

## Bond Basics

### Everything You Need to Know About Bonds

The bond market is by far the largest securities market in the world<sup>1</sup>, providing investors with virtually limitless investment options. Many investors are familiar with aspects of the market, but as the number of new products grows, even a bond expert is challenged to keep pace. While we spend a great deal of time discussing economic forecasts and how those forecasts may affect unique sectors of the bond market, we have yet to answer the most basic question: *What is a bond?*

In this article, we will explain the fundamentals of the bond market, including pricing and interest rates, the risks of investing in bonds, and the traditional role of bonds in an investment portfolio. We will then explore the many sectors of the market, as well as the benefits bonds can provide within an overall investment strategy.

#### What Makes a Bond a Bond?

First and foremost, a bond is a loan that the bond purchaser, or bondholder, makes to the bond issuer. Governments, corporations and municipalities issue bonds when they need capital. If you buy a government bond, you're lending the government money. If you buy a corporate bond, you're lending the corporation money. Like a loan, a bond pays interest periodically and repays the principal at a stated time.

Suppose a corporation wants to build a new manufacturing plant for \$1 million and decides to issue a bond to help pay for the plant. The corporation might decide to sell 1,000 bonds to investors for \$1,000 each. In this case, the **"face value"** of each bond is \$1,000. The corporation—now referred to as the bond "issuer"—determines an annual interest rate, known as the **"coupon,"** and a timeframe within which it will repay the principal, or the \$1 million. To set the coupon, the issuer takes into account the prevailing interest-rate environment to ensure that the coupon is competitive with those on comparable bonds and attractive to investors. Our hypothetical corporation may decide to sell five-year bonds with an annual coupon of 5%. At the end of five years, the bond reaches **"maturity"** and the corporation repays the \$1,000 face value to each bondholder.

How long it takes for a bond to reach maturity can play an important role in the amount of risk as well as the potential return an investor can expect. A \$1 million bond repaid in five years is typically regarded as less risky than the same bond repaid over 30 years because many factors can have a negative impact on the issuer's ability to pay bondholders over a 30-year period. The additional risk incurred by a longer maturity bond has a direct relation to the interest rate, or coupon, the issuer must pay on the bond. In other words, an issuer will pay a higher interest rate for a long-term bond. An investor therefore will potentially earn greater returns on longer-term bonds, but in exchange for that return, the investor incurs additional risk.

**Face Value:** The value of a bond as stated on the actual security. Also the amount that will be returned to the bondholder when the bond reaches 'maturity'.

**Coupon:** The stated interest rate on a bond when it is issued. In the U.K., most coupons are paid twice a year while annual payments are more common in Europe.

**Maturity:** The amount of time before the bond repayment is due. A bond with a '10-year maturity' is repaid by the issuer in the tenth year.

<sup>1</sup> The precise size of the global bond market is difficult to pin down because of the market's rapid growth and increasing diversity. For example, Merrill Lynch's 'Size and Structure of the World Bond Market: 2004' estimates that there were about \$45 trillion in global bonds outstanding at the end of 2003 while a recent study by the McKinsey Global Institute, '\$118 Trillion and Counting: Taking Stock of the World's Capital Markets', estimated the size of the global bond market at about \$51 trillion in 2003. For comparison, the same McKinsey study estimated the size of the global equity market was \$32 trillion, not quite two-thirds of the size of the global bond market.

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**Default:** Default occurs when a bond issuer fails to make full payments on the bond (either the coupon or the face value). Default is usually the result of bankruptcy.

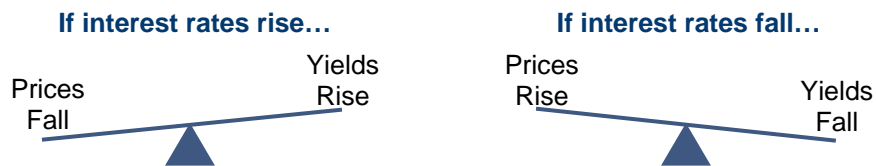
**Price:** The market price of a bond is the present value of its future cash flows, including coupon payments and principal. Bond prices are usually quoted as a percentage of the bond's face value.

**Yield:** The term 'yield' usually refers to yield-to-maturity, which is the average annual return on a bond if held to maturity. Another term, current yield, refers to a bond's annual interest income.

Every bond also carries some risk that the issuer will “**default**,” or fail to fully repay the loan. Independent credit rating services assess the default risk of most bond issuers and publish credit ratings in major financial newspapers. These ratings not only help investors evaluate risk but also help determine the interest rates on individual bonds. An issuer with a high credit rating will pay a lower interest rate than one with a low credit rating. Again, investors who purchase bonds with low credit ratings can potentially earn higher returns, but they must bear the additional risk of default by the bond issuer.

### What Determines the Price of a Bond in the Open Market?

Bonds can be traded in the open market after they are issued. When listed on the open market, a bond's **price** and **yield** determine its value. Obviously, a bond must have a price at which it can be bought and sold (see “Understanding Bond Market Prices” below for more). A bond's yield is the actual annual return an investor can expect if the bond is held to maturity. Yield is therefore based on the purchase price of the bond as well as the coupon.



A bond's price always moves in the opposite direction of its yield, as illustrated above. The key to understanding this critical feature of the bond market is to recognize that a bond's price reflects the value of the income that it provides through its regular coupon interest payments. When prevailing interest rates fall—notably rates on government bonds—older bonds of all types become more valuable because they were sold in a higher interest-rate environment and therefore have higher coupons. Investors holding older bonds can charge a “premium” to sell them in the open market. On the other hand, if interest rates rise, older bonds may become less valuable because their coupons are relatively low, and older bonds therefore trade at a “discount.”

### Understanding Bond Market Prices

In the market, bond prices are quoted as a percent of the bond's face value. The easiest way to understand bond prices is to add a zero to the price quoted in the market. For example, if a bond is quoted at '99' in the market, the price is \$990 for every \$1,000 of face value and the bond is said to be trading at a 'discount'. If the bond is trading at '101', it costs \$1,010 for every \$1,000 of face value and the bond is said to be trading at a 'premium'. If the bond is trading at 100, it costs \$1,000 for every \$1,000 of face value and is said to be trading at 'par'. Another term you might hear is 'par value', which is simply another way of saying face value.

Face Value:	Price Quoted As:	Market Price:	The Bond is Trading at:
\$1,000	100	\$1,000	'Par'
\$1,000	102	\$1,020	A 'premium' to par
\$1,000	97	\$970	A 'discount' to par
\$5,000	99	\$4,950	A 'discount' to par

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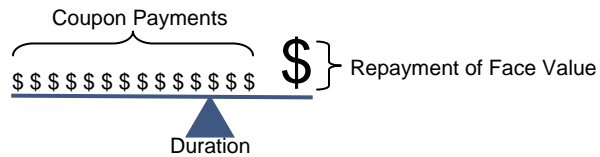
Put simply, rising interest rates are considered “bad” for bond investors because new bonds will pay investors a higher interest rate than old ones, so old bonds tend to drop in price. Falling interest rates, however, mean that older bonds are paying higher interest rates than new bonds, and therefore older bonds tend to sell at premiums in the market.

On a short-term basis, this is true. However, keep in mind the long-term investment picture: as a bondholder, you want to earn the highest yields you can (within your given risk tolerance). Rising interest rates can actually boost a bond portfolio’s return over longer time periods, as the money from maturing bonds is *reinvested* in bonds with higher yields. Conversely, falling interest rates, while helpful to bondholders in the short term, mean that money from maturing bonds may need to be reinvested in new bonds that pay lower rates, potentially lowering longer-term returns.

### Measuring Bond Risk: What Is Duration?

Now that we’ve established that bond prices and yields move in opposite directions, let’s explore the price-yield relationship in more detail. How do we know how much a bond’s price will move when interest rates change? This is a key question because some bonds are more sensitive to changes in interest rates than others.

To estimate how much a specific bond’s price will move when interest rates change, the bond market uses a measure known as “**duration**.” Duration is a weighted average of the present value of a bond’s cash flows, which include a series of regular coupon payments followed by a much larger payment at the end when the bond matures and the face value is repaid, as illustrated below.



As you can see from the illustration, duration is less than the maturity. Duration will also be affected by the size of the regular coupon payments and the bond’s face value. For a zero coupon bond, maturity and duration are equal since there are no regular coupon payments and all cash flows occur at maturity. Because of this feature, zero coupon bonds tend to provide the most price movement for a given change in interest rates, which can make zero coupon bonds attractive to investors expecting a decline in rates.

The end result of the duration calculation, which is unique to each bond, is a risk measure that allows us to compare bonds with different maturities, coupons and face values on an apples-to-apples basis. Duration tells us the approximate change in price that any given bond will experience in the event of a 100 “**basis point**” (one percentage point) change in interest rates. For example, suppose that interest rates fall by one percent, causing yields on every bond in the market to fall by the same amount. In that event, the price of a bond with a duration of two years will rise two percent and the price of a five-year duration bond will rise five percent.

**Duration:** Duration measures a bond’s interest rate risk and is expressed in years. The longer the duration of a bond, the more sensitive the bond’s price is to changes in interest rates

**Basis Point:** A basis point is 1/100 of a percent, i.e., 100 basis points equals one percent. Changes in bond yields are often quoted in basis points. For example, a drop in bond yields from 5% to 4.5% would be a 50 basis point decline. Returns can also be quoted in basis points.

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### **The Role of Bonds in a Portfolio**

Investors have traditionally held bonds in their portfolio for three reasons: income, diversification, and protection against economic weakness or deflation. Let's look at each of these in more detail.

**Income:** Most bonds provide the investor with “fixed” income. On a set schedule, perhaps quarterly, twice a year or annually, the bond issuer sends the bondholder an interest payment—a check that can be spent or reinvested in other bonds. Stocks might also provide income through dividend payments, but dividends tend to be much smaller than bond coupon payments, and companies make dividend payments at their discretion, while bond issuers are obligated to make coupon payments.

**Diversification:** Diversification means not “putting all of your eggs in one basket.” A stock market investor faces the risk that the stock market will decline and take the portfolio along for the ride. To offset this risk, investors have long turned to the bond market because the performance of stocks and bonds is often non-correlated: market factors that are likely to have a negative impact on the performance of stocks historically have little to no impact on bonds and in some cases can actually improve bond performance. For example, an investor who purchases a blue-chip stock and a government bond may offset a downward market cycle in either asset class because a drop in a particular company's share price and a government's ability to repay a bond are usually unrelated. Although diversification does not ensure against loss, an investor can diversify a portfolio across different asset classes that perform independently in market cycles to reduce the risk of low, or even negative, returns.

**Protection Against Economic Slowdown or Deflation:** Bonds can help protect investors against an economic slowdown for several reasons. Recall that the price of a bond depends on how much investors value the income that bonds provide. Most bonds pay a fixed income that doesn't change. When the prices of goods and services are rising, an economic condition known as “inflation,” a bond's fixed income becomes less attractive because that income buys fewer goods and services. Inflation is usually caused by faster economic growth, which increases demand for goods and services. On the other hand, slower economic growth usually leads to lower inflation, which makes bond income more attractive. An economic slowdown is also typically bad for corporate profits and stock returns, adding to the attractiveness of bond income as a source of return. If the slowdown becomes bad enough that consumers stop buying things and prices in the economy begin to fall—a dire economic condition known as “deflation”—then bond income becomes even more attractive because you can buy more goods and services (due to their deflated prices) with the same bond income. As demand for bonds increases, so do bond prices and bondholder returns.

### **Variations on a Theme: The Many Different Kinds of Bonds**

Now that we've highlighted the main features common to virtually all bonds, let's move on to the bond market's evolution and the many different types of bonds available in the global market. In its early days, the bond market was primarily a place for governments and large companies to borrow money. The main investors in bonds were insurance companies, pension funds and individual investors seeking a high quality investment for money that would be needed for some specific future purpose.

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In the 1970s, the bond market began to evolve as investors learned there was money to be made by trading bonds in the open market. As investor interest in bonds grew (and faster computers made bond math easier), finance professionals created innovative ways for borrowers to tap the bond market for funds and new ways for investors to tailor their exposure to risk and return potential.

Broadly speaking, government bonds and corporate bonds remain the largest sectors of the bond market, but there are a growing number of subcategories within these broad groups. There are also large segments of the market, such as mortgage-backed and asset-backed securities, which do not fall easily into either category. Here's what you need to know about the major sectors of the bond market:

### Government Bonds

The government bond sector is a broad category that includes “sovereign” debt, which is issued and backed by a central government. Government of Canada Bonds (GoCs), U.K. Gilts, U.S. Treasuries, German Bunds, Japanese Government Bonds (JGBs) and French OATs are all examples of sovereign government bonds. The U.S., Japan and Europe (primarily the U.K., Germany, France, Italy and Spain) dominate the government bond market, accounting for more than 84% of all government bonds outstanding.<sup>2</sup> Sovereign bonds issued by these major industrialized countries are generally considered to have very low default risk and are among the safest investments available. However, we should note that guarantees on government bonds tend to relate to the timely repayment of interest and do not eliminate market risk. Also, shares of a portfolio of government bonds are not guaranteed.

A number of governments also issue sovereign bonds that are linked to inflation, also known as “linkers” in Europe or “TIPS” in the U.S. On an inflation-linked bond, the interest and/or principal is adjusted on a regular basis to reflect changes in the rate of inflation, thus providing a “real,” or inflation-adjusted, return. But, unlike other bonds, inflation linked bonds could experience greater losses when real interest rates are moving faster than nominal interest rates.

In addition to sovereign bonds, the government bond sector also includes a number of subcomponents, such as:

- Agency and “Quasi-Government” Bonds: Central governments pursue various goals—supporting affordable housing or the development of small businesses, for example—through agencies, a number of which issue bonds to support their operations. Some agency bonds are guaranteed by the central government while others are not. For example, the German government guarantees bonds issued by the agency KfW, which makes housing and small businesses loans. On the other hand, the U.S. government does not guarantee bonds issued by agencies Fannie Mae and Freddie Mac, both of which buy mortgages from banks, but does guarantee bonds issued by Ginnie Mae, another mortgage agency. Supranational organizations, like the World Bank

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<sup>2</sup> Source: European Central Bank, ‘Euro Bond Market Study’, December 2004

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and the European Investment Bank also borrow in the bond market to finance public projects and/or development.

- **Emerging Market Bonds:** Emerging market bonds are sovereign bonds issued by countries with developing economies, including most of Africa, Eastern Europe, Latin America, Russia, the Middle East and Asia excluding Japan. The emerging market sector has grown and matured significantly in recent years, attracting many new investors. While emerging market bonds can offer very attractive yields, they also pose special risks, including but not limited to currency fluctuation, economics and political risk. An emerging market portfolio would usually be more volatile than that of a U.S.-only portfolio.
- **Local Government Bonds:** Local governments borrow to finance a variety of projects, from bridges to schools, as well as general operations. The market for local government bonds is well established in the U.S., where these bonds are known as “municipal bonds,” and European local government bond issuance has grown significantly in recent years. In the U.S., municipal bonds (munis) may enjoy a tax advantage over other bonds because interest on municipal bonds is exempt from federal taxes. However, capital gains on U.S. munis are not tax exempt and income from portfolios that invest in munis may be subject to state and local taxes and, possibly, the alternative minimum tax.

### Corporate Bonds

After the government sector, the next largest segment of the bond market is corporate bonds, accounting for nearly 30% of outstanding bonds in the global market, according to Merrill Lynch. Corporations borrow money in the bond market to expand operations or fund new business ventures. The corporate sector is evolving rapidly and is one of the fastest growing segments of the bond market, particularly in Europe. From the end of 2000 to the end of 2003, the outstanding amount of bonds issued by non-financial euro area corporations grew nearly 60%, according to the European Central Bank.

Corporate bonds fall into two broad categories: investment-grade and speculative-grade (also known as high-yield or “junk”) bonds. Speculative-grade bonds are issued by companies perceived to have a lower level of credit quality and higher default risk compared to more highly rated, investment-grade, companies. Within these two broad categories, corporate bonds have a wide range of ratings, reflecting the fact that the financial health of issuers can vary significantly (see table).

Speculative-grade bonds tend to be issued by newer companies, companies that are in a particularly competitive or volatile sector, or companies with troubling fundamentals. While a speculative-grade credit rating indicates a higher default probability, higher coupons on these bonds often compensate for the higher risk. Ratings can be downgraded if the credit quality of the issuer deteriorates or upgraded if fundamentals improve.

In recent years, new securities have emerged that provide investors with additional options for gaining exposure to corporate credit. For example, investors can buy credit default swaps that provide insurance against a default by the corporate bond issuer. Credit default swaps can also be used to gain exposure to corporate credit without

#### Credit Ratings

The table below shows credit ratings by Moody's and Standard & Poor's in descending order, from the highest rating to the lowest:

#### Investment Grade

Moody's	S&P
Aaa	AAA
Aa	AA
A	A
Baa	BBB

#### Speculative Grade

Ba	BB
B	B
Caa	CCC
Ca	CC
C	C
	D

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buying actual corporate bonds, or to “sell short” corporate exposure, which was previously not possible. Credit default swaps and other corporate credit derivatives have also been bundled into index products that allow for diversified, and in some cases leveraged, exposure to a broad array of corporate credit.

Derivatives carry their own distinct risks and portfolios investing in derivatives could potentially lose more than the principal amount invested. Derivatives may involve certain costs and risks such as liquidity risk, interest rate risk, market risk, credit risk, management risk and the risk that a portfolio could not close out a position when it would be most advantageous to do so.

### Mortgage-Backed and Asset-Backed Securities

Another major growth area in the global bond market comes from a process known as “securitization,” in which the cash flows from various types of loans (mortgage payments, car payments or credit card payments, for example) are bundled together and resold to investors as securities. Mortgage-backed securities and asset-backed securities are the largest examples of securitization, but there are many other variations. Here’s what you need to know about the major types of securitized loans:

- Mortgage-Backed Securities: These bonds are securities created from the monthly mortgage payments of many residential homeowners. Mortgage lenders sell individual mortgage loans to another entity that bundles those loans into a security that pays an interest rate similar to the mortgage rate being paid by the homeowners. As with other bonds, mortgage-backed securities may be sensitive to changes in prevailing interest rates and could decline in value when interest rates rise. And while most mortgage-backed securities are backed by a private guarantor, there is no assurance that the private guarantors or insurers will meet their obligations.
- Asset-Backed Securities: These bonds are securities created from car payments, credit card payments or other loans. As with mortgage-backed securities, similar loans are bundled together and packaged as a security that is then sold to investors. Special entities are created to administer asset-backed securities, allowing credit card companies and other lenders to move loans off of their balance sheet. Asset-backed securities are usually “tranching,” meaning that loans are bundled together into high-quality and lower-quality classes of securities. Similar to mortgage-backed securities, asset-backed securities contain similar rights as discussed above.
- Pfandbriefe and Covered Bonds: German securities secured by mortgages are known as Pfandbriefe or, depending on the size of the offering, “Jumbo” Pfandbriefe. The Jumbo Pfandbrief market is one of the largest sectors of the European bond market. The key difference between Pfandbriefe and mortgage-backed or asset-backed securities is that banks that make loans and package them into Pfandbriefe keep those loans on their books. Because of this feature, Pfandbriefe are sometimes classified as corporate bonds. However, unlike mortgage and asset-backed securities, Pfandbriefe are backed by all laws of the issuing bank. Other nations in Europe are increasingly issuing Pfandbrief-like securities known as covered bonds.

**LIBOR:** LIBOR stands for the London Interbank Offered Rate. This is the rate at which very large banks with high credit ratings lend to each other. If LIBOR is 2% and a bond is quoted at 100 basis points over LIBOR, the bond is trading at 3%.

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**Credit Spread:** Credit spreads reflect the additional return investors require to take on more credit risk. Bonds with lower credit ratings have larger credit spreads. For example, a corporate bond quoted at a credit spread of 100 basis points means investors are requiring 100 basis points of additional yield to buy that bond rather than an alternative such as a government bond.

The non-government bonds described above tend to be priced relative to a rate with little or no risk, rates such as government bond yields or the London Interbank Offered Rate (**LIBOR**). The difference between the yield on a lower-rated bond and the government or LIBOR rate is known as the “**credit spread**.” Credit spreads adjust based on investor perceptions of credit quality and economic growth, as well as investor demand for risk and higher returns.

Now that you’re familiar with the major types of bonds—and recognize that there are many variations within each of the major categories we’ve discussed—let’s move on to some of the major bond investment strategies investors or their bond managers employ.

### Bond Investment Strategies

Investors have several options for adding bonds to their portfolio. One option is to invest with an “active” bond manager that will employ various strategies in an effort to maximize the return on a bond portfolio and outperform the market’s return as measured by a selected benchmark. A second option is to invest with a “passive” manager whose goal is to replicate (rather than outperform) the returns of the bond market or a specific sector of the bond market. A third option is to invest in a “laddered” bond strategy, in which maturing bonds are passively reinvested in new bonds without any attempt to maximize returns.

Investors have long debated the merits of active management versus passive management and laddered strategies. The key contention in this debate is whether the bond market is too efficient to allow active managers to consistently outperform the market itself. An active bond manager, such as PIMCO, would counter this argument by noting that both size and flexibility enable active managers to optimize short- and long-term trends in order to outperform the market.

Active bond managers commonly adjust a bond portfolio’s duration (the weighted average duration of all the bonds in the portfolio) based on an economic forecast. For example, in anticipation of declining interest rates an active manager may lengthen a portfolio’s duration because the longer the duration, the more price appreciation the portfolio will experience if rates decline. To lengthen duration, the bond manager might sell shorter-term bonds and buy longer-term bonds. On the other hand, a bond manager expecting interest rates to rise would normally shorten the bond portfolio’s duration by buying shorter-term bonds and selling longer-term bonds. In the event of rising interest rates, the price of a shorter-duration portfolio should fall less than that of a longer-duration portfolio.

Another active bond investment strategy is to adjust the credit quality of the portfolio. For example, when economic growth is accelerating, an active manager might add bonds with lower credit quality in hopes that the bond issuers will experience credit improvement with the positive change in the economy and the bond prices will rise. In some cases, active managers take advantage of strong credit analysis capabilities to identify sectors of the market that seem likely to improve, therein potentially increasing a portfolio’s return.

**Yield Curve:** The yield curve is a line graph that plots the relationship between yields to maturity and time to maturity for bonds of the same asset class and credit quality. The plotted line begins with the spot interest rate, which is the rate for the shortest maturity, and extends out in time, now reaching 50 years.

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A third active bond strategy is to adjust the maturity structure of the portfolio based on expected changes in the relationship between bonds with different maturities, a relationship illustrated by the “**yield curve**.” While yields normally rise with maturity, this relationship can change, creating opportunities for active bond managers to position a portfolio in the area of the yield curve that is likely to perform the best in a given economic environment.

### **Conclusion: Bonds are the Cornerstone of a Well Diversified Portfolio**

Bonds offer investors fixed-income payments, portfolio diversification and a hedge against an economic slowdown. As the largest securities market available, bonds offer a plethora of choices for investors seeking price protection. The unique characteristics of the many bond issuers in today’s market create opportunities for investors with a broad spectrum of risk/return objectives.

**Past performance is no guarantee of future results.** Each sector of the bond market entails risk. Municipals may realize gains and may incur a tax liability from time to time. The guarantee on Treasuries, TIPS and Government Bonds is to the timely repayment of principal and interest, shares of a portfolio that invest in them are not guaranteed. Mortgage-backed securities are subject prepayment risk and may be sensitive to changes in prevailing interest rates, when they rise the value generally declines. With corporate bonds there is no assurance that issuers will meet their obligations. An investment in high-yield securities generally involves greater risk to principal than an investment in higher-rated bonds. Investing in non-U.S. securities may entail risk as a result of non-U.S. economic and political developments, which may be enhanced when investing in emerging markets.

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