought and Sold

As we mentioned all the way back in Chapter 1, most trading in bonds takes place over the counter, or OTC. Recall that this means that there is no particular place where buying and selling occur. Instead, dealers around the country (and around the world) stand ready to buy and sell. The various dealers are connected electronically.

One reason the bond markets are so big is that the number of bond issues far exceeds the number of stock issues. There are two reasons for this. First, a corporation would typically have only one common stock issue outstanding (there are exceptions to this that we discuss in our next chapter). However, a single large corporation could easily have a dozen

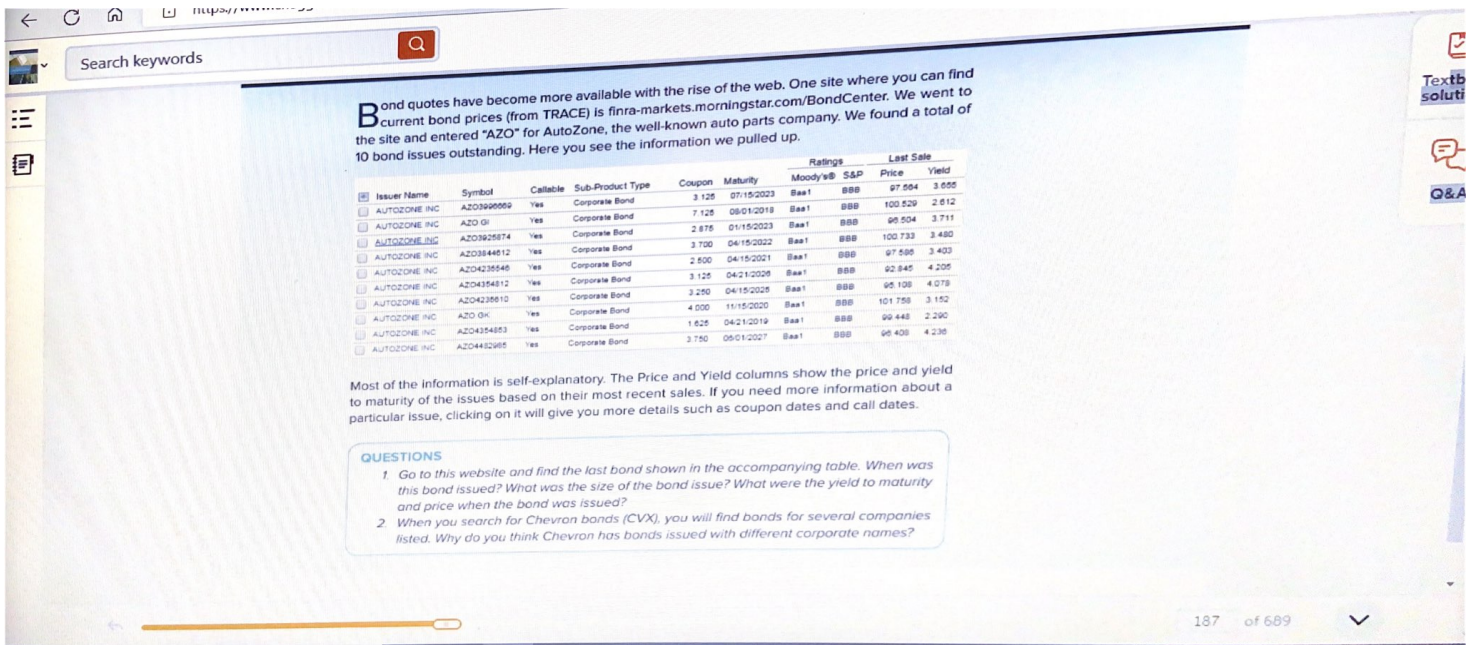
or more note and bond issues outstanding. Beyond this, federal, state, and local borrowing is enormous. For example, even a small city would usually have a wide variety of notes and bonds outstanding, representing money borrowed to pay for things like roads, sewers, and schools. When you think about how many small cities there are in the United States, you begin to get the picture!

Because the bond market is almost entirely OTC, it has historically had little or no *transparency*. A financial market is transparent if it is possible to easily observe its prices and trading volume. On the New York Stock Exchange, for example, it is possible to see the price and quantity for every single transaction. In contrast, in the bond market, historically it was not possible to observe either. Transactions are privately negotiated between parties, and there is little or no centralized reporting of transactions.

Although the total volume of trading in bonds far exceeds that in stocks, only a very small fraction of the total bond issues that exist actually trade on a given day. This means that getting up-to-date prices on individual bonds is often difficult or impossible, particularly for smaller corporate or municipal issues. Instead, a variety of sources of estimated prices exist and are very commonly used.

WORK THE WEB

Bond quotes have become more available with the rise of the web. One site where you can find



Bond quotes have become more available with the rise of the web. One site where you can find current bond prices (from TRACE) is finra-markets.morningstar.com/BondCenter. We went to the site and entered "AZO" for AutoZone, the well-known auto parts company. We found a total of 10 bond issues outstanding. Here you see the information we pulled up.

Issuer Name	Symbol	Callable	Sub-Product Type	Coupon	Maturity	Ratings		Last Sale	
						Moody's®	S&P	Price	Yield
AUTOZONE INC	AZ03990909	Yes	Corporate Bond	3.125	07/15/2023	Baa1	BBB	97.564	3.655
AUTOZONE INC	AZO 01	Yes	Corporate Bond	7.125	09/01/2018	Baa1	BBB	100.529	2.612
AUTOZONE INC	AZO 01	Yes	Corporate Bond	2.875	01/15/2023	Baa1	BBB	96.504	3.711
AUTOZONE INC	AZ03925874	Yes	Corporate Bond	3.700	04/15/2022	Baa1	BBB	100.733	3.480
AUTOZONE INC	AZ03844512	Yes	Corporate Bond	2.500	04/15/2021	Baa1	BBB	97.586	3.403
AUTOZONE INC	AZ04235546	Yes	Corporate Bond	3.125	04/21/2026	Baa1	BBB	92.845	4.205
AUTOZONE INC	AZ04354812	Yes	Corporate Bond	3.250	04/15/2025	Baa1	BBB	95.106	4.078
AUTOZONE INC	AZ04235510	Yes	Corporate Bond	4.000	11/15/2020	Baa1	BBB	101.758	3.152
AUTOZONE INC	AZO 0K	Yes	Corporate Bond	1.625	04/21/2019	Baa1	BBB	99.448	2.290
AUTOZONE INC	AZ04354853	Yes	Corporate Bond	1.625	04/21/2019	Baa1	BBB	96.408	4.236
AUTOZONE INC	AZ04432965	Yes	Corporate Bond	3.750	05/01/2027	Baa1	BBB	96.408	4.236

Most of the information is self-explanatory. The Price and Yield columns show the price and yield to maturity of the issues based on their most recent sales. If you need more information about a particular issue, clicking on it will give you more details such as coupon dates and call dates.

QUESTIONS

- 1 Go to this website and find the last bond shown in the accompanying table. When was this bond issued? What was the size of the bond issue? What were the yield to maturity and price when the bond was issued?
- 2 When you search for Chevron bonds (CVX), you will find bonds for several companies listed. Why do you think Chevron has bonds issued with different corporate names?