PART I

FIXED-INCOME ESSENTIALS
LEARNING OUTCOMES

After completing this chapter, you will be able to do the following:

• describe the basic features of a fixed-income security;
• describe functions of a bond indenture;
• compare affirmative and negative covenants and identify examples of each;
• describe how legal, regulatory, and tax considerations affect the issuance and trading of
  fixed-income securities;
• describe how cash flows of fixed-income securities are structured;
• describe contingency provisions affecting the timing and/or nature of cash flows of fixed-income
  securities and identify whether such provisions benefit the borrower or the lender.

1. INTRODUCTION

Judged by total market value, fixed-income securities constitute the most prevalent means
of raising capital globally. A fixed-income security is an instrument that allows governments,
companies, and other types of issuers to borrow money from investors. Any borrowing of
money is debt. The promised payments on fixed-income securities are, in general, contractual
(legal) obligations of the issuer to the investor. For companies, fixed-income securities contrast
to common shares in not having ownership rights. Payment of interest and repayment of prin-
cipal (amount borrowed) are a prior claim on the company’s earnings and assets compared with
the claim of common shareholders. Thus, a company’s fixed-income securities have, in theory,
lower risk than that company’s common shares.

In portfolio management, fixed-income securities fulfill several important roles. They are a
prime means by which investors—individual and institutional—can prepare to fund, with some

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degree of safety, known future obligations such as tuition payments or pension obligations. The correlations of fixed-income securities with common shares vary, but adding fixed-income securities to portfolios including common shares is usually an effective way of obtaining diversification benefits.

Among the questions this chapter addresses are the following:

- What set of features define a fixed-income security, and how do these features determine the scheduled cash flows?
- What are the legal, regulatory, and tax considerations associated with a fixed-income security, and why are these considerations important for investors?
- What are the common structures regarding the payment of interest and repayment of principal?
- What types of provisions may affect the disposal or redemption of fixed-income securities?

Embarking on the study of fixed-income securities, please note that the terms “fixed-income securities,” “debt securities,” and “bonds” are often used interchangeably by experts and non-experts alike. We will also follow this convention, and where any nuance of meaning is intended, it will be made clear.  

The remainder of this chapter is organized as follows. Section 2 describes, in broad terms, what an investor needs to know when investing in fixed-income securities. Section 3 covers both the nature of the contract between the issuer and the bondholders as well as the legal, regulatory, and tax framework within which this contract exists. Section 4 presents the principal and interest payment structures that characterize fixed-income securities. Section 5 discusses the contingency provisions that affect the timing and/or nature of a bond's cash flows. The final section provides a conclusion and summary of the chapter.

2. OVERVIEW OF A FIXED-INCOME SECURITY

There are three important elements that an investor needs to know about when investing in a fixed-income security:

- The bond's features, including the issuer, maturity, par value, coupon rate and frequency, and currency denomination. These features determine the bond's scheduled cash flows and, therefore, are key determinants of the investor's expected and actual return.
- The legal, regulatory, and tax considerations that apply to the contractual agreement between the issuer and the bondholders.
- The contingency provisions that may affect the bond's scheduled cash flows. These contingency provisions are options; they give the issuer or the bondholders certain rights affecting the bond's disposal or redemption.

This section describes a bond's basic features and introduces yield measures. The legal, regulatory, and tax considerations and contingency provisions are discussed in Sections 3 and 5, respectively.

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1 Note that the term “fixed income” is not to be understood literally: Some fixed-income securities have interest payments that change over time. Some experts include preference shares as a type of fixed-income security, but none view them as a type of bond. Finally, in some contexts, bonds refer to the longer-maturity form of debt securities in contrast to money market securities.
2.1. Basic Features of a Bond

All bonds, whether they are “traditional” bonds (i.e., non-securitized bonds) or securitized bonds, are characterized by the same basic features. **Securitized bonds** are created from a process called securitization, which involves moving assets into a special legal entity. This special legal entity then uses the assets as guarantees to back (secure) a bond issue, leading to the creation of securitized bonds. Assets that are typically used to create securitized bonds include residential and commercial mortgages, automobile loans, student loans, and credit card debt, among others.

2.1.1. Issuer

Many entities issue bonds: private individuals, such as the musician David Bowie; national governments, such as Singapore or Italy; and companies, such as BP, General Electric, or Tata Group.

Bond issuers are classified into categories based on the similarities of these issuers and their characteristics. Major types of issuers include the following:

- Supranational organizations, such as the World Bank or the European Investment Bank;
- Sovereign (national) governments, such as the United States or Japan;
- Non-sovereign (local) governments, such as the state of Minnesota in the United States, the region of Catalonia in Spain, or the city of Edmonton in Canada;
- Quasi-government entities (i.e., agencies that are owned or sponsored by governments), such as postal services in many countries—for example, Correios in Brazil, La Poste in France, or Pos in Indonesia; and
- Companies (i.e., corporate issuers). Market participants often distinguish between financial issuers (e.g., banks and insurance companies) and non-financial issuers.

Bondholders are exposed to credit risk—that is, the risk of loss resulting from the issuer failing to make full and timely payments of interest and/or repayments of principal. Credit risk is inherent to all debt investments. Bond markets are sometimes classified into sectors based on the issuer’s creditworthiness as judged by credit rating agencies. One major distinction is between investment-grade and non-investment-grade (also called high-yield or speculative) bonds. Although a variety of considerations enter into distinguishing the two sectors, the promised payments of investment-grade bonds are perceived as less risky than those of non-investment-grade bonds because of profitability and liquidity considerations. Some regulated financial intermediaries, such as banks and life insurance companies, may face explicit or implicit limitations of holdings of non-investment-grade bonds. The investment policy statements of some investors may also include constraints or limits on such holdings. From the issuer’s perspective, an investment-grade credit rating generally allows easier access to bond markets, especially in conditions of limited credit, and at lower interest rates than does a non-investment-grade credit rating.

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2. The three largest credit rating agencies are Moody’s Investors Service, Standard & Poor’s, and Fitch Ratings. Bonds rated Baa3 or higher by Moody’s and BBB– or higher by Standard & Poor’s and Fitch are considered investment grade.

3. Several other distinctions among credit ratings are made. They are discussed in depth in the chapter on fundamentals of credit analysis.
2.1.2. Maturity
The maturity date of a bond refers to the date when the issuer is obligated to redeem the bond by paying the outstanding principal amount. The tenor, also known as the term to maturity, is the time remaining until the bond’s maturity date. The tenor is an important consideration in the analysis of a bond. It indicates the period over which the bondholder can expect to receive the coupon payments and the length of time until the principal is repaid in full.

Maturities typically range from overnight to 30 years or longer. Fixed-income securities with maturities at issuance (original maturity) of one year or less are known as money market securities. Issuers of money market securities include governments and companies. Commercial paper and certificates of deposit are examples of money market securities. Fixed-income securities with original maturities that are longer than one year are called capital market securities. Although very rare, perpetual bonds, such as the consols issued by the sovereign government in the United Kingdom, have no stated maturity date.

2.1.3. Par Value
The principal amount, principal value, or simply principal of a bond is the amount that the issuer agrees to repay the bondholders on the maturity date. This amount is also referred to as the par value, or simply par, face value, nominal value, redemption value, or maturity value. Bonds can have any par value.

In practice, bond prices are quoted as a percentage of their par value. For example, assume that a bond’s par value is $1,000. A quote of 95 means that the bond price is $950 (95% × $1,000). When the bond is priced at 100% of par, the bond is said to be trading at par. If the bond’s price is below 100% of par, such as in the previous example, the bond is trading at a discount. Alternatively, if the bond’s price is above 100% of par, the bond is trading at a premium.

2.1.4. Coupon Rate and Frequency
The coupon rate or nominal rate of a bond is the interest rate that the issuer agrees to pay each year until the maturity date. The annual amount of interest payments made is called the coupon. A bond’s coupon is determined by multiplying its coupon rate by its par value. For example, a bond with a coupon rate of 6% and a par value of $1,000 will pay annual interest of $60 (6% × $1,000).

Coupon payments may be made annually, such as those for German government bonds or Bunds. Many bonds, such as government and corporate bonds issued in the United States or government gilts issued in the United Kingdom, pay interest semi-annually. Some bonds make quarterly or monthly interest payments. The acronyms QUIBS (quarterly interest bonds) and QUIDS (quarterly income debt securities) are used by Morgan Stanley and Goldman Sachs, respectively, for bonds that make quarterly interest payments. Many mortgage-backed securities pay interest monthly to match the cash flows of the mortgages backing these bonds. If a bond has a coupon rate of 6% and a par value of $1,000, the periodic interest payments will be $60 if coupon payments are made annually, $30 if they are made semi-annually, $15 if they are made quarterly, and $5 if they are made monthly.

A plain vanilla bond or conventional bond pays a fixed rate of interest. In this case, the coupon payment does not change during the bond’s life. However, there are bonds that pay a floating rate of interest; such bonds are called floating-rate notes (FRNs) or floaters. The coupon rate of an FRN includes two components: a reference rate plus a spread. The spread, also called margin, is typically constant and expressed in basis points (bps). A basis point is equal to 0.01%; put another way, there are 100 basis points in 1%. The spread is set when the bond
is issued based on the issuer’s creditworthiness at issuance: The higher the issuer’s credit quality, the lower the spread. The reference rate, however, resets periodically. Thus, as the reference rate changes, the coupon rate and coupon payment change accordingly.

A widely used reference rate is the London interbank offered rate (Libor). Libor is a collective name for a set of rates covering different currencies for different maturities ranging from overnight to one year. Other reference rates include the Euro interbank offered rate (Euribor), the Hong Kong interbank offered rate (Hibor), or the Singapore interbank offered rate (Sibor) for issues denominated in euros, Hong Kong dollars, and Singapore dollars, respectively. Euribor, Hibor, and Sibor are, like Libor, sets of rates for different maturities up to one year.

For example, assume that the coupon rate of an FRN that makes semi-annual interest payments in June and December is expressed as the six-month Libor + 150 bps. Suppose that in December 20X0, the six-month Libor is 3.25%. The interest rate that will apply to the payment due in June 20X1 will be 4.75% (3.25% + 1.50%). Now suppose that in June 20X1, the six-month Libor has decreased to 3.15%. The interest rate that will apply to the payment due in December 20X1 will decrease to 4.65% (3.15% + 1.50%). More details about FRNs are provided in Section 4.2.1.

All bonds, whether they pay a fixed or floating rate of interest, make periodic coupon payments except for zero-coupon bonds. Such bonds do not pay interest, hence their name. Instead, they are issued at a discount to par value and redeemed at par; they are sometimes referred to as pure discount bonds. The interest earned on a zero-coupon bond is implied and equal to the difference between the par value and the purchase price. For example, if the par value is $1,000 and the purchase price is $950, the implied interest is $50.

2.1.5. Currency Denomination

Bonds can be issued in any currency, although a large number of bond issues are made in either euros or US dollars. The currency of issue may affect a bond’s attractiveness. If the currency is not liquid or freely traded, or if the currency is very volatile relative to major currencies, investments in that currency will not appeal to many investors. For this reason, borrowers in developing countries often elect to issue bonds in a currency other than their local currency, such as in euros or US dollars, because doing so makes it easier to place the bond with international investors. Issuers may also choose to issue in a foreign currency if they are expecting cash flows in the foreign currency because the interest payments and principal repayments can act as a natural hedge, reducing currency risk. If a bond is aimed solely at a country’s domestic investors, it is more likely that the borrower will issue in the local currency.

Dual-currency bonds make coupon payments in one currency and pay the par value at maturity in another currency. For example, assume that a Japanese company needs to finance a long-term project in the United States that will take several years to become profitable. The Japanese company could issue a yen/US dollar dual-currency bond. The coupon payments in yen can be made from the cash flows generated in Japan, and the principal can be repaid in US dollars using the cash flows generated in the United States once the project becomes profitable.

Currency option bonds can be viewed as a combination of a single-currency bond plus a foreign currency option. They give bondholders the right to choose the currency in which they want to receive interest payments and principal repayments. Bondholders can select one of two currencies for each payment.

Exhibit 1 brings all the basic features of a bond together and illustrates how these features determine the cash flow pattern for a plain vanilla bond. The bond is a five-year Japanese government bond (JGB) with a coupon rate of 0.4% and a par value of ¥10,000. Interest payments are made semi-annually. The bond is priced at par when it is issued and is redeemed at par.
The downward-pointing arrow in Exhibit 1 represents the cash flow paid by the bond investor (received by the issuer) on the day of the bond issue—that is, ¥10,000. The upward-pointing arrows are the cash flows received by the bondholder (paid by the issuer) during the bond’s life. As interest is paid semi-annually, the coupon payment is ¥20 \([0.004 \times ¥10,000 \div 2]\) every six months for five years—that is, 10 coupon payments of ¥20. The last payment is equal to ¥10,020 because it includes both the last coupon payment and the payment of the par value.

EXHIBIT 1  Cash Flows for a Plain Vanilla Bond

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Semi-Annual Time Periods

EXAMPLE 1

1. An example of sovereign bond is a bond issued by:
   A. the World Bank.
   B. the city of New York.
   C. the federal German government.
2. The risk of loss resulting from the issuer failing to make full and timely payment of interest is called:
   A. credit risk.
   B. systemic risk.
   C. interest rate risk.
3. A money market security most likely matures in:
   A. one year or less.
   B. between one and 10 years.
   C. over 10 years.
4. If the bond’s price is higher than its par value, the bond is trading at:
   A. par.
   B. a discount.
   C. a premium.
5. A bond has a par value of £100 and a coupon rate of 5%. Coupon payments are made semi-annually. The periodic interest payment is:
   A. £2.50, paid twice a year.
   B. £5.00, paid once a year.
   C. £5.00, paid twice a year.

6. The coupon rate of a floating-rate note that makes payments in June and December is expressed as six-month Libor + 25 bps. Assuming that the six-month Libor is 3.00% at the end of June 20XX and 3.50% at the end of December 20XX, the interest rate that applies to the payment due in December 20XX is:
   A. 3.25%.
   B. 3.50%.
   C. 3.75%.

7. The type of bond that allows bondholders to choose the currency in which they receive each interest payment and principal repayment is a:
   A. pure discount bond.
   B. dual-currency bond.
   C. currency option bond.

Solution to 1: C is correct. A sovereign bond is a bond issued by a national government, such as the federal German government. A is incorrect because a bond issued by the World Bank is a supranational bond. B is incorrect because a bond issued by a local government, such as the city of New York, is a non-sovereign bond.

Solution to 2: A is correct. Credit risk is the risk of loss resulting from the issuer failing to make full and timely payments of interest and/or repayments of principal. B is incorrect because systemic risk is the risk of failure of the financial system. C is incorrect because interest rate risk is the risk that a change in market interest rate affects a bond’s value. Systemic risk and interest rate risk are defined in Sections 5.3 and 4.2.1, respectively.

Solution to 3: A is correct. The primary difference between a money market security and a capital market security is the maturity at issuance. Money market securities mature in one year or less, whereas capital market securities mature in more than one year.

Solution to 4: C is correct. If a bond’s price is higher than its par value, the bond is trading at a premium. A is incorrect because a bond is trading at par if its price is equal to its par value. B is incorrect because a bond is trading at a discount if its price is lower than its par value.

Solution to 5: A is correct. The annual coupon payment is $5\% \times £100 = £5.00$. The coupon payments are made semi-annually, so £2.50 paid twice a year.

Solution to 6: A is correct. The interest rate that applies to the payment due in December 20XX is the six-month Libor at the end of June 20XX plus 25 bps. Thus, it is 3.25% (3.00% + 0.25%).

Solution to 7: C is correct. A currency option bond gives bondholders the right to choose the currency in which they want to receive each interest payment and principal repayment. A is incorrect because a pure discount bond is issued at a discount to par value and redeemed at par. B is incorrect because a dual-currency bond makes coupon payments in one currency and pays the par value at maturity in another currency.
2.2. Yield Measures

There are several yield measures commonly used by market participants. The current yield or running yield is equal to the bond’s annual coupon divided by the bond’s price, expressed as a percentage. For example, if a bond has a coupon rate of 6%, a par value of $1,000, and a price of $1,010, the current yield is 5.94% ($60 / $1,010). The current yield is a measure of income that is analogous to the dividend yield for a common share.

The most commonly referenced yield measure is known as the yield to maturity, also called the yield to redemption or redemption yield. The yield to maturity is the internal rate of return on a bond’s expected cash flows—that is, the discount rate that equates the present value of the bond’s expected cash flows until maturity with the bond’s price. The yield to maturity can be considered an estimate of the bond’s expected return; it reflects the annual return that an investor will earn on a bond if this investor purchases the bond today and holds it until maturity. There is an inverse relationship between the bond’s price and its yield to maturity, all else being equal. That is, the higher the bond’s yield to maturity, the lower its price. Alternatively, the higher the bond’s price, the lower its yield to maturity. Thus, investors anticipating a lower interest rate environment (in which investors demand a lower yield-to-maturity on the bond) hope to earn a positive return from price appreciation. The chapter on understanding risk and return of fixed-income securities covers these fundamentals and more.

3. LEGAL, REGULATORY, AND TAX CONSIDERATIONS

A bond is a contractual agreement between the issuer and the bondholders. As such, it is subject to legal considerations. Investors in fixed-income securities must also be aware of the regulatory and tax considerations associated with the bonds in which they invest or want to invest.

3.1. Bond Indenture

The trust deed is the legal contract that describes the form of the bond, the obligations of the issuer, and the rights of the bondholders. Market participants frequently call this legal contract the bond indenture, particularly in the United States and Canada. The indenture is written in the name of the issuer and references the features of the bond issue, such as the principal value for each bond, the interest rate or coupon rate to be paid, the dates when the interest payments will be made, the maturity date when the bonds will be repaid, and whether the bond issue comes with any contingency provisions. The indenture also includes information regarding the funding sources for the interest payment and principal repayments, and it specifies any collaterals, credit enhancements, or covenants. Collaterals are assets or financial guarantees underlying the debt obligation above and beyond the issuer’s promise to pay. Credit enhancements are provisions that may be used to reduce the credit risk of the bond issue. Covenants are clauses that specify the rights of the bondholders and any actions that the issuer is obligated to perform or prohibited from performing.

Because it would be impractical for the issuer to enter into a direct agreement with each of many bondholders, the indenture is usually held by a trustee. The trustee is typically a financial institution with trust powers, such as the trust department of a bank or a trust company. It is appointed by the issuer, but it acts in a fiduciary capacity with the bondholders. The trustee’s role is to monitor that the issuer complies with the obligations specified in the indenture and
to take action on behalf of the bondholders when necessary. The trustee’s duties tend to be administrative and usually include maintaining required documentation and records; holding beneficial title to, safeguarding, and appraising collateral (if any); invoicing the issuer for interest payments and principal repayments; and holding funds until they are paid, although the actual mechanics of cash flow movements from the issuers to the trustee are typically handled by the principal paying agent. In the event of default, the discretionary powers of the trustee increase considerably. The trustee is responsible for calling meetings of bondholders to discuss the actions to take. The trustee can also bring legal action against the issuer on behalf of the bondholders.

For a plain vanilla bond, the indenture is often a standard template that is updated for the specific terms and conditions of a particular bond issue. For exotic bonds, the document is tailored and can often be several hundred pages.

When assessing the risk–reward profile of a bond issue, investors should be informed by the content of the indenture. They should pay special attention to their rights in the event of default. In addition to identifying the basic bond features described earlier, investors should carefully review the following areas:

- the legal identity of the bond issuer and its legal form;
- the source of repayment proceeds;
- the asset or collateral backing (if any);
- the credit enhancements (if any); and
- the covenants (if any).

We consider each of these areas in the following sections.

3.1.1. Legal Identity of the Bond Issuer and Its Legal Form
The legal obligation to make the contractual payments is assigned to the bond issuer. The issuer is identified in the indenture by its legal name. For a sovereign bond, the legal issuer is usually the office responsible for managing the national budget, such as HM Treasury (Her Majesty's Treasury) in the United Kingdom. The legal issuer may be different from the body that administers the bond issue process. Using the UK example, the legal obligation to repay gilts lies with HM Treasury, but the bonds are issued by the UK Debt Management Office, an executive agency of HM Treasury.

For corporate bonds, the issuer is usually the corporate legal entity—for example, Wal-Mart Stores Inc., Samsung Electronics Co. Ltd., or Volkswagen AG. However, bonds are sometimes issued by a subsidiary of a parent legal entity. In this case, investors should look at the credit quality of the subsidiary, unless the indenture specifies that the bond liabilities are guaranteed by the parent. When they are rated, subsidiaries often carry a credit rating that is lower than their parent, but this is not always the case. For example, in May 2012, Santander UK plc was rated higher by Moody's than its Spanish parent, Banco Santander.

Bonds are sometimes issued by a holding company, which is the parent legal entity for a group of companies, rather than by one of the operating companies in the group. This issue is important for investors to consider because a holding company may be rated differently from its operating companies and investors may lack recourse to assets held by those companies. If the bonds are issued by a holding company that has fewer (or no) assets to call on should it default, investors face a higher level of credit risk than if the bonds were issued by one of the operating companies in the group.
For securitized bonds, the legal obligation to repay the bondholders often lies with a separate legal entity that was created by the financial institution in charge of the securitization process. The financial institution is known as the sponsor or originator. The legal entity is most frequently referred to as a special purpose entity (SPE) in the United States and a special purpose vehicle (SPV) in Europe, and it is also sometimes called a special purpose company (SPC). The legal form for an SPV may be a limited partnership, a limited liability company, or a trust. Typically, SPVs are thinly capitalized, have no independent management or employees, and have no purpose other than the transactions for which they were created.

Through the securitization process, the sponsor transfers the assets to the SPV to carry out some specific transaction or series of transactions. One of the key reasons for forming an SPV is bankruptcy remoteness. The transfer of assets by the sponsor is considered a legal sale; once the assets have been securitized, the sponsor no longer has ownership rights. Any party making claims following the bankruptcy of the sponsor would be unable to recover the assets or their proceeds. As a result, the SPV’s ability to pay interest and repay the principal should remain intact even if the sponsor were to fail—hence the reason why the SPV is also called a bankruptcy-remote vehicle.

3.1.2. Source of Repayment Proceeds
The indenture usually describes how the issuer intends to service the debt (make interest payments) and repay the principal. Generally, the source of repayment for bonds issued by supranational organizations is either the repayment of previous loans made by the organization or the paid-in capital from its members. National governments may also act as guarantors for certain bond issues. If additional sources of repayment are needed, the supranational organization can typically call on its members to provide funds.

Sovereign bonds are backed by the “full faith and credit” of the national government and thus by that government’s ability to raise tax revenues and print money. Sovereign bonds denominated in local currency are generally considered the safest of all investments because governments have the power to raise taxes to make interest payments and principal repayments. Thus, it is highly probable that interest and principal will be paid fully and on time. As a consequence, the yields on sovereign bonds are typically lower than those for other local issuers.

There are three major sources for repayment of non-sovereign government debt issues, and bonds are usually classified according to these sources. The first source is through the general taxing authority of the issuer. The second source is from the cash flows of the project the bond issue is financing. The third source is from special taxes or fees established specifically for the purpose of funding the payment of interest and repayment of principal.

The source of payment for corporate bonds is the issuer’s ability to generate cash flows, primarily through its operations. These cash flows depend on the issuer’s financial strength and integrity. Because they carry a higher level of credit risk, corporate bonds typically offer a higher yield than sovereign bonds.

Securitizations typically rely on the cash flows generated by one or more underlying financial assets that serve as the primary source for the contractual payments to bondholders rather than on the claims-paying ability of an operating entity. A wide range of financial assets have been securitized, including residential and commercial mortgages, automobile loans, student loans, credit card receivables, equipment loans and leases, and business trade receivables. Unlike corporate bonds, most securitized bonds are amortized, meaning that the principal amount borrowed is paid back gradually over the specified term of the loan rather than in one lump sum at the maturity of the loan.
3.1.3. Asset or Collateral Backing
Collateral backing is a way to alleviate credit risk. Investors should review where they rank compared with other creditors in the event of default and analyze the quality of the collateral backing the bond issue.

3.1.3.1. Seniority Ranking  
Secured bonds are backed by assets or financial guarantees pledged to ensure debt repayment in the case of default. In contrast, unsecured bonds have no collateral; bondholders have only a general claim on the issuer’s assets and cash flows. Thus, unsecured bonds are paid after secured bonds in the event of default. By lowering credit risk, collateral backing increases the bond issue’s credit quality and decreases its yield.

A bond’s collateral backing might not specify an identifiable asset but instead may be described as the “general plant and infrastructure” of the issuer. In such cases, investors rely on seniority ranking, the systematic way in which lenders are repaid in case of bankruptcy or liquidation. What matters to investors is where they rank compared with other creditors rather than whether there is an asset of sufficient quality and value in place to cover their claims. Senior debt is debt that has a priority claim over subordinated debt or junior debt. Financial institutions issue a large volume of both senior unsecured and subordinated bonds globally; it is not uncommon to see large as well as smaller banks issue such bonds. For example, in 2012, banks as diverse as Royal Bank of Scotland in the United Kingdom and Prime Bank in Bangladesh issued senior unsecured bonds to institutional investors.

Debentures are a type of bond that can be secured or unsecured. In many jurisdictions, debentures are unsecured bonds, with no collateral backing assigned to the bondholders. In contrast, bonds known as “debentures” in the United Kingdom and in other Commonwealth countries, such as India, are usually backed by an asset or pool of assets assigned as collateral support for the bond obligations and segregated from the claims of other creditors. Thus, it is important for investors to review the indenture to determine whether a debenture is secured or unsecured. If the debenture is secured, debenture holders rank above unsecured creditors of the company; they have a specific asset or pool of assets that the trustee can call on to realize the debt in the event of default.

3.1.3.2. Types of Collateral Backing  
There is a wide range of bonds that are secured by some form of collateral. Some companies issue collateral trust bonds and equipment trust certificates. Collateral trust bonds are secured by securities such as common shares, other bonds, or other financial assets. These securities are pledged by the issuer and typically held by the trustee. Equipment trust certificates are bonds secured by specific types of equipment or physical assets, such as aircraft, railroad cars, shipping containers, or oil rigs. They are most commonly issued to take advantage of the tax benefits of leasing. For example, suppose an airline finances the purchase of new aircraft with equipment trust certificates. The legal title to the aircraft is held by the trustee, which issues equipment trust certificates to investors in the amount of the aircraft purchase price. The trustee leases the aircraft to the airline and collects lease payments from the airline to pay the interest on the certificates. When the certificates mature, the trustee sells the aircraft to the airline, uses the proceeds to retire the principal, and cancels the lease.

One of the most common forms of collateral for securitized bonds is mortgaged property. Mortgage-backed securities (MBS) are debt obligations that represent claims to the cash flows from pools of mortgage loans, most commonly on residential property. Mortgage loans are purchased from banks, mortgage companies, and other originators and then assembled into pools by a governmental, quasi-governmental, or private entity.
Financial institutions, particularly in Europe, issue covered bonds. A covered bond is a debt obligation backed by a segregated pool of assets called a “cover pool.” Covered bonds are similar to securitized bonds but offer bondholders additional protection if the financial institution defaults. A financial institution that sponsors securitized bonds transfers the assets backing the bonds to a SPV. If the financial institution defaults, investors who hold bonds in the financial institution have no recourse against the SPV and its pool of assets because the SPV is a bankruptcy-remote vehicle; the only recourse they have is against the financial institution itself. In contrast, in the case of covered bonds, the pool of assets remains on the financial institution’s balance sheet. In the event of default, bondholders have recourse against both the financial institution and the cover pool. Thus, the cover pool serves as collateral. If the assets that are included in the cover pool become non-performing (i.e., the assets are not generating the promised cash flows), the issuer must replace them with performing assets. Therefore, covered bonds usually carry lower credit risks and offer lower yields than otherwise similar securitized bonds.

3.1.4. Credit Enhancement
Credit enhancement refers to a variety of provisions that can be used to reduce the credit risk of a bond issue and is very often used in securitized bonds. Credit enhancement provides additional collateral, insurance, and/or a third-party guarantee that the issuer will meet its obligations. Thus, it reduces credit risk, which increases the issue’s credit quality and decreases the bond’s yield.

There are two primary types of credit enhancement: internal and external. Internal credit enhancement relies on structural features regarding the priority of payment or the value of the collateral. External credit enhancement refers to guarantees received from a third party, often called a guarantor. We describe each type in the following sections.

3.1.4.1. Internal Credit Enhancement
Subordination refers to the ordering of claim priorities for ownership or interest in an asset, and it is the most popular internal credit enhancement technique. The cash flows generated by the assets are allocated with different priority to classes of different seniority. The subordinated or junior tranches function as credit protection for the more senior tranches, in the sense that the class of highest seniority has the first claim on available cash flows. This type of protection is commonly referred to as a waterfall structure because in the event of default, the proceeds from liquidating assets will first be used to repay the most senior creditors. Thus, if the issuer defaults, losses are allocated from the bottom up (from the most junior to the most senior tranche). The most senior tranche is typically unaffected unless losses exceed the amount of the subordinated tranches, which is why the most senior tranche is usually rated Aaa/AAA.

Overcollateralization refers to the process of posting more collateral than is needed to obtain or secure financing. For example, in the case of MBS, the principal amount of an issue may be $100 million while the principal value of the mortgages underlying the issue may equal $120 million. One major problem associated with overcollateralization is the valuation of the collateral. For example, one of the most significant contributors to the 2007–2009 credit crisis was a valuation problem with the residential housing assets backing MBS. Many properties were originally valued in excess of the worth of the issued securities. But as property prices fell and homeowners started to default on their mortgages, the credit quality of many MBS declined sharply. The result was a rapid rise in yields and panic among investors in these securities.
Excess spread, sometimes called excess interest cash flow, is the difference between the cash flow received from the assets used to secure the issue and the interest paid to investors. The excess spread is sometimes deposited into a reserve account and serves as a first line of protection against losses. In a process called turboing, the excess spread is used to retire principal, with senior issues having the first claim on these funds.

3.1.4.2. External Credit Enhancement

One form of an external credit enhancement is a surety bond or a bank guarantee. Surety bonds and bank guarantees are very similar in nature because they both reimburse investors for any losses incurred if the issuer defaults. However, there is usually a maximum amount that is guaranteed, called the penal sum. The major difference between a surety bond and a bank guarantee is that the former is issued by a rated and regulated insurance company, whereas the latter is issued by a bank.

A letter of credit from a financial institution is another form of an external credit enhancement for a bond issue. The financial institution provides the issuer with a credit line to reimburse any cash flow shortfalls from the assets backing the issue. Letters of credit are becoming less common forms of credit enhancement as a result of the rating agencies downgrading the long-term debt of several banks that were providers of letters of credit.

Surety bonds, bank guarantees, and letters of credit expose the investor to third-party (or counterparty) risk, the possibility that a guarantor cannot meet its obligations. A cash collateral account mitigates this concern because the issuer immediately borrows the credit-enhancement amount and then invests that amount, usually in highly rated short-term commercial paper. Because this is an actual deposit of cash rather than a pledge of cash, a downgrade of the cash collateral account provider will not necessarily result in a downgrade of the bond issue backed by that provider.

3.1.5. Covenants

Bond covenants are legally enforceable rules that borrowers and lenders agree on at the time of a new bond issue. An indenture will frequently include affirmative (or positive) and negative covenants. Affirmative covenants enumerate what issuers are required to do, whereas negative covenants enumerate what issuers are prohibited from doing.

Affirmative covenants are typically administrative in nature. For example, frequently used affirmative covenants include what the issuer will do with the proceeds from the bond issue and the promise of making the contractual payments. The issuer may also promise to comply with all laws and regulations, maintain its current lines of business, insure and maintain its assets, and pay taxes as they come due. These types of covenants typically do not impose additional costs to the issuer and do not materially constrain the issuer’s discretion regarding how to operate its business.

In contrast, negative covenants are frequently costly and do materially constrain the issuer’s potential business decisions. The purpose of negative covenants is to protect bondholders from such problems as the dilution of their claims, asset withdrawals or substitutions, and suboptimal investments by the issuer. Examples of negative covenants include the following:

- Restrictions on debt regulate the issue of additional debt. Maximum acceptable debt usage ratios (sometimes called leverage ratios or gearing ratios) and minimum acceptable interest coverage ratios are frequently specified, permitting new debt to be issued only when justified by the issuer’s financial condition.
- Negative pledges prevent the issuance of debt that would be senior to or rank in priority ahead of the existing bondholders’ debt.
• *Restrictions on prior claims* protect unsecured bondholders by preventing the issuer from using assets that are not collateralized (called unencumbered assets) to become collateralized.

• *Restrictions on distributions to shareholders* restrict dividends and other payments to shareholders such as share buy-backs (repurchases). The restriction typically operates by reference to the borrower’s profitability; that is, the covenant sets a base date, usually at or near the time of the issue, and permits dividends and share buy-backs only to the extent of a set percentage of earnings or cumulative earnings after that date.

• *Restrictions on asset disposals* set a limit on the amount of assets that can be disposed by the issuer during the bond’s life. The limit on cumulative disposals is typically set as a percentage of a company’s gross assets. The usual intent is to protect bondholder claims by preventing a break-up of the company.

• *Restrictions on investments* constrain risky investments by blocking speculative investments. The issuer is essentially forced to devote its capital to its going-concern business. A companion covenant may require the issuer to stay in its present line of business.

• *Restrictions on mergers and acquisitions* prevent these actions unless the company is the surviving company or unless the acquirer delivers a supplemental indenture to the trustee expressly assuming the old bonds and terms of the old indenture. These requirements effectively prevent a company from avoiding its obligations to bondholders by selling out to another company.

These are only a few examples of negative covenants. The common characteristic of all negative covenants is ensuring that the issuer will not take any actions that would significantly reduce its ability to make interest payments and repay the principal. Bondholders, however, rarely wish to be too specific about how an issuer should run its business because doing so would imply a degree of control that bondholders legally want to avoid. In addition, very restrictive covenants may not be in the bondholders’ best interest if they force the issuer to default when default is avoidable. For example, strict restrictions on debt may prevent the issuer from raising new funds that are necessary to meet its contractual obligations; strict restrictions on asset disposals may prohibit the issuer from selling assets or business units and obtaining the necessary liquidity to make interest payments or principal repayments; and strict restrictions on mergers and acquisitions may prevent the issuer from being taken over by a stronger company that would be able to honor the issuer’s contractual obligations.

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**EXAMPLE 2**

1. The term *most likely* used to refer to the legal contract under which a bond is issued is:
   A. indenture.
   B. debenture.
   C. letter of credit.

2. The individual or entity that *most likely* assumes the role of trustee for a bond issue is:
   A. a financial institution appointed by the issuer.
   B. the treasurer or chief financial officer of the issuer.
   C. a financial institution appointed by a regulatory authority.
3. The individual or entity most likely responsible for the timely payment of interest and repayment of principal to bondholders is the:
   A. trustee.
   B. primary or lead bank of the issuer.
   C. treasurer or chief financial officer of the issuer.

4. The major advantage of issuing bonds through a special purpose vehicle is:
   A. bankruptcy remoteness.
   B. beneficial tax treatments.
   C. greater liquidity and lower issuing costs.

5. The category of bond most likely repaid from the repayment of previous loans made by the issuer is:
   A. sovereign bonds.
   B. supranational bonds.
   C. non-sovereign bonds.

6. The type of collateral used to secure collateral trust bonds is most likely:
   A. securities.
   B. mortgages.
   C. physical assets.

7. The external credit enhancement that has the least amount of third-party risk is a:
   A. surety bond.
   B. letter of credit.
   C. cash collateral account.

8. An example of an affirmative covenant is the requirement:
   A. that dividends will not exceed 60% of earnings.
   B. to insure and perform periodic maintenance on financed assets.
   C. that the debt-to-equity ratio will not exceed 0.4 and times interest earned will not fall below 8.0.

9. An example of a covenant that protects bondholders against the dilution of their claims is a restriction on:
   A. debt.
   B. investments.
   C. mergers and acquisitions.

Solution to 1: A is correct. The contract between a bond issuer and the bondholders is very often called an indenture or deed trust. The indenture documents the terms of the issue, including the principal amount, the coupon rate, and the payments schedule. It also provides information about the funding sources for the contractual payments and specifies whether there are any collateral, credit enhancement, or covenants. B is incorrect because a debenture is a type of bond. C is incorrect because a letter of credit is an external credit enhancement.

Solution to 2: A is correct. The issuer chooses a financial institution with trust powers, such as the trust department of a bank or a trust company, to act as a trustee for the bond issue.

Solution to 3: A is correct. Although the issuer is ultimately the source of the contractual payments, it is the trustee that ensures timely payments. Doing so is accomplished by invoicing the issuer for interest payments and principal repayments and holding the funds until they are paid.
3.2. Legal and Regulatory Considerations

Fixed-income securities are subject to different legal and regulatory requirements depending on where they are issued and traded, as well as who holds them. Unfortunately, there are no unified legal and regulatory requirements that apply globally.

An important consideration for investors is where the bonds are issued and traded because it affects the laws and regulation that apply. The global bond markets consist of national bond markets and the Eurobond market. A national bond market includes all the bonds that are issued and traded in a specific country, and denominated in the currency of that country. Bonds issued by entities that are incorporated in that country are called domestic bonds, whereas bonds issued by entities that are incorporated in another country are called foreign bonds.

_Solution to 4:_ A is correct. A SPV is a bankruptcy-remote vehicle. Bankruptcy remoteness is achieved by transferring the assets from the sponsor to the SPV. Once this transfer is completed, the sponsor no longer has ownership rights. If the sponsor defaults, no claims can be made to recover the assets that were transferred or the proceeds from the transfer to the SPV.

_Solution to 5:_ B is correct. The source of payment for bonds issued by supranational organizations is either the repayment of previous loans made by the organization or the paid-in capital of its member states. A is incorrect because national governments rely on their taxing authority and money creation to repay their debt. C is incorrect because non-sovereign bonds are typically repaid from the issuer’s taxing authority or the cash flows of the project being financed.

_Solution to 6:_ A is correct. Collateral trust bonds are secured by securities, such as common shares, other bonds, or other financial assets. B is incorrect because mortgage-backed securities are secured by mortgages. C is incorrect because equipment trust certificates are backed by physical assets such as aircraft, railroad cars, shipping containers, or oil rigs.

_Solution to 7:_ C is correct. The third-party (or counterparty) risk for a surety bond and a letter of credit arises from both being future promises to pay. In contrast, a cash collateral account allows the issuer to immediately borrow the credit-enhancement amount and then invest it.

_Solution to 8:_ B is correct. Affirmative covenants indicate what the issuer “must do” and are administrative in nature. A covenant requiring the issuer to insure and perform periodic maintenance on financed assets is an example of affirmative covenant. A and C are incorrect because they are negative covenants; they indicate what the issuer cannot do.

_Solution to 9:_ A is correct. A restriction on debt typically takes the form of a maximum acceptable debt usage ratio or a minimum acceptable interest coverage ratio. Thus, it limits the issuer’s ability to issue new debt that would dilute the bondholders’ claims. B and C are incorrect because they are covenants that restrict the issuer’s business activities by preventing the company from making investments or being taken over, respectively.
If Ford Motor Company issues bonds denominated in US dollars in the United States, these bonds will be classified as domestic. If Volkswagen Group or Toyota Motor Corporation (or their German or Japanese subsidiaries) issue bonds denominated in US dollars in the United States, these bonds will be classified as foreign. Foreign bonds very often receive nicknames. For example, foreign bonds are called “kangaroo bonds” in Australia, “maple bonds” in Canada, “panda bonds” in China, “Samurai bonds” in Japan, “kimchi bonds” in South Korea, “matrioshka bonds” in Russia, “matador bonds” in Spain, “bulldog bonds” in the United Kingdom, and “Yankee bonds” in the United States. National regulators may make distinctions both between and among resident and non-resident issuers, and they may have different requirements regarding the issuance process, the level of disclosures, or the restrictions imposed on the bond issuer and/or the investors who can purchase the bonds.

Governments and companies have issued foreign bonds in London since the 19th century, and foreign bond issues expanded in such countries as the United States, Japan, and Switzerland during the 1980s. But the 1960s saw the emergence of another bond market: the Eurobond market. The Eurobond market was created primarily to bypass the legal, regulatory, and tax constraints imposed on bond issuers and investors, particularly in the United States. Bonds issued and traded on the Eurobond market are called Eurobonds, and they are named after the currency in which they are denominated. For example, Eurodollar and Euroyen bonds are denominated in US dollars and Japanese yens, respectively. Bonds that are denominated in euros are called euro-denominated Eurobonds.

Eurobonds are typically less regulated than domestic and foreign bonds because they are issued outside the jurisdiction of any single country. They are usually unsecured bonds and can be denominated in any currency, including the issuer’s domestic currency. They are underwritten by an international syndicate—that is, a group of financial institutions from different jurisdictions. Most Eurobonds are bearer bonds, meaning that the trustee does not keep records of who owns the bonds; only the clearing system knows who the bond owners are. In contrast, most domestic and foreign bonds are registered bonds for which ownership is recorded by either name or serial number. Some investors may prefer bearer bonds to registered bonds, possibly for tax reasons.

A reference is sometimes made to global bonds. A global bond is issued simultaneously in the Eurobond market and in at least one domestic bond market. Issuing bonds in several markets at the same time ensures that there is sufficient demand for large bond issues, and that the bonds can be purchased by all investors, no matter where these investors are located. For example, the World Bank is a regular issuer of global bonds. Many market participants refer to foreign bonds, Eurobonds, and global bonds as international bonds as opposed to domestic bonds.

The differences among domestic bonds, foreign bonds, Eurobonds, and global bonds matter to investors because these bonds are subject to different legal, regulatory, and as described in Section 3.3, tax requirements. They are also characterized by differences in the frequency of interest payments and the way the interest payment is calculated, which affect the bond’s cash flows and thus its price. Note, however, that the currency in which a bond is denominated has a stronger effect on its price than where the bond is issued or traded. This is because market interest rates have a strong influence on a bond’s price, and the market interest rates that affect a bond are those associated with the currency in which the bond is denominated.

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4 Eurobonds denominated in US dollars cannot be sold to US investors at the time of issue because they are not registered with the US Securities and Exchange Commission (SEC). Most Eurobonds are sold to investors in Europe, the Middle East, and Asia Pacific.
As the emergence and growth of the Eurobond market illustrates, legal and regulatory considerations affect the dynamics of the global fixed-income markets. Exhibit 2 compares the amount of domestic and international debt outstanding for the 15 countries that were the largest domestic debt issuers at the end of December 2011. The reported amounts are based on the residence of the issuer.

**EXHIBIT 2**  Domestic and International Debt Securities by Residence of Issuer at the End of December 2011

<table>
<thead>
<tr>
<th>Issuers</th>
<th>Domestic Debt Securities (US$ billions)</th>
<th>International Debt Securities (US$ billions)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>All issuers</strong></td>
<td><strong>69,912.7</strong></td>
<td><strong>28,475.4</strong></td>
</tr>
<tr>
<td>United States</td>
<td>26,333.1</td>
<td>6,822.0</td>
</tr>
<tr>
<td>Japan</td>
<td>14,952.5</td>
<td>180.6</td>
</tr>
<tr>
<td>China</td>
<td>3,344.8</td>
<td>28.3</td>
</tr>
<tr>
<td>France</td>
<td>3,307.6</td>
<td>1,977.0</td>
</tr>
<tr>
<td>Italy</td>
<td>3,077.7</td>
<td>1,135.0</td>
</tr>
<tr>
<td>Germany</td>
<td>2,534.2</td>
<td>2,120.6</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>1,743.8</td>
<td>3,671.4</td>
</tr>
<tr>
<td>Canada</td>
<td>1,547.7</td>
<td>710.9</td>
</tr>
<tr>
<td>Brazil</td>
<td>1,488.8</td>
<td>137.4</td>
</tr>
<tr>
<td>Spain</td>
<td>1,448.7</td>
<td>1,499.5</td>
</tr>
<tr>
<td>South Korea</td>
<td>1,149.0</td>
<td>154.6</td>
</tr>
<tr>
<td>Australia</td>
<td>1,023.4</td>
<td>586.4</td>
</tr>
<tr>
<td>Netherlands</td>
<td>955.5</td>
<td>2,019.7</td>
</tr>
<tr>
<td>Denmark</td>
<td>714.6</td>
<td>142.6</td>
</tr>
<tr>
<td>India</td>
<td>596.1</td>
<td>26.1</td>
</tr>
</tbody>
</table>


**EXAMPLE 3**

1. An example of a domestic bond is a bond issued by:
   A. LG Group from South Korea, denominated in British pounds, and sold in the United Kingdom.
   B. the UK Debt Management Office, denominated in British pounds, and sold in the United Kingdom.
   C. Wal-Mart from the United States, denominated in US dollars, and sold in various countries in North America, Europe, the Middle East, and Asia Pacific.

2. A bond issued by Sony in Japan, denominated in US dollars but not registered with the SEC, and sold to an institutional investor in the Middle East, is *most likely* an example of a:
   A. Eurobond.
   B. global bond.
   C. foreign bond.
3.3. Tax Considerations

Generally speaking, the income portion of a bond investment is taxed at the ordinary income tax rate, which is typically the same tax rate that an individual would pay on wage or salary income. Tax-exempt securities are the exception to this rule. For example, interest income received by holders of municipal bonds issued in the United States is often exempt from federal income tax and from the income tax of the state in which the bonds are issued. The tax status of bond income may also depend on where the bond is issued and traded. For example, some domestic bonds pay their interest net of income tax. Other bonds, including some Eurobonds, make gross interest payments.

In addition to earnings from interest, a bond investment may also generate a capital gain or loss. If a bond is sold before its maturity date, the price is likely to have changed compared with the purchase price. This change will generate a capital gain if the bond price has increased or a capital loss if the bond price has decreased. From the standpoint of taxes, a capital gain or loss is usually treated differently from taxable income. In addition, in some countries, there is a different tax rate for long-term and short-term capital gains. For example, capital gains that are recognized more than 12 months after the original purchase date may be taxed at a long-term capital gains tax rate, whereas capital gains that are recognized within 12 months of purchasing the investment may be taxed as a short-term capital gain. Very often, the tax rate for long-term capital gains is lower than the tax rate for short-term capital gains, and the tax rate for short-term capital gains is equal to the ordinary income tax rate, although there are exceptions. Not all countries, however, implement a capital gains tax. Furthermore, differences in national and local legislation often result in a very diverse set of aggregate country capital gains tax rates.

For bonds issued at a discount, an additional tax consideration is related to the tax status of the original issue discount. The original issue discount is the difference between the par value and the original issue price. In some countries, such as the United States, a prorated portion of the discount must be included in interest income every tax year. This is not the case in other countries, such as Japan. Exhibit 3 illustrates the potential importance of this tax consideration.

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**Solution to 1:** B is correct. A domestic bond is issued by a local issuer, denominated in local currency, and sold in the domestic market. Gilts are British pound–denominated bonds issued by the UK Debt Management Office in the United Kingdom. Thus, they are UK domestic bonds. A is incorrect because a bond issued by LG Group from South Korea, denominated in British pounds, and sold in the United Kingdom, is an example of a foreign bond (bulldog bond). C is incorrect because a bond issued by Wal-Mart from the United States, denominated in US dollars, and sold in various countries in North America, Europe, the Middle East, and Asia Pacific is most likely an example of a global bond, particularly if it is also sold in the Eurobond market.

**Solution to 2:** A is correct. A Eurobond is a bond that is issued internationally, outside the jurisdiction of any single country. Thus, a bond issued by Sony from Japan, denominated in US dollars but not registered with the SEC, is an example of a Eurobond. B is incorrect because global bonds are bonds that are issued simultaneously in the Eurobond market and in at least one domestic bond market. C is incorrect because if Sony’s bond issue were a foreign bond (Yankee bond), it would be registered with the SEC.
Some jurisdictions also have tax provisions for bonds bought at a premium. They may allow investors to deduct a prorated portion of the amount paid in excess of the bond’s par value from their taxable income every tax year until maturity. When Company A’s bonds mature, bondholders receive the par value of Z1,000. Company B issues a zero-coupon bond at a discount. Investors buy Company B’s bonds for Z148.64. They do not receive any cash flows until Company B pays the par value of Z1,000 when the bonds mature.

Company A’s bonds and Company B’s bonds are economically identical in the sense that they have the same maturity (20 years) and the same yield to maturity (10%). Company A’s bonds make periodic payments, however, whereas Company B’s bonds defer payment until maturity. Investors in Company A’s bonds must include the annual interest payments in taxable income. When they receive their original Z1,000 investment back at maturity, they face no capital gain or loss. Without an original issue discount tax provision, investors in Company B’s bonds do not have any taxable income until the bonds mature. When they receive the par value at maturity, they face a capital gain on the original issue discount—that is, on Z851.36 (Z1,000 – Z148.64). The purpose of an original issue discount tax provision is to tax investors in Company B’s bonds the same way as investors in Company A’s bonds. Thus, a prorated portion of the Z851.36 original issue discount is included in taxable income every tax year until maturity. This allows investors in Company B’s bonds to increase their cost basis in the bonds so that at maturity, they face no capital gain or loss.

Some jurisdictions also have tax provisions for bonds bought at a premium. They may allow investors to deduct a prorated portion of the amount paid in excess of the bond’s par value from their taxable income every tax year until maturity. For example, if an investor pays $1,005 for a bond that has a par value of $1,000 and matures five years later, she can deduct $1 from her taxable income every tax year for five years. But the deduction may not be required; the investor may have the choice either to deduct a prorated portion of the premium each year or to deduct nothing and declare a capital loss when the bond is redeemed at maturity.

EXAMPLE 4

1. The coupon payment is most likely to be taxed as:
   A. ordinary income.
   B. short-term capital gain.
   C. long-term capital gain.

2. Assume that a company issues bonds in the hypothetical country of Zinland, where the local currency is the zini (Z). There is an original issue discount tax provision in Zinland’s tax code. The company issues a 10-year zero-coupon bond with a par value of Z1,000 and sells it for Z800. An investor who buys the zero-coupon bond at issuance and holds it until maturity most likely:
   A. has to include Z20 in his taxable income every tax year for 10 years and has to declare a capital gain of Z200 at maturity.
B. has to include Z20 in his taxable income every tax year for 10 years and does not have to declare a capital gain at maturity.
C. does not have to include anything in his taxable income every tax year for 10 years but has to declare a capital gain of Z200 at maturity.

Solution to 1: A is correct. Interest income is typically taxed at the ordinary income tax rate, which may be the same tax rate that individuals pay on wage and salary income.

Solution to 2: B is correct. The original issue discount tax provision requires the investor to include a prorated portion of the original issue discount in his taxable income every tax year until maturity. The original issue discount is the difference between the par value and the original issue price—that is, Z1,000 – Z800 = Z200. The bond’s maturity is 10 years. Thus, the prorated portion that must be included each year is Z200 ÷ 10 = Z20. The original issue discount tax provision allows the investor to increase his cost basis in the bond so that when the bond matures, the investor faces no capital gain or loss.

4. STRUCTURE OF A BOND’S CASH FLOWS

The most common payment structure by far is that of a plain vanilla bond, as depicted in Exhibit 1. These bonds make periodic, fixed coupon payments and a lump-sum payment of principal at maturity. But there are other structures regarding both the principal repayment and the interest payments. This section discusses the major schedules observed in the global fixed-income markets. Schedules for principal repayments and interest payments are typically similar for a particular type of bond, such as 10-year US Treasury bonds. However, payment schedules vary considerably between types of bonds, such as government bonds versus corporate bonds.

4.1. Principal Repayment Structures

How the amount borrowed is repaid is an important consideration for investors because it affects the level of credit risk they face from holding the bonds. Any provision that periodically retires some of the principal amount outstanding is a way to reduce credit risk.

4.1.1. Bullet, Fully Amortized, and Partially Amortized Bonds

The payment structure of a plain vanilla bond has been used for nearly every government bond ever issued as well as for the majority of corporate bonds. Such a bond is also known as a bullet bond because the entire payment of principal occurs at maturity.

In contrast, an amortizing bond has a payment schedule that calls for periodic payments of interest and repayments of principal. A bond that is fully amortized is characterized by a fixed periodic payment schedule that reduces the bond’s outstanding principal amount to zero by the maturity date. A partially amortized bond also makes fixed periodic payments until maturity, but only a portion of the principal is repaid by the maturity date. Thus, a balloon payment is required at maturity to retire the bond’s outstanding principal amount.

Exhibit 4 illustrates the differences in the payment schedules for a bullet bond, a fully amortized bond, and a partially amortized bond. For the three bonds, the principal amount is
$1,000, the maturity is five years, the coupon rate is 6%, and interest payments are made annually. The market interest rate used to discount the bonds’ expected cash flows until maturity is assumed to be constant at 6%. The bonds are issued and redeemed at par. For the partially amortized bond, the balloon payment is $200 at maturity.\(^5\)

EXHIBIT 4 Example of Payment Schedules for Bullet, Fully Amortized, and Partially Amortized Bonds

**Bullet Bond**

<table>
<thead>
<tr>
<th>Year</th>
<th>Investor Cash Flows</th>
<th>Interest Payment</th>
<th>Principal Repayment</th>
<th>Outstanding Principal at the End of the Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>−$1,000.00</td>
<td>$60.00</td>
<td>$0.00</td>
<td>$1,000.00</td>
</tr>
<tr>
<td>1</td>
<td>60.00</td>
<td>60.00</td>
<td>0.00</td>
<td>1,000.00</td>
</tr>
<tr>
<td>2</td>
<td>60.00</td>
<td>60.00</td>
<td>0.00</td>
<td>1,000.00</td>
</tr>
<tr>
<td>3</td>
<td>60.00</td>
<td>60.00</td>
<td>0.00</td>
<td>1,000.00</td>
</tr>
<tr>
<td>4</td>
<td>60.00</td>
<td>60.00</td>
<td>0.00</td>
<td>1,000.00</td>
</tr>
<tr>
<td>5</td>
<td>1,060.00</td>
<td>60.00</td>
<td>1,000.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

**Fully Amortized Bond**

<table>
<thead>
<tr>
<th>Year</th>
<th>Investor Cash Flows</th>
<th>Interest Payment</th>
<th>Principal Repayment</th>
<th>Outstanding Principal at the End of the Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>−$1,000.00</td>
<td>$60.00</td>
<td>$177.40</td>
<td>$822.60</td>
</tr>
<tr>
<td>1</td>
<td>237.40</td>
<td>49.36</td>
<td>188.04</td>
<td>634.56</td>
</tr>
<tr>
<td>2</td>
<td>237.40</td>
<td>38.07</td>
<td>199.32</td>
<td>435.24</td>
</tr>
<tr>
<td>3</td>
<td>237.40</td>
<td>26.11</td>
<td>211.28</td>
<td>223.96</td>
</tr>
<tr>
<td>4</td>
<td>237.40</td>
<td>13.44</td>
<td>223.96</td>
<td>0.00</td>
</tr>
</tbody>
</table>

**Partially Amortized Bond**

<table>
<thead>
<tr>
<th>Year</th>
<th>Investor Cash Flows</th>
<th>Interest Payment</th>
<th>Principal Repayment</th>
<th>Outstanding Principal at the End of the Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>−$1,000.00</td>
<td>$60.00</td>
<td>$141.92</td>
<td>$858.08</td>
</tr>
<tr>
<td>1</td>
<td>201.92</td>
<td>51.48</td>
<td>150.43</td>
<td>707.65</td>
</tr>
<tr>
<td>2</td>
<td>201.92</td>
<td>42.46</td>
<td>159.46</td>
<td>548.19</td>
</tr>
<tr>
<td>3</td>
<td>201.92</td>
<td>32.89</td>
<td>169.03</td>
<td>379.17</td>
</tr>
<tr>
<td>4</td>
<td>401.92</td>
<td>22.75</td>
<td>379.17</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Investors pay $1,000 now to purchase any of the three bonds. For the bullet bond, they receive the coupon payment of $60 (6% × $1,000) every year for five years. The last payment is $1,060 because it includes both the last coupon payment and the principal amount.

\(^5\)The examples in this chapter were created in Microsoft Excel. Numbers may differ from the results obtained using a calculator because of rounding.
Chapter 1  Fixed-Income Securities: Defining Elements

For the fully amortized bond, the annual payment, which includes both the coupon payment and the principal repayment, is constant. Thus, this annual payment can be viewed as an annuity. This annuity lasts for five years; its present value, discounted at the market interest rate of 6%, is equal to the bond price of $1,000. Therefore, the annual payment is $237.40. The first year, the interest part of the payment is $60 (6% × $1,000), which implies that the principal repayment part is $177.40 ($237.40 – $60). This repayment leaves an outstanding principal amount, which becomes the basis for the calculation of the interest the following year, of $822.60 ($1,000 – $177.40). The second year, the interest part of the payment is $49.36 (6% × $822.60), the principal repayment part is $188.04 ($237.40 – $49.36), and the outstanding principal amount is $634.56 ($822.60 – $188.04). The fifth year, the outstanding principal amount is fully repaid. Note that the annual payment is constant but, over time, the interest payment decreases and the principal repayment increases.

The partially amortized bond can be viewed as the combination of two elements: a five-year annuity plus the balloon payment at maturity. The sum of the present values of these two elements is equal to the bond price of $1,000. As for the fully amortized bond, the discount rate is the market interest rate of 6%, making the constant amount for the annuity $201.92. This amount represents the annual payment for the first four years. For Years 1 through 4, the split between interest and principal is done the same way as for the fully amortized bond. The interest part of the payment is equal to 6% multiplied by the outstanding principal at the end of the previous year; the principal repayment part is equal to $201.92 minus the interest part of the payment for the year; and the outstanding principal amount at the end of the year is equal to the outstanding principal amount at the end of the previous year minus the principal repayment for the year. In Year 5, investors receive $401.92; this amount is calculated either as the sum of the interest payment ($22.75) and the outstanding principal amount ($379.17) or as the constant amount of the annuity ($201.92) plus the balloon payment ($200). As for the fully amortized bond, the interest payment decreases and the principal repayment increases over time. Because the principal amount is not fully amortized, interest payments are higher for the partially amortized bond than for the fully amortized bond, except the first year when they are equal.

Exhibit 4 does not address the complexity of the repayment structure for some bonds, such as many securitized bonds. For example, mortgage-backed securities face prepayment risk, which is the possible early repayment of mortgage principal. Borrowers usually have the right to prepay mortgages, which typically occurs when a current homeowner purchases a new home or when homeowners refinance their mortgages because market interest rates have fallen.

EXAMPLE 5

1. The structure that requires the largest repayment of principal at maturity is that of a:
   A. bullet bond.
   B. fully amortized bond.
   C. partially amortized bond.
2. A plain vanilla bond has a maturity of 10 years, a par value of £100, and a coupon rate of 9%. Interest payments are made annually. The market interest rate is assumed to be constant at 9%. The bond is issued and redeemed at par. The principal repayment the first year is closest to:
   A. £0.00.
   B. £6.58.
   C. £10.00.
4.1.2. Sinking Fund Arrangements

A **sinking fund arrangement** is another approach that can be used to achieve the same goal of periodically retiring the bond's principal outstanding. The term “sinking fund” refers to an issuer's plans to set aside funds over time to retire the bond. Originally, a sinking fund was a specified cash reserve that was segregated from the rest of the issuer's business for the purpose of repaying the principal. More generally today, a sinking fund arrangement specifies the portion of the bond's principal outstanding, perhaps 5%, that must be repaid each year throughout the bond's life or after a specified date. This repayment occurs whether or not an actual segregated cash reserve has been created.

Typically, the issuer will forward repayment proceeds to the bond's trustee. The trustee will then either redeem bonds to this value or select by lottery the serial numbers of bonds to be paid off. The bonds for repayment may be listed in business newspapers, such as the *Wall Street Journal* or the *Financial Times*.

As well as the standard version described above, another type of sinking fund arrangement operates by redeeming a steadily increasing amount of the bond's notional principal (total amount) each year. Any remaining principal is then redeemed at maturity. It is common to find utility and energy companies in the United States, the United Kingdom, and the Commonwealth countries that issue bonds with sinking fund arrangements that incorporate such a provision.

Another common variation is for the bond issue to include a call provision, which gives the issuer the option to repurchase the bonds before maturity—callable bonds are discussed in Section 5.1. The issuer can usually repurchase the bonds at the market price, at par, or at a specified sinking fund price, whichever is the lowest. To allocate the burden of the call provision fairly among bondholders, the bonds to be retired are selected at random based on serial number. Usually, the issuer can repurchase only a small portion of the bond issue. Some
indentures, however, allow issuers to use a doubling option to repurchase double the required number of bonds.

The benefit of a sinking fund arrangement is that it ensures that a formal plan is in place for retiring the debt. For an investor, a sinking fund arrangement reduces the risk the issuer will default when the principal is due, thereby reducing the credit risk of the bond issue. But investors experience potential disadvantages with sinking fund arrangements. First, investors face reinvestment risk, the risk associated with having to reinvest cash flows at an interest rate that may be lower than the current yield to maturity. If the serial number of an investor’s bonds is selected, the bonds will be repaid and the investor will have to reinvest the proceeds. If market interest rates have fallen since the investor purchased the bonds, he or she probably will not be able to purchase a bond offering the same return. Another potential disadvantage for investors occurs if the issuer has the option to repurchase bonds at below-market prices. For example, an issuer could exercise a call option to buy back bonds at par on bonds priced above par. In this case, investors would suffer a loss.

Exhibit 5 illustrates an example of a sinking fund arrangement.

**EXHIBIT 5**

**Example of a Sinking Fund Arrangement**

The notional principal of the bond issue is £200 million. The sinking fund arrangement calls for 5% of the outstanding principal amount to be retired in Years 10 through 19, with the outstanding balance paid off at maturity in 20 years.

<table>
<thead>
<tr>
<th>Year</th>
<th>Outstanding Principal at the Beginning of the Year (£ millions)</th>
<th>Sinking Fund Payment (£ millions)</th>
<th>Outstanding Principal at the End of the Year (£ millions)</th>
<th>Final Principal Repayment (£ millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>200.00</td>
<td>0.00</td>
<td>200.00</td>
<td>200.00</td>
</tr>
<tr>
<td>1 to 9</td>
<td>200.00</td>
<td>10.00</td>
<td>190.00</td>
<td>190.00</td>
</tr>
<tr>
<td>10</td>
<td>190.00</td>
<td>9.50</td>
<td>180.50</td>
<td>180.50</td>
</tr>
<tr>
<td>11</td>
<td>180.50</td>
<td>9.03</td>
<td>171.48</td>
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<td>12</td>
<td>171.48</td>
<td>8.57</td>
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<td>162.90</td>
</tr>
<tr>
<td>13</td>
<td>162.90</td>
<td>8.15</td>
<td>154.76</td>
<td>154.76</td>
</tr>
<tr>
<td>14</td>
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<td>7.74</td>
<td>147.02</td>
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</tr>
<tr>
<td>15</td>
<td>147.02</td>
<td>7.35</td>
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<td>139.67</td>
</tr>
<tr>
<td>16</td>
<td>139.67</td>
<td>6.98</td>
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<td>17</td>
<td>132.68</td>
<td>6.63</td>
<td>126.05</td>
<td>126.05</td>
</tr>
<tr>
<td>18</td>
<td>126.05</td>
<td>6.30</td>
<td>119.75</td>
<td>119.75</td>
</tr>
<tr>
<td>19</td>
<td>119.75</td>
<td></td>
<td>119.75</td>
<td>119.75</td>
</tr>
<tr>
<td>20</td>
<td>119.75</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

There is no repayment of the principal during the first nine years. Starting the 10th year, the sinking fund arrangement calls for 5% of the outstanding principal amount to be retired each year. In Year 10, £10 million (5% × £200 million) are paid off, which leaves an outstanding principal balance of £190 million. In Year 11, the principal amount repaid is £9.50 million (5% × £190 million). The final repayment of the remaining balance (£119.75 million) is a balloon payment at maturity.
4.2. Coupon Payment Structures

A coupon is the interest payment that the bond issuer makes to the bondholder. A conventional bond pays a fixed periodic coupon over a specified time to maturity. Most frequently, the coupon is paid semi-annually for sovereign and corporate bonds; this is the case in the United States, the United Kingdom, and Commonwealth countries such as Bangladesh, India, and New Zealand. Eurobonds usually pay an annual coupon, although some Eurobonds make quarterly coupon payments. The norm for bonds issued in the eurozone is for an annual coupon, although there are exceptions.

Fixed-rate coupons are not the only coupon payment structure, however. A wide range of coupon types is offered in the global fixed-income markets. This variety exists to meet the differing needs of both issuers and investors.

4.2.1. Floating-Rate Notes

Floating-rate notes do not have a fixed coupon; instead, their coupon rate is linked to an external reference rate, such as Libor. Thus, an FRN’s interest rate will fluctuate periodically during the bond’s life, following the changes in the reference rate. As a consequence, the FRN’s cash flows are not known with certainty. Large issuers of FRNs include government-sponsored enterprises (GSEs), such as the Federal Home Loan Banks (FHLB), the Federal National Mortgage Association (“Fannie Mae”), and the Federal Home Loan Mortgage Corporation (“Freddie Mac”) in the United States, as well as banks and financial institutions in Europe and Asia Pacific. It is rare for national governments to issue FRNs because investors in sovereign bonds generally prefer fixed-coupon bonds.

Almost all FRNs have quarterly coupons, although counter examples do exist. FRNs usually pay a fixed spread over the specified reference rate. A typical coupon rate may be the three-month US dollar Libor + 20 bps (i.e., Libor + 0.20%) for a US dollar-denominated bond or the three-month Euribor + 20 bps for a euro-denominated FRN. Occasionally the spread is not fixed; in this case, the bond is known as a variable-rate note.

Contrary to plain vanilla, fixed-rate securities that decline in value in a rising interest rate environment, FRNs are less affected when interest rates increase because their coupon rates vary with market interest rates and are reset at regular, short-term intervals. Thus, FRNs have little interest rate risk—that is, the risk that a change in market interest rate affects a bond’s value. FRNs are frequently favored by investors who expect that interest rates will rise. That said, investors still face credit risk when investing in FRNs. If an issuer’s credit risk does not change from one coupon reset date to the next, the FRN’s price generally will stay close to the par value. However, if there is a change in the issuer’s credit quality that affects the perceived credit risk associated with the bond, the price of the FRN will deviate from its par value. A higher level of credit risk will lead to a lower price and a higher yield.

Additional features observed in FRNs may include a floor or a cap. A floor (floored FRN) prevents the coupon from falling below a specified minimum rate. This feature benefits the bondholders, who are guaranteed that the interest rate will not fall below the specified rate during a time of falling interest rates. In contrast, a cap (capped FRN) prevents the coupon from rising above a specified maximum rate. This feature benefits the issuer, because it sets a limit to the interest rate paid on the debt during a time of rising interest rates. It is also possible to have a collared FRN, which includes both a cap and a floor.

An inverse or reverse FRN, or simply an inverse floater, is a bond whose coupon rate has an inverse relationship to the reference rate. The basic structure is the same as an ordinary FRN except for the direction in which the coupon rate is adjusted. When interest rates fall, the coupon
rate on an ordinary FRN decreases; in contrast, the coupon rate on a reverse FRN increases. Thus, inverse FRNs are typically favored by investors who expect interest rates to decline.

4.2.2. Step-Up Coupon Bonds
The coupon of a **step-up coupon bond**, which may be fixed or floating, increases by specified margins at specified dates. An example of a bond with a step-up coupon is the FRN that was issued by the British bank Holding Bank of Scotland (HBOS) in 2005. This FRN had a 20-year maturity, and the coupon was linked to the three-month Libor plus an initial spread of 50 bps. The spread was scheduled to increase to 250 bps over Libor in 2015 for the bond’s tenor.

Bonds with step-up coupons offer bondholders some protection against rising interest rates, and they may be an important feature for callable bonds. When interest rates increase, there is a higher likelihood that the issuer will not call the bonds, particularly if the bonds have a fixed rate of interest. The step-up coupon allows bondholders to receive a higher coupon, in line with the higher market interest rates. Alternatively, when interest rates decrease or remain stable, the step-up feature acts as an incentive for the issuer to call the bond before the spread increases and the interest expense rises. Thus, at issuance, most investors viewed the bond issued by HBOS as a 10-year investment, given that they expected the issuer to redeem it after 10 years to avoid paying the higher coupon.

Redeeming the bond when the spread increases is not automatic, however; the issuer may choose to keep the bond despite its increasing cost. This may happen if refinancing the bond is necessary and alternatives are less advantageous for this issuer. For example, a financial crisis may make it difficult for the issuer to refinance. Alternatively, the issuer’s credit quality may have deteriorated, which would lead to a higher spread, potentially making the coupon rate on the new bond more expensive than that on the existing bond despite the stepped-up coupon. Although the issuer does not have to call the bond before the spread increases, there is an implicit expectation from investors that it will. Failure to do so may be viewed negatively by market participants and reduce investors’ appetite for that particular issuer’s bonds in the future.

4.2.3. Credit-Linked Coupon Bonds
A **credit-linked coupon bond** has a coupon that changes when the bond’s credit rating changes. An example of a bond with a credit-linked coupon is one of British Telecom’s bonds maturing in 2020. It has a coupon rate of 9%, but the coupon will increase by 50 bps for every credit rating downgrade below the bond’s credit rating at the time of issuance and will decrease by 50 bps for every credit rating upgrade above the bond’s credit rating at the time of issuance.

Bonds with credit-linked coupons are attractive to investors who are concerned about the future creditworthiness of the issuer. They may also provide some general protection against a poor economy because credit ratings tend to decline the most during recessions. A potential problem associated with these bonds is that increases in the coupon payments resulting from a downgrade may ultimately result in further deteriorations of the credit rating or even contribute to the issuer’s default.

4.2.4. Payment-in-Kind Coupon Bonds
A payment-in-kind (PIK) coupon bond typically allows the issuer to pay interest in the form of additional amounts of the bond issue rather than as a cash payment. Such bonds are favored by issuers who are concerned that the issuer may face potential cash flow problems in the future. They are used, for example, in financing companies that have a high debt burden, such
as companies going through a leveraged buyout (a form of acquisition in which the financing consists primarily of debt). Because investors are aware of the additional credit risk associated with these bonds, they usually demand a higher yield for holding bonds with PIK coupons.

Other forms of PIK arrangements can also be found, such as paying the bondholders with common shares worth the amount of coupon due. With a PIK toggle note, the borrower has the option, for each interest period, to pay interest in cash, to make the interest payment in kind, or some mix of the two. Cash payments or payments in kind are frequently at the discretion of the borrower, but whether the payment is made in cash or in kind can be determined by an earnings or cash flow trigger identified in the indenture.

4.2.5. Deferred Coupon Bonds

A deferred coupon bond, sometimes called a split coupon bond, pays no coupons for its first few years but then pays a higher coupon than it otherwise would for the remainder of its life. Issuers of deferred coupon bonds are usually seeking ways to conserve cash in the years immediately following the bond issue, which may indicate poorer credit quality. Deferred coupon bonds are also common in project financing when the assets being developed do not generate any income during the development phase. A deferred coupon bond allows the issuer to delay interest payments until the project is completed and the cash flows generated by the assets being financed can be used to service the debt.

One of the main advantages of investing in a deferred coupon bond is that these bonds are typically priced at significant discounts to par. Investors may also find the deferred coupon structure to be very helpful in managing taxes. If taxes due on the interest income can be delayed, investors may be able to minimize taxes. This tax advantage, however, depends on the jurisdiction concerned and how its tax rules apply to deferred coupon payments.

A zero-coupon bond can be thought of as an extreme form of deferred coupon bond. These securities pay no interest to the investor and thus are issued at a deep discount to par value. At maturity, the bondholder receives the par value of the bond as payment. Effectively, a zero-coupon bond defers all interest payments until maturity.

4.2.6. Index-Linked Bonds

An index-linked bond has its coupon payments and/or principal repayment linked to a specified index. In theory, a bond can be indexed to any published variable, including an index reflecting prices, earnings, economic output, commodities, or foreign currencies. Inflation-linked bonds are an example of index-linked bonds. They offer investors protection against inflation by linking a bond’s coupon payments and/or the principal repayment to an index of consumer prices such as the UK Retail Price Index (RPI) or the US Consumer Price Index (CPI). The advantage of using the RPI or CPI is that these indices are well-known, transparent, and published regularly.

Governments are large issuers of inflation-linked bonds, also called linkers. The United Kingdom was one of the first developed countries to issue inflation-linked bonds in 1981, offering gilts linked to the UK RPI, its main measure of the rate of inflation. In 1997, the US Treasury began introducing Treasury inflation-indexed securities (TIIS) or Treasury inflation-protected securities (TIPS) linked to the US CPI. Inflation-linked bonds are now more frequently being offered by corporate issuers, including both financial and non-financial companies.

A bond’s stated coupon rate represents the nominal interest rate received by the bondholders. But inflation reduces the actual value of the interest received. The interest rate that
bondholders actually receive, net of inflation, is the real interest rate; it is approximately equal to the nominal interest rate minus the rate of inflation. By increasing the coupon payments and/or the principal repayment in line with increases in the price index, inflation-linked bonds reduce inflation risk. An example of an inflation-linked bond is the 1.25% UK Treasury index-linked gilt maturing in 2017: Bondholders receive a real interest rate of 1.25%, and the actual interest payments are adjusted in line with changes in the UK RPI.

Exhibit 6 shows the national governments that issue the largest amounts of inflation-linked bonds. These sovereign issuers can be grouped into three categories. Countries such as Brazil, Chile, and Colombia have issued inflation-linked bonds because they were experiencing extremely high rates of inflation when borrowing, and offering inflation-linked bonds was their only available alternative to raise funds. The second category includes the United Kingdom, Australia, and Sweden. These countries have issued inflation-linked bonds in an effort to add credibility to the government's commitment to disinflationary policies and also to capitalize on the demand from investors still concerned about inflation risk. The third category, which includes the United States, Canada, Germany, and France, consists of national governments that are most concerned about the social welfare benefits associated with inflation-linked securities. Theoretically, inflation-linked bonds provide investors the benefit of a long-term asset with a fixed real return that is free from inflation risk.

**EXHIBIT 6  Inflation-Linked Bonds Outstanding by Market Value at the End of December 2011**

![Graph showing inflation-linked bonds outstanding by market value at the end of December 2011](image)

*Source: Based on data from Barclays Capital.*

Different methods have been used for linking the cash flows of an index-linked bond to a specified index; the link can be made via the interest payments, the principal repayment, or both. The following examples describe how the link between the cash flows and the index is established, using inflation-linked bonds as an illustration.

- Zero-coupon-indexed bonds pay no coupon, so the inflation adjustment is made via the principal repayment only: The principal amount to be repaid at maturity increases in line with increases in the price index during the bond’s life. This type of bond has been issued in Sweden.
• Interest-indexed bonds pay a fixed nominal principal amount at maturity but an index-linked coupon during the bond's life. Thus, the inflation adjustment applies to the interest payments only. This type of bond was briefly issued by the Australian government in the late 1980s, but it never became a significant part of the inflation-linked bond market.

• Capital-indexed bonds pay a fixed coupon rate, but it is applied to a principal amount that increases in line with increases in the index during the bond's life. Thus, both the interest payments and the principal repayment are adjusted for inflation. Such bonds have been issued by governments in Australia, Canada, New Zealand, the United Kingdom, and the United States.

• Indexed-annuity bonds are fully amortized bonds, in contrast to interest-indexed and capital-indexed bonds that are non-amortizing coupon bonds. The annuity payment, which includes both payment of interest and repayment of the principal, increases in line with inflation during the bond's life. Indexed-annuity bonds linked to a price index have been issued by local governments in Australia, but not by the national government.

Exhibit 7 illustrates the different methods used for inflation-linked bonds.

EXHIBIT 7

Examples of Inflation-Linked Bonds

Assume a hypothetical country, Lemuria, where the currency is the lemming (L). The country issued 20-year bonds linked to the domestic Consumer Price Index (CPI). The bonds have a par value of L1,000. Lemuria’s economy has been free of inflation until the most recent six months, when the CPI increased by 5%.

Suppose that the bonds are zero-coupon-indexed bonds. There will never be any coupon payments. Following the 5% increase in the CPI, the principal amount to be repaid increases to L1,050 \[L1,000 \times (1 + 0.05)\] and will continue increasing in line with inflation until maturity.

Now, suppose that the bonds are coupon bonds that make semi-annual interest payments based on an annual coupon rate of 4%. If the bonds are interest-indexed bonds, the principal amount at maturity will remain L1,000 regardless of the CPI level during the bond’s life and at maturity. The coupon payments, however, will be adjusted for inflation. Prior to the increase in inflation, the semi-annual coupon payment was L20 \[((0.04 \times L1,000) \div 2)\]. Following the 5% increase in the CPI, the semi-annual coupon payment increases to L21 \[L20 \times (1 + 0.05)\]. Future coupon payments will also be adjusted for inflation.

If the bonds are capital-indexed bonds, the annual coupon rate remains 4%, but the principal amount is adjusted for inflation and the coupon payment is based on the inflation-adjusted principal amount. Following the 5% increase in the CPI, the inflation-adjusted principal amount increases to L1,050 \[L1,000 \times (1 + 0.05)\], and the new semi-annual coupon payment is L21 \[((0.04 \times L1,050) \div 2)\]. The principal amount will continue increasing in line with increases in the CPI until maturity, and so will the coupon payments.

If the bonds are indexed-annuity bonds, they are fully amortized. Prior to the increase in inflation, the semi-annual payment was L36.56—the annuity payment based on a principal amount of L1,000 paid back in 40 semi-annual payments with an annual discount rate of 4%. Following the 5% increase in the CPI, the annuity payment increases to L38.38 \[L36.56 \times (1 + 0.05)\]. Future annuity payments will also be adjusted for inflation in a similar manner.
Financial institutions also issue index-linked bonds that are connected to a stock market index. An equity-linked note (ELN) is a fixed-income security that differs from a conventional bond in that the final payment is based on the return of an equity index. A typical ELN is principal protected, which means that the investor is guaranteed to receive at maturity a percentage of the original amount invested in the ELN, usually 100%. The guarantee, however, is only as good as the financial institution from which the investor purchased the ELN. If the issuer defaults, ELNs may end up worthless even if the return of the equity index to which the bond was linked was positive. ELNs can be thought of as a zero-coupon bond with a return profile linked to the value of the equity index. If the equity index increases in value from its level when the ELN was issued, the investor receives a positive return.

**EXAMPLE 6**

1. Floating-rate notes most likely pay:
   A. annual coupons.
   B. quarterly coupons.
   C. semi-annual coupons.

2. A zero-coupon bond can best be considered a:
   A. step-up bond.
   B. credit-linked bond.
   C. deferred coupon bond.

3. The bonds that do not offer protection to the investor against increases in market interest rates are:
   A. step-up bonds.
   B. floating rate notes.
   C. inverse floating rate notes.

4. The US Treasury offers Treasury Inflation-Protected Securities (TIPS). The principal of TIPS increases with inflation and decreases with deflation based on changes in the US Consumer Price Index. When TIPS mature, an investor is paid the original principal or inflation-adjusted principal, whichever is greater. TIPS pay interest twice a year based on a fixed real coupon rate that is applied to the inflation-adjusted principal. TIPS are most likely:
   A. capital-indexed bonds.
   B. interest-indexed bonds.
   C. indexed-annuity bonds.

5. Assume a hypothetical country, Lemuria, where the national government has issued 20-year capital-indexed bonds linked to the domestic Consumer Price Index (CPI). Lemuria’s economy has been free of inflation until the most recent six months, when the CPI increased. Following the increase in inflation:
   A. the principal amount remains unchanged but the coupon rate increases.
   B. the coupon rate remains unchanged but the principal amount increases.
   C. the coupon payment remains unchanged but the principal amount increases.

*Solution to 1:* B is correct. Most FRNs pay interest quarterly and are tied to a three-month reference rate such as Libor.
5. BONDS WITH CONTINGENCY PROVISIONS

A contingency refers to some future event or circumstance that is possible but not certain. A contingency provision is a clause in a legal document that allows for some action if the event or circumstance does occur. For bonds, the term embedded option refers to various contingency provisions found in the indenture. These contingency provisions provide the issuer or the bondholders the right, but not the obligation, to take some action. These rights are called “options.” These options are not independent of the bond and cannot be traded separately—hence the term “embedded.” Some common types of bonds with embedded options include callable bonds, putable bonds, and convertible bonds. The options embedded in these bonds grant either the issuer or the bondholders certain rights affecting the disposal or redemption of the bond.

5.1. Callable Bonds

The most widely used embedded option is the call provision. A callable bond gives the issuer the right to redeem all or part of the bond before the specified maturity date. The primary reason why issuers choose to issue callable bonds rather than non-callable bonds is to protect themselves against a decline in interest rates. This decline can come either from market interest rates falling or from the issuer’s credit quality improving. If market interest rates fall or credit quality improves, the issuer of a callable bond has the right to replace an old, expensive bond...
issue with a new, cheaper bond issue. In other words, the issuer can benefit from a decline in interest rates by being able to refinance its debt at a lower interest rate. For example, assume that the market interest rate was 6% at the time of issuance and that a company issued a bond with a coupon rate of 7%—the market interest rate plus a spread of 100 bps. Now assume that the market interest rate has fallen to 4% and that the company’s creditworthiness has not changed; it can still issue at the market interest rate plus 100 bps. If the original bond is callable, the company can redeem it and replace it with a new bond paying 5% annually. If the original bond is non-callable, the company must carry on paying 7% annually and cannot benefit from the decline in market interest rates.

As illustrated in this example, callable bonds are advantageous to the issuer of the security. Put another way, the call option has value to the issuer. Callable bonds present investors with a higher level of reinvestment risk than non-callable bonds; that is, if the bonds are called, bondholders have to reinvest funds in a lower interest rate environment. For this reason, callable bonds have to offer a higher yield and sell at a lower price than otherwise similar non-callable bonds. The higher yield and lower price compensate the bondholders for the value of the call option to the issuer.

Callable bonds have a long tradition and are commonly issued by corporate issuers. Although first issued in the US market, they are now frequently issued in every major bond market and in a variety of forms.

The details about the call provision are specified in the indenture. These details include the call price, which represents the price paid to bondholders when the bond is called. The call premium is the amount over par paid by the issuer if the bond is called. There may be restrictions on when the bond can be called, or the bond may have different call prices depending on when it is called. The call schedule specifies the dates and prices at which a bond may be called. Some callable bonds are issued with a call protection period, also called lockout period, cushion, or deferment period. The call protection period prohibits the issuer from calling a bond early in its life and is often added as an incentive for investors to buy the bond. The earliest time that a bond might be called is known as the call date.

Make-whole calls first appeared in the US corporate bond market in the mid-1990s and have become more commonplace ever since. A typical make-whole call requires the issuer to make a lump-sum payment to the bondholders based on the present value of the future coupon payments and principal repayment not paid because of the bond being redeemed early. The discount rate used is usually some pre-determined spread over the yield to maturity of an appropriate sovereign bond. The typical result is a redemption value that is significantly greater than the bond’s current market price. A make-up call provision is less detrimental to bondholders than a regular call provision because it allows them to be compensated if the issuer calls the bond. Issuers, however, rarely invoke this provision because redeeming a bond that includes a make-whole provision before the maturity date is costly. Issuers tend to include a make-whole provision as a “sweetener” to make the bond issue more attractive to potential buyers and allow them to pay a lower coupon rate.

Available exercise styles on callable bonds include the following:

- American call, sometimes referred to as continuously callable, for which the issuer has the right to call a bond at any time starting on the first call date.
- European call, for which the issuer has the right to call a bond only once on the call date.
- **Bermuda-style** call, for which the issuer has the right to call bonds on specified dates following the call protection period. These dates frequently correspond to coupon payment dates.
5.2. Putable Bonds

A put provision gives the bondholders the right to sell the bond back to the issuer at a pre-determined price on specified dates. **Putable bonds** are beneficial for the bondholder by guaranteeing a pre-specifed selling price at the redemption dates. If interest rates rise after the

### EXAMPLE 7

Assume a hypothetical 30-year bond is issued on 15 August 2012 at a price of 98.195 (as a percentage of par). Each bond has a par value of $1,000. The bond is callable in whole or in part every 15 August from 2022 at the option of the issuer. The call prices are shown below.

<table>
<thead>
<tr>
<th>Year</th>
<th>Call Price</th>
<th>Year</th>
<th>Call Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>2022</td>
<td>103.870</td>
<td>2028</td>
<td>101.548</td>
</tr>
<tr>
<td>2023</td>
<td>103.485</td>
<td>2029</td>
<td>101.161</td>
</tr>
<tr>
<td>2024</td>
<td>103.000</td>
<td>2030</td>
<td>100.774</td>
</tr>
<tr>
<td>2025</td>
<td>102.709</td>
<td>2031</td>
<td>100.387</td>
</tr>
<tr>
<td>2026</td>
<td>102.322</td>
<td>2032 and thereafter</td>
<td>100.000</td>
</tr>
<tr>
<td>2027</td>
<td>101.955</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. The call protection period is:
   A. 10 years.
   B. 11 years.
   C. 20 years.
2. The call premium (per bond) in 2026 is closest to:
   A. $2.32.
   B. $23.22.
   C. $45.14.
3. The call provision is most likely:
   A. a Bermuda call.
   B. a European call.
   C. an American call.

**Solution to 1:** A is correct. The bonds were issued in 2012 and are first callable in 2022. The call protection period is 2022 – 2012 = 10 years.

**Solution to 2:** B is correct. The call prices are stated as a percentage of par. The call price in 2026 is $1,023.22 (102.322% × $1,000). The call premium is the amount paid above par by the issuer. The call premium in 2026 is $23.22 ($1,023.22 – $1,000).

**Solution to 3:** A is correct. The bond is callable every 15 August from 2022—that is, on specified dates following the call protection period. Thus, the embedded option is a Bermuda call.
issue date, thus depressing the bond’s price, the bondholders can put the bond back to the issuer and get cash. This cash can be reinvested in bonds that offer higher yields, in line with the higher market interest rates.

Because a put provision has value to the bondholders, the price of a putable bond will be higher than the price of an otherwise similar bond issued without the put provision. Similarly, the yield on a bond with a put provision will be lower than the yield on an otherwise similar non-putable bond. The lower yield compensates the issuer for the value of the put option to the investor.

The indenture lists the redemption dates and the prices applicable to the sale of the bond back to the issuer. The selling price is usually the par value of the bond. Depending on the terms set out in the indenture, putable bonds may allow buyers to force a sellback only once or multiple times during the bond’s life. Putable bonds that incorporate a single sellback opportunity are referred to as one-time put bonds, whereas those that allow these sellback opportunities more frequently are known as multiple put bonds. Multiple put bonds offer more flexibility for investors, so they are generally more expensive than one-time put bonds. Available exercise styles on putable bonds are similar to those on callable bonds. An American put gives the bondholder the right to sell the bond back to the issuer at any time starting on the first put date. In contrast, the bondholder can put the bond back to the issuer only once on the put date in the case of a European put and only on specified dates in the case of a Bermuda put.

Typically, putable bonds incorporate one- to five-year put provisions. Their increasing popularity has often been motivated by investors wanting to protect themselves against major declines in bond prices. One benefit of this rising popularity has been an improvement in liquidity in some markets, because the put protection attracts more conservative classes of investors. The global financial crisis that started in 2008 showed that these securities can often exacerbate liquidity problems, however, because they provide a first claim on the issuer’s assets. The put provision gives bondholders the opportunity to convert their claim into cash before other creditors.

5.3. Convertible Bonds

A convertible bond is a hybrid security with both debt and equity features. It gives the bondholder the right to exchange the bond for a specified number of common shares in the issuing company. Thus, a convertible bond can be viewed as the combination of a straight bond (option-free bond) plus an embedded equity call option. Convertible bonds can also include additional provisions, the most common being a call provision.

From the investor’s perspective, a convertible bond offers several advantages relative to a non-convertible bond. First, it gives the bondholder the ability to convert into equity in case of share price appreciation, and thus participate in the equity upside. At the same time, the bondholder receives downside protection; if the share price does not appreciate, the convertible bond offers the comfort of regular coupon payments and the promise of principal repayment at maturity. Even if the share price and thus the value of the equity call option decline, the price of a convertible bond cannot fall below the price of the straight bond. Consequently, the value of the straight bond acts as a floor for the price of the convertible bond.

Because the conversion provision is valuable to bondholders, the price of a convertible bond is higher than the price of an otherwise similar bond without the conversion provision. Similarly, the yield on a convertible bond is lower than the yield on an otherwise similar non-convertible bond. However, most convertible bonds offer investors a yield advantage; the coupon rate on the convertible bond is typically higher than the dividend yield on the underlying common share.
From the issuer’s perspective, convertible bonds offer two main advantages. The first is reduced interest expense. Issuers are usually able to offer below-market coupon rates because of investors’ attraction to the conversion feature. The second advantage is the elimination of debt if the conversion option is exercised. But the conversion option is dilutive to existing shareholders.

Key terms regarding the conversion provision include the following:

- The **conversion price** is the price per share at which the convertible bond can be converted into shares.
- The **conversion ratio** is the number of common shares that each bond can be converted into. The indenture sometimes does not stipulate the conversion ratio but only mentions the conversion price. The conversion ratio is equal to the par value divided by the conversion price. For example, if the par value is 1,000€ and the conversion price is 20€, the conversion ratio is $1,000€ \div 20€ = 50:1$, or 50 common shares per bond.
- The **conversion value**, sometimes called the parity value, is the current share price multiplied by the conversion ratio. For example, if the current share price is 33€ and the conversion ratio is 30:1, the conversion value is $33€ \times 30 = 990€$.
- The conversion premium is the difference between the convertible bond’s price and its conversion value. For example, if the convertible bond’s price is 1,020€ and the conversion value is 990€, the conversion premium is 1,020€ – 990€ = 30€.
- Conversion parity occurs if the conversion value is equal to the convertible bond’s price. Using the previous two examples, if the current share price is 34€ instead of 33€, then both the convertible bond’s price and the conversion value are equal to 1,020€ (i.e., a conversion premium equal to 0). This condition is referred to as parity. If the common share is selling for less than 34€, the condition is below parity. In contrast, if the common share is selling for more than 34€, the condition is above parity.

Generally, convertible bonds have maturities of five to 10 years. First-time or younger issuers are usually able to issue convertible bonds of up to three years in maturity only. Although it is common for convertible bonds to reach conversion parity before maturity, bondholders rarely exercise the conversion option before that time. Early conversion would eliminate the yield advantage of continuing to hold the convertible bond; investors would typically receive in dividends less than they would receive in coupon payments. For this reason, it is common to find convertible bonds that are also callable by the issuer on a set of specified dates. If the convertible bond includes a call provision and the conversion value is above the current share price, the issuer may force the bondholders to convert their bonds into common shares before maturity. For this reason, callable convertible bonds have to offer a higher yield and sell at a lower price than otherwise similar non-callable convertible bonds. Some indentures specify that the bonds can be called only if the share price exceeds a specified price, giving investors more predictability about the share price at which the issuer may force conversion.

Although somewhat similar in purpose to a conversion option, a **warrant** is actually not an embedded option but rather an “attached” option. A warrant entitles the holder to buy the underlying stock of the issuing company at a fixed exercise price until the expiration date. Warrants are considered yield enhancements; they are frequently attached to bond issues as a “sweetener.” Warrants are actively traded in some financial markets, such as the Deutsche Börse and the Hong Kong Stock Exchange.

Several European banks have been issuing a type of convertible bond called contingent convertible bonds. **Contingent convertible bonds**, nicknamed “CoCos,” are bonds with
contingent write-down provisions. Two main features distinguish bonds with contingent write-down provisions from the traditional convertible bonds just described. A traditional convertible bond is convertible at the option of the bondholder, and conversion occurs on the upside—that is, if the issuer's share price increases. In contrast, bonds with contingent write-down provisions are convertible on the downside. In the case of CoCos, conversion is automatic if a specified event occurs—for example, if the bank's core Tier 1 capital ratio (a measure of the bank's proportion of core equity capital available to absorb losses) falls below the minimum requirement set by the regulators. Thus, in the event that the bank experiences losses that reduce its equity capital below the minimum requirement, CoCos are a way to reduce the bank's likelihood of default and, therefore, systemic risk—that is, the risk of failure of the financial system. When the bank's core Tier 1 capital falls below the minimum requirement, the CoCos immediately convert into equity, automatically recapitalizing the bank, lightening the debt burden, and reducing the risk of default. Because the conversion is not at the option of the bondholders but automatic, CoCos force bondholders to take losses. For this reason, CoCos must offer a higher yield than otherwise similar bonds.

Exhibit 8 shows the relative importance of plain vanilla (straight fixed-rate), floating-rate, and equity-related bonds to the total amount of international bonds outstanding. It indicates that the majority of bond issues are plain vanilla bonds.

### EXHIBIT 8  Outstanding Bonds and Notes by Type of Interest Payment and Conversion Features at the End of March 2012

<table>
<thead>
<tr>
<th>Type of Bond</th>
<th>Amount (US$ billions)</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Straight fixed-rate issues</td>
<td>20,369.9</td>
<td>71.2%</td>
</tr>
<tr>
<td>Floating-rate issues</td>
<td>7,749.6</td>
<td>27.1%</td>
</tr>
<tr>
<td>Equity-related issues</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Convertibles</td>
<td>491.9</td>
<td>1.7%</td>
</tr>
<tr>
<td>Warrants</td>
<td>2.3</td>
<td>0.0%</td>
</tr>
<tr>
<td>Total</td>
<td>28,613.7</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

*Source: Based on data from the Bank of International Settlements, Table 13B, available at [www.bis.org/statistics/secstats.htm](http://www.bis.org/statistics/secstats.htm) (accessed 7 September 2012).*

### EXAMPLE 8

1. Which of the following is **not** an example of an embedded option?
   A. Warrant
   B. Call provision
   C. Conversion provision

2. The type of bonds with an embedded option that would **most likely** sell at a lower price than an otherwise similar bond without the embedded option is a:
   A. putable bond.
   B. callable bond.
   C. convertible bond.
3. The additional risk inherent to a callable bond is best described as:
   A. credit risk.
   B. interest rate risk.
   C. reinvestment risk.

4. The put provision of a putable bond:
   A. limits the risk to the issuer.
   B. limits the risk to the bondholder.
   C. does not materially affect the risk of either the issuer or the bondholder.

5. Assume that a convertible bond issued in South Korea has a par value of ₩1,000,000 and is currently priced at ₩1,100,000. The underlying share price is ₩40,000 and the conversion ratio is 25:1. The conversion condition for this bond is:
   A. parity.
   B. above parity.
   C. below parity.

Solution to 1: A is correct. A warrant is a separate, tradable security that entitles the holder to buy the underlying common share of the issuing company. B and C are incorrect because the call provision and the conversion provision are embedded options.

Solution to 2: B is correct. The call provision is an option that benefits the issuer. Because of this, callable bonds sell at lower prices and higher yields relative to otherwise similar non-callable bonds. A and C are incorrect because the put provision and the conversion provision are options that benefit the investor. Thus, putable bonds and convertible bonds sell at higher prices and lower yields relative to otherwise similar bonds that lack those provisions.

Solution to 3: C is correct. Reinvestment risk refers to the effect that lower interest rates have on available rates of return when reinvesting the cash flows received from an earlier investment. Because bonds are typically called following a decline in market interest rates, reinvestment risk is particularly relevant for the holder of a callable bond. A is incorrect because credit risk refers to the risk of loss resulting from the issuer failing to make full and timely payments of interest and/or repayments of principal. B is incorrect because interest rate risk is the risk that a change in market interest rate affects a bond's value. Credit risk and interest rate risk are not inherent to callable bonds.

Solution to 4: B is correct. A putable bond limits the risk to the bondholder by guaranteeing a pre-specified selling price at the redemption dates.

Solution to 5: C is correct. The conversion value of the bond is ₩40,000 × 25 = ₩1,000,000. The price of the convertible bond is ₩1,100,000. Thus, the conversion value of the bond is less than the bond's price, and this condition is referred to as below parity.
6. SUMMARY

This chapter provides an introduction to the salient features of fixed-income securities while noting how these features vary among different types of securities. Important points include the following:

- The three important elements that an investor needs to know when investing in a fixed-income security are (1) the bond’s features, which determine its scheduled cash flows and thus the bondholder’s expected and actual return; (2) the legal, regulatory, and tax considerations that apply to the contractual agreement between the issuer and the bondholders; and (3) the contingency provisions that may affect the bond’s scheduled cash flows.
- The basic features of a bond include the issuer, maturity, par value (or principal), coupon rate and frequency, and currency denomination.
- Issuers of bonds include supranational organizations, sovereign governments, non-sovereign governments, quasi-government entities, and corporate issuers.
- Bondholders are exposed to credit risk and may use bond credit ratings to assess the credit quality of a bond.
- A bond’s principal is the amount the issuer agrees to pay the bondholder when the bond matures.
- The coupon rate is the interest rate that the issuer agrees to pay to the bondholder each year. The coupon rate can be a fixed rate or a floating rate. Bonds may offer annual, semi-annual, quarterly, or monthly coupon payments depending on the type of bond and where the bond is issued.
- Bonds can be issued in any currency. Bonds such as dual-currency bonds and currency option bonds are connected to two currencies.
- The yield to maturity is the discount rate that equates the present value of the bond’s future cash flows until maturity to its price. Yield to maturity can be considered an estimate of the market’s expectation for the bond’s return.
- A plain vanilla bond has a known cash flow pattern. It has a fixed maturity date and pays a fixed rate of interest over the bond’s life.
- The bond indenture or trust deed is the legal contract that describes the form of the bond, the issuer’s obligations, and the investor’s rights. The indenture is usually held by a financial institution called a trustee, which performs various duties specified in the indenture.
- The issuer is identified in the indenture by its legal name and is obligated to make timely payments of interest and repayment of principal.
- For securitized bonds, the legal obligation to repay bondholders often lies with a separate legal entity—that is, a bankruptcy-remote vehicle that uses the assets as guarantees to back a bond issue.
- How the issuer intends to service the debt and repay the principal should be described in the indenture. The source of repayment proceeds varies depending on the type of bond.
- Collateral backing is a way to alleviate credit risk. Secured bonds are backed by assets or financial guarantees pledged to ensure debt payment. Examples of collateral-backed bonds include collateral trust bonds, equipment trust certificates, mortgage-backed securities, and covered bonds.
- Credit enhancement can be internal or external. Examples of internal credit enhancement include subordination, overcollateralization, and excess spread. A surety bond, a bank guarantee, a letter of credit, and a cash collateral account are examples of external credit enhancement.
• Bond covenants are legally enforceable rules that borrowers and lenders agree on at the time of a new bond issue. Affirmative covenants enumerate what issuers are required to do, whereas negative covenants enumerate what issuers are prohibited from doing.

• An important consideration for investors is where the bonds are issued and traded, because it affects the laws, regulation, and tax status that apply. Bonds issued in a particular country in local currency are domestic bonds if they are issued by entities incorporated in the country and foreign bonds if they are issued by entities incorporated in another country. Eurobonds are issued internationally, outside the jurisdiction of any single country, and are subject to a lower level of listing, disclosure, and regulatory requirements than domestic or foreign bonds. Global bonds are issued in the Eurobond market and at least one domestic market at the same time.

• Although some bonds may offer special tax advantages, as a general rule, interest is taxed at the ordinary income tax rate. Some countries also implement a capital gains tax. There may be specific tax provisions for bonds issued at a discount or bought at a premium.

• An amortizing bond is a bond whose payment schedule requires periodic payment of interest and repayment of principal. This differs from a bullet bond, whose entire payment of principal occurs at maturity. The amortizing bond’s outstanding principal amount is reduced to zero by the maturity date for a fully amortized bond, but a balloon payment is required at maturity to retire the bond’s outstanding principal amount for a partially amortized bond.

• Sinking fund agreements provide another approach to the periodic retirement of principal, in which an amount of the bond’s principal outstanding amount is usually repaid each year throughout the bond’s life or after a specified date.

• A floating-rate note or floater is a bond whose coupon is set based on some reference rate plus a spread. FRNs can be floored, capped, or collared. An inverse FRN is a bond whose coupon has an inverse relationship to the reference rate.

• Other coupon payment structures include bonds with step-up coupons, which pay coupons that increase by specified amounts on specified dates; bonds with credit-linked coupons, which change when the issuer’s credit rating changes; bonds with payment-in-kind coupons that allow the issuer to pay coupons with additional amounts of the bond issue rather than in cash; and bonds with deferred coupons, which pay no coupons in the early years following the issue but higher coupons thereafter.

• The payment structures for index-linked bonds vary considerably among countries. A common index-linked bond is an inflation-linked bond or linker whose coupon payments and/or principal repayments are linked to a price index. Index-linked payment structures include zero-coupon-indexed bonds, interest-indexed bonds, capital-indexed bonds, and indexed-annuity bonds.

• Common types of bonds with embedded options include callable bonds, putable bonds, and convertible bonds. These options are “embedded” in the sense that there are provisions provided in the indenture that grant either the issuer or the bondholder certain rights affecting the disposal or redemption of the bond. They are not separately traded securities.

• Callable bonds give the issuer the right to buy bonds back prior to maturity, thereby raising the reinvestment risk for the bondholder. For this reason, callable bonds have to offer a higher yield and sell at a lower price than otherwise similar non-callable bonds to compensate the bondholders for the value of the call option to the issuer.

• Putable bonds give the bondholder the right to sell bonds back to the issuer prior to maturity. Putable bonds offer a lower yield and sell at a higher price than otherwise similar non-putable bonds to compensate the issuer for the value of the put option to the bondholders.

• A convertible bond gives the bondholder the right to convert the bond into common shares of the issuing company. Because this option favors the bondholder, convertible bonds offer a lower yield and sell at a higher price than otherwise similar non-convertible bonds.
PROBLEMS

This question set was developed by Lee M. Dunham, CFA (Omaha, NE, USA), and Elbie Louw, CFA, CIPM (Pretoria, South Africa). Copyright © 2013 CFA Institute.

1. A 10-year bond was issued four years ago. The bond is denominated in US dollars, offers a coupon rate of 10% with interest paid semi-annually, and is currently priced at 102% of par. The bond's:
   A. tenor is six years.
   B. nominal rate is 5%.
   C. redemption value is 102% of the par value.

2. A sovereign bond has a maturity of 15 years. The bond is best described as a:
   A. perpetual bond.
   B. pure discount bond.
   C. capital market security.

3. A company has issued a floating-rate note with a coupon rate equal to the three-month Libor + 65 basis points. Interest payments are made quarterly on 31 March, 30 June, 30 September, and 31 December. On 31 March and 30 June, the three-month Libor is 1.55% and 1.35%, respectively. The coupon rate for the interest payment made on 30 June is:
   A. 2.00%.
   B. 2.10%.
   C. 2.20%.

4. The legal contract that describes the form of the bond, the obligations of the issuer, and the rights of the bondholders can be best described as a bond's:
   A. covenant.
   B. indenture.
   C. debenture.

5. Which of the following is a type of external credit enhancement?
   A. Covenants
   B. A surety bond
   C. Overcollaterization

6. An affirmative covenant is most likely to stipulate:
   A. limits on the issuer’s leverage ratio.
   B. how the proceeds of the bond issue will be used.
   C. the maximum percentage of the issuer’s gross assets that can be sold.

7. Which of the following best describes a negative bond covenant? The issuer is:
   A. required to pay taxes as they come due.
   B. prohibited from investing in risky projects.
   C. required to maintain its current lines of business.

8. A South African company issues bonds denominated in pound sterling that are sold to investors in the United Kingdom. These bonds can be best described as:
   A. Eurobonds.
   B. global bonds.
   C. foreign bonds.

9. Relative to domestic and foreign bonds, Eurobonds are most likely to be:
   A. bearer bonds.
   B. registered bonds.
   C. subject to greater regulation.
10. An investor in a country with an original issue discount tax provision purchases a 20-year zero-coupon bond at a deep discount to par value. The investor plans to hold the bond until the maturity date. The investor will most likely report:
   A. a capital gain at maturity.
   B. a tax deduction in the year the bond is purchased.
   C. taxable income from the bond every year until maturity.

11. A bond that is characterized by a fixed periodic payment schedule that reduces the bond’s outstanding principal amount to zero by the maturity date is best described as a:
   A. bullet bond.
   B. plain vanilla bond.
   C. fully amortized bond.

12. If interest rates are expected to increase, the coupon payment structure most likely to benefit the issuer is a:
   A. step-up coupon.
   B. inflation-linked coupon.
   C. cap in a floating-rate note.

13. Investors who believe that interest rates will rise most likely prefer to invest in:
   A. inverse floaters.
   B. fixed-rate bonds.
   C. floating-rate notes.

14. A 10-year, capital-indexed bond linked to the Consumer Price Index (CPI) is issued with a coupon rate of 6% and a par value of 1,000. The bond pays interest semi-annually. During the first six months after the bond’s issuance, the CPI increases by 2%. On the first coupon payment date, the bond’s:
   A. coupon rate increases to 8%.
   B. coupon payment is equal to 40.
   C. principal amount increases to 1,020.

15. The provision that provides bondholders the right to sell the bond back to the issuer at a predetermined price prior to the bond’s maturity date is referred to as:
   A. a put provision.
   B. a make-whole call provision.
   C. an original issue discount provision.

16. Which of the following provisions is a benefit to the issuer?
   A. Put provision
   B. Call provision
   C. Conversion provision

17. Relative to an otherwise similar option-free bond, a:
   A. putable bond will trade at a higher price.
   B. callable bond will trade at a higher price.
   C. convertible bond will trade at a lower price.