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Understanding your investments:
A guide to bonds

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An overview of bonds

Fixed-income securities such as bonds are the most prevalent means of raising capital globally. In terms of overall market value, global bond markets exceed the value of stock markets. This can be surprising for investors because stocks seem to get all of the attention however, bonds are critical to the global financial system.

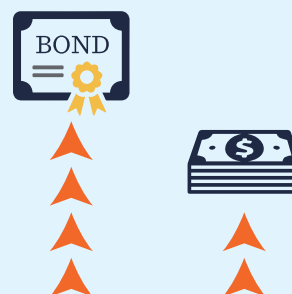
At the most basic level, fixed income securities are instruments that facilitate borrowing for governments and corporations. Bonds are the most common type of fixed income securities — so much so that the terms are often used interchangeably in the context of an investment portfolio.

Bonds play a very important role within an individual's portfolio and learning about them is essential to become a better investor. Understanding the characteristics of bonds and how they interact with stocks in a diversified portfolio is wise for investors of all ages and risk tolerances alike.

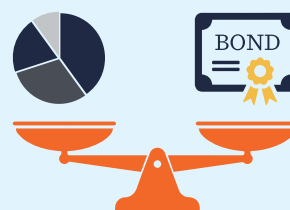
What bonds bring to a portfolio



Provide investors with a predictable income stream



Are lower risk investments that tend to offer higher interest rates than those of cash



Can lower the risk in a balanced portfolio through diversification and offsetting exposure to more volatile stock holdings

What is a bond?

A bond is a type of fixed-income security that involves a borrower (bond issuer) and a lender (investor). Bonds can be thought of as a formal IOU between the two parties that states the rights of the investor and the obligations of the issuer. In exchange for an investor's loan, a bond issuer will make contractual interest payments and will ultimately pay back the investor's principal on the maturity date specified. Typical issuers include municipalities, provincial and federal governments, as well as corporations.

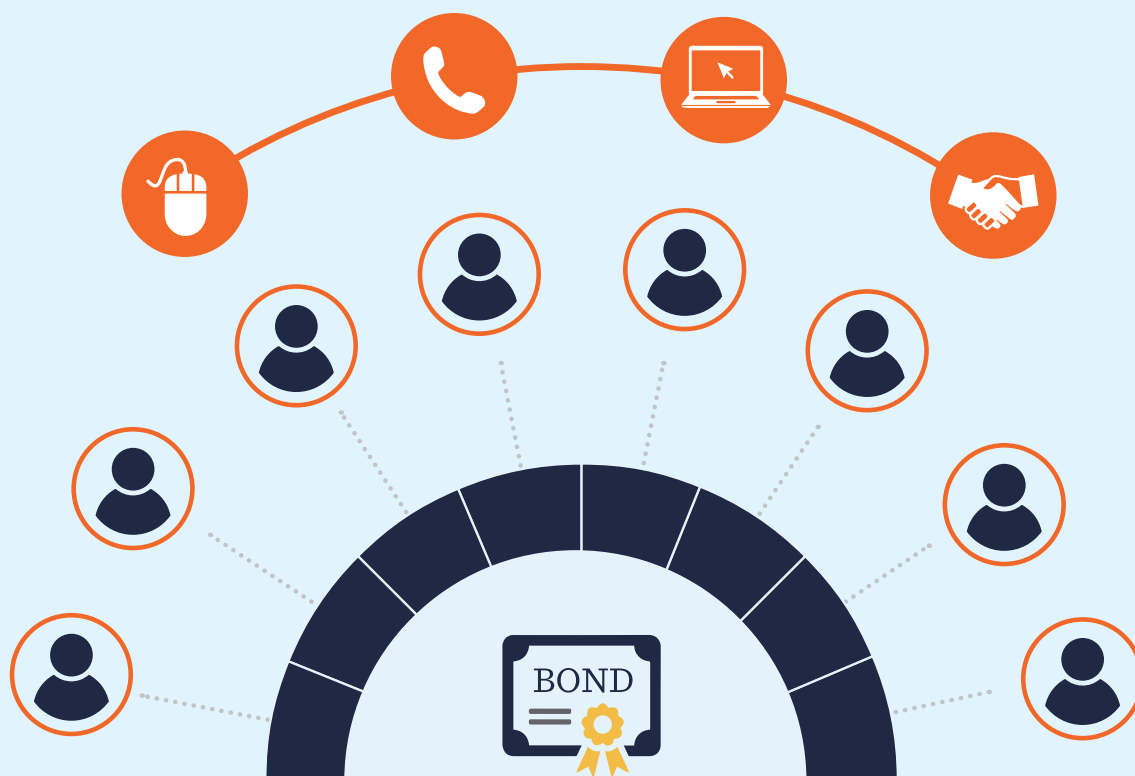
How are bonds different from stocks?

Corporate-issued bonds differ from equity (also known as common share or stock) investments in that they do not represent an ownership stake in the company. As such, bondholders do not typically participate in the future growth of a company like common shareholders do.

However, the payment of interest and the principal amounts borrowed for bonds are to be paid from company assets and earnings before any dividends are paid out to shareholders. Additionally, if a company declares bankruptcy, bondholders will also have a prior claim to any remaining company assets before common shareholders. For these reasons, bonds are viewed as less risky investments than stocks, but also have corresponding return prospects that are lower.

Bonds come in many different shapes and sizes and can include special features like embedded options, floating interest payments or the ability to convert to common shares. For the purpose of this guide, we will focus on basic straight bonds which pay interest at regular intervals and return the principal at maturity. Other special bond varieties are less common and often build upon many of the same characteristics of straight bonds.





How to invest in bonds?

Many investors may remember a time when bond ownership meant holding a physical bond certificate that would entitle the holder to the interest and principal payments from the issuer. For example, the commonly purchased Canada Savings Bonds (CSB) were available in a physical certificate form. Today, such certificates are all but extinct, with bond ownership being tracked digitally.

Though investors are still able to purchase individual bonds for their portfolios through a broker, financial advisor or a self-directed brokerage platform, bond investments more commonly take the form of pooled products such as an exchange-traded fund (ETF) or mutual fund. In such products, an investor purchases units or shares of an underlying portfolio giving them fractional ownership of many different bond issues.

Basics of bonds

The basic terminologies and attributes of straight bonds are helpful to know to better understand how they work within a portfolio. This is true for investors whether they're purchasing individual bonds or a portfolio of bonds through an ETF or mutual fund.

Par value

The par value (also known as the principal, face value or maturity value) represents the amount of money that the bond issuer promises to repay bondholders at the bond's maturity date. Since bond issuers typically raise large amounts of money at a time, their "debts" are sliced up and sold to investors in much smaller units. Bonds are typically issued in \$1,000 denominations, so the par value of a bond is also typically measured in \$1,000 denominations.

Over the life of a bond, its market value will fluctuate and diverge from its par value depending on many factors such as the economic climate and changes in interest rates (which we'll discuss in more detail later on). When a bond is trading at a higher price than its par value, it's said to be trading at a premium. When it is trading below its par value, it is trading at a discount. As a bond gets closer to maturity, its market price will converge with its par value or will be "pulled to par" so to speak. This means that a bond trading at a premium will see its value decrease as it gets closer to maturity, while a bond trading at a discount will see its value increase. This makes sense as an investor will receive the par value of the bond at maturity, regardless of what the previous market value of the bond may have been.

Coupon

The par value is also important in determining the bond's coupon payment, which is the annual amount of contractual interest payments that the bondholder receives from the issuer. A bond's coupon is determined by multiplying its coupon rate by its par value. The coupon rate represents the issuer's cost of borrowing funds as well as the interest rate that the bondholder receives and does not change over the life of the bond. Similar to an individual applying for a loan, the coupon rate is largely governed by the issuer's credit quality and the prevailing market interest rates at the time of issuance. Coupon payments are typically made on a semi-annual basis in Canada but may occur at other frequencies.

Sources of return

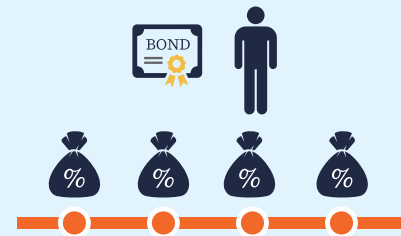
When an investor purchases a bond, they can expect two primary sources of return and one secondary source of return. The first primary return source is from the periodic coupon interest payments. As long as the investor holds the bond, they will receive these scheduled coupon payments and if they hold the bond until maturity, they'll also receive the bond's par value back at that time.

The second primary source of return occurs from the change in the market value of the bond. From the bond's initial issuance (typically at par) to the bond's maturity, the bond will experience fluctuations in its market value. These fluctuations in market value can lead to unrealized capital gains or losses that are realized when the investor sells the bond.

Oftentimes, investors will buy and sell bonds that have been trading for a while among themselves on what's called the secondary market. In such cases, the price an investor pays for a bond will rarely be equal to the bond's par value and will either be at a premium or a discount to par. As discussed, the market value of a bond will gradually approach its par value as the bond nears its maturity date, providing the investor with either a capital gain or loss depending on the purchase price.

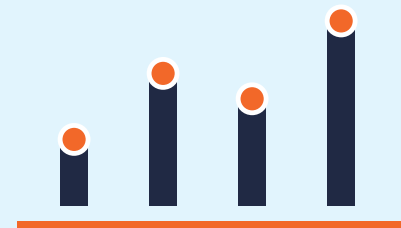
The last source of return is a secondary source that comes from reinvesting the coupon payments that the bondholder receives. When a bondholder receives a coupon payment from the bond, they'll look to reinvest this cash flow, which will now also earn interest. This 'interest on interest' is called reinvestment income and typically represents the smallest source of return from a bond.

1



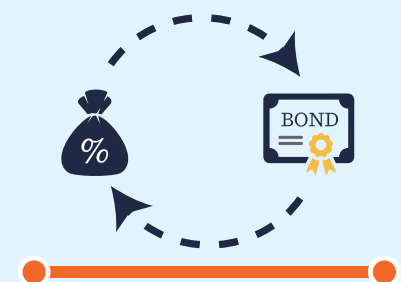
Periodic coupon
interest payments

2



Market
value changes

3



Reinvestment
income

Yield

Unlike investing in stocks, where market price appreciation is typically more volatile, bond investors have a greater degree of certainty around their investment. They know the amount and timing of coupon interest payments and when they'll receive their principle back—assuming that the issuer upholds their end of the contract and does not default. With this information, a bond's return prospects, or yield, can be closely calculated.

A bond's yield can be expressed in several ways with varying degrees of complexity and is helpful in providing an estimate of a bond's expected return. Two common measures of yield are outlined below.

Current yield

This is a simple measurement of the amount of income that a bond will provide from its coupon payments as a percentage of its current market value. The current yield can be calculated by dividing the bond's annual coupon by its market price.

For example, if a bond has a coupon rate of 3%, a par value of \$1,000, and a market value of \$1,050, its current yield is equal to 2.86% (\$30 coupon divided by the market value of \$1,050).

$$\begin{array}{ccccccc} \text{BOND} & & \% & & & & \\ \text{Par value} & \times & \text{Coupon rate} & = & \text{Coupon} & \rightarrow & \text{Current yield} \\ \$1,000 & & 3\% & & \$30 & \rightarrow & \\ & & & & & & \\ & & & & \text{Coupon} & \div & \text{Market value} \\ & & & & \$30 & & \$1,050 \\ & & & & & & = 2.86\% \end{array}$$

Although this method can be easier to calculate and interpret, the drawback of this calculation is that it only considers coupon interest and the current market value of the bond and does not account for any potential capital gains or losses. As a result, it is a meaningful assessment of yield for only a short period of time. Reinvestment income is also ignored using this basic methodology.

Yield to maturity (YTM)

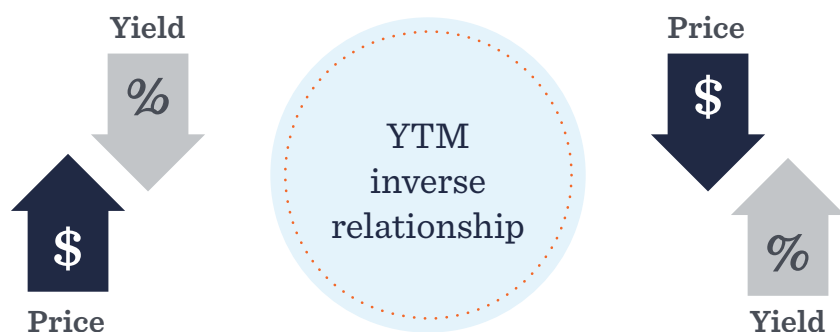
To account for all three sources of return from a bond investment, yield to maturity is the most commonly used method. This measure provides an estimate of the bond's total expected return and reflects the annual return that an investor should earn if the bond is purchased today and held until maturity.

The average YTM of a bond portfolio is usually listed on the fund company's website for reference. Several assumptions are made in the calculation of YTM:

- The bonds in the portfolio are all held to maturity.
- All coupon and principal payments are paid on schedule.
- Coupon payments received from the bonds will also be able to be reinvested at the same rate as the YTM.
 - This means that if a bond's YTM is 3%, in order for the YTM to actually be 3%, the coupon payments will need to be reinvested at 3% as well.
- Taxes on the income earned from the bond and investment management fees are not considered.
- Inflation is also not considered.

Though a much more complex calculation than the current yield, the YTM factors in all potential sources of return from a bond and provides the most comprehensive estimate of the bond or bond portfolio's long-term return prospects.

All else being equal, there is an inverse relationship between a bond's YTM and its price. That is, the higher the bond's YTM, the lower its price and the lower the bond's YTM, the higher its price. This means that if a bond's price were to rise then its yield would decrease. Conversely, if the price of the bond were to decrease, then its yield would rise.



These two mentioned measurements of yield provide an investor with an idea of the degree of return they can expect from a bond. The more comprehensive and accurate YTM measure assumes that an investor will hold the bond to maturity. However, over the life of the bond, and before its maturity date, there are factors that can cause its market value to fluctuate. These fluctuations can be material and may lead to larger unrealized gains or losses over the short term than the yield would suggest. For example, these gains or losses would be realized if the investor needed to sell the bond.

Two primary factors contribute to a bond's yield and the potential fluctuation in value: credit risk (as measured by credit quality) and interest rate risk (as measured by duration).

Credit risk

Credit risk represents the possibility that a bond issuer such as a government or corporation will fail to meet the contractual obligations of their loans, which typically means that the bondholder will not be paid the principal or interest that they are owed. The credit risk of a bond will depend on the creditworthiness of the issuer and is based on their financial strength. Bonds issued by federal governments and those issued by corporations will differ in credit risk for this reason.



Government bonds

Federal government bonds of developed countries, such as those issued by the Canadian or U.S. Governments are considered to have essentially no credit risk. This is because the issuing government backs the bonds and can raise (nearly unlimited) funds through their central bank, which is a much easier process than a corporation having to borrow privately. Since government bonds issued by developed countries are nearly risk-free in nature, they tend to offer lower rates of return relative to even the most highly rated corporate bonds. Bonds issued by governments of emerging markets will carry greater credit risk as these countries often have much more political and geographic risk than developed markets.



Corporate bonds

The credit risk of a corporate bond can be assessed through its credit rating, which is largely determined by the corporation's financial strength. Just as individuals with poor credit ratings have to pay higher interest rates on borrowed funds, so do corporations. Corporate credit ratings are published by credit rating agencies and are used by investors to determine the likelihood that the debt will be repaid and interest payments will be made on time. In other words, the credit rating agencies assess the likelihood that a corporation will default on its debt obligations.

In Canada, Dominion Bond Rating Service (DBRS), Moody's and Standard and Poor's (S&P) provide ratings for both corporate bonds and those issued by provincial or municipal governments. Each rating agency has its own rating code to express its credit assessment.

These ratings fall on a spectrum but distinguish two broad categories of bonds—investment grade and high yield or junk bonds.

Credit ratings summary from DBRS

Investment grade bonds

AAA	Highest credit quality, exceptionally strong protection of principal and interest.
AA high - AA low	Superior credit quality, high protection of principal and interest.
A high - A low	Satisfactory credit quality, substantial protection of principal and interest.
BBB high - BBB low	Adequate credit quality, acceptable protection of principal and interest, fairly susceptible to adverse changes in financial and economic conditions.

High yield/junk bonds

BB high - BB low	Low grade, speculative credit quality, uncertain protection of principal and interest particularly in economic recessions.
B high - B low	Highly speculative credit quality, reasonably high uncertainty level on the repayment of interest or principal especially in economic recessions.
<i>Substantial risk of default or actively in default</i>	
CCC - C low	Very speculative credit quality, substantial risk of principal and interest being in default.
D	Default. Not met scheduled payment of interest or principal.



Investment grade bonds

An investment grade bond is one that indicates a low risk of default, making it attractive for conservative investors. As previously mentioned, federally-backed government bonds are typically the highest credit quality and would usually land at the top of the investment grade category.

It's important to note that investment grade bonds from corporate issuers do not all carry the same credit risk as illustrated in the above table. Though all of these issuers have demonstrated the capacity to meet their financial obligations, those near the bottom of the threshold are more susceptible to changing economic conditions and carry a greater risk of default than those at the top.

Since their risk of default is low and the credit quality of the issuers is high, investment grade bonds come with relatively lower interest payments and subsequent yields and typically exhibit milder fluctuations in value than their high yield counterparts. They also tend to outperform both equities and lower rated high yield bonds during market corrections when investors have less appetite for risk. This is particularly true for government bonds since deteriorating economic conditions have little impact on the issuing government's creditworthiness, whereas corporations can be much more sensitive.

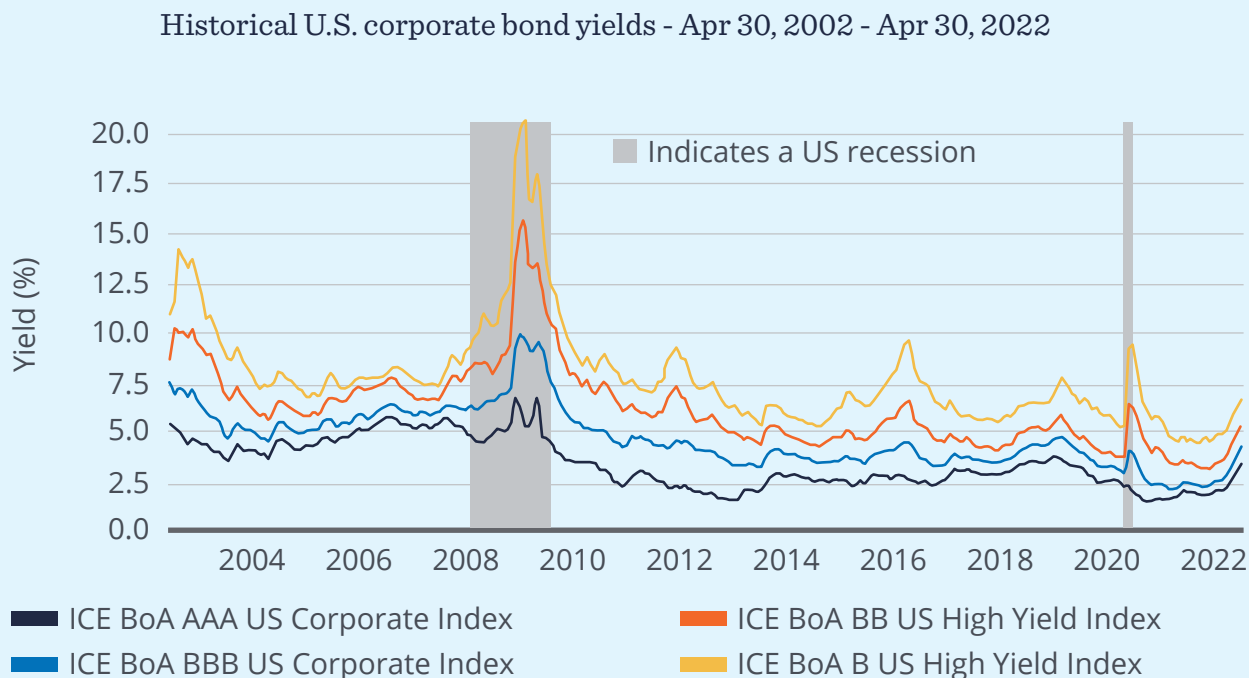


High yield/junk bonds

High yield (or junk) bonds have lower credit ratings, reflecting the greater likelihood for the issuer to default. As such, investors demand a higher yield to compensate for this added risk. The issuers of junk bonds have a lower capacity to service their debt obligations and this capacity can be further threatened during poor economic conditions. During recessions, these bonds will carry an increased risk of default (whether real or perceived) which will lower the price an investor is willing to pay for the bonds.

Similarly, when the economy is strong, investors may be willing to pay more for the bonds and their higher yields since the risk of default is thought to be less likely. Consequently, high yield bonds display greater correlation to equities in both up and down markets and thus do not provide as much diversification to an equity portfolio as investment grade bonds do. Greater overall volatility is also expected with this classification of bonds.

A bond index is a method for measuring the performance of a particular section of the bond market and is usually computed using the total market value and the prices of selected bonds with similar qualities. The chart below shows the historical yields of various U.S. corporate bond indices with varying credit qualities and includes the highest quality investment grade bonds (AAA), investment grade bonds near the bottom of the threshold (BBB), high yield bonds just below the investment grade threshold (BB), and poorer quality high yield bonds (B). The periods shaded in grey depict U.S. recessions.



Ilce Data Indices, LLC, ICE BofA BBB US Corporate Index Effective Yield [BAMLC0A4CBBBEY], LLC, ICE BofA AAA US Corporate Index Effective Yield [BAMLC0A1CAAAY], ICE BofA BB US High Yield Index Effective Yield [BAMLH0A1HYBBEY], ICE BofA Single-B US High Yield Index Effective Yield [BAMLH0A2HYBEY], retrieved from FRED, Federal Reserve Bank of St. Louis; <https://fred.stlouisfed.org>, May 3, 2022.

Some observations can be made from the historical yields of the corporate bond indices above:

- Bonds with stronger credit ratings have lower yields and those with poorer credit ratings have higher yields, confirming that investors demand greater return in order to accept more credit risk.
- Poorer quality bonds generally exhibit greater price fluctuations or volatility than those with better credit ratings since fluctuations in yields are associated with fluctuating prices (increase in yield is caused by a decrease in price). This coincides with changing market expectations for riskier assets and potential impacts on the financial capacities of issuing corporations.
- Yields increased, or prices decreased, to a much greater degree during recessions for poorer quality bonds than their stronger rated counterparts. This price movement would have been occurring alongside equity values dropping and would be highly correlated.



Interest rate risk

Interest rate risk is the potential for the price of a bond to fluctuate as a result of a change in market interest rates. Interest rates and bond prices have an inverse relationship—as rates increase, the price of a bond decreases. Similarly, if interest rates were to decrease, the price of a bond would increase.

Interest rates are largely governed by monetary policies implemented by central banks. In recessionary times, monetary policy can be used to help support the economy, often leading to interest rates being lowered to help spur investment and economic growth.

As an example, in response to the financial crisis of 2008, central banks such as the Bank of Canada used monetary policy as described above. Rates were lowered which contributed to the rise in the value of high quality bonds. This rise in value from bonds would have helped offset losses in an investor's portfolio from declining stock prices due to the recession.

Conversely, later in the economic cycle when the effects of a recession are long gone (employment is high, equity markets are strong and inflation is rising), central banks may begin to raise interest rates to cool off an overheating economy. This would have an adverse impact on the price of bonds, resulting in declining bond prices.

This relationship between bonds and interest rate changes—typically seen at different points in the market cycle—is most prevalent for government bonds and higher quality, investment grade corporate bonds. The prices of these bonds do not move nearly as much in tandem with stocks as lower quality, high yield bonds. This lower degree of correlation helps to provide diversification and can act as a much better safety net during stock market declines versus high yield bonds.

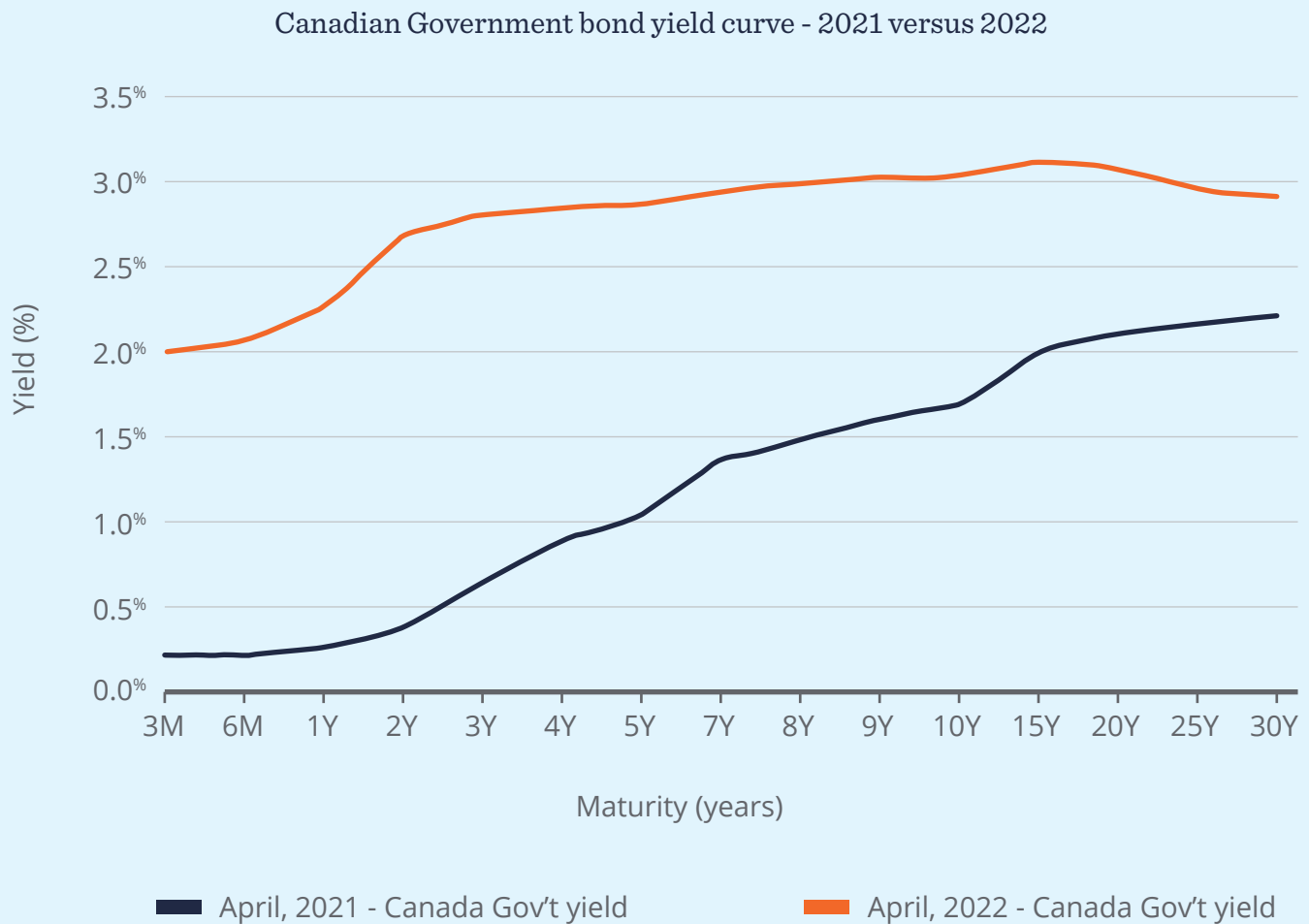


Duration

Though the prices of bonds will rise and fall depending on underlying changes in interest rates, not all bonds of similar credit quality will be equally affected. The degree of change in the price of the bond given a change in interest rates is known as its duration.

The duration of a bond, or the average duration of a bond portfolio, provides an investor with an idea of the sensitivity to changes in interest rates. The higher the duration, the greater the sensitivity. Given a similar credit quality, bonds with longer maturity dates will usually have higher duration and will be more sensitive to interest rate changes. Under most normal circumstances, bonds with longer maturities offer greater yields, while those with shorter maturities offer less. Therefore, if an investor is looking for greater yield, their bond investments will likely have a higher duration and greater interest rate risk associated with it.

This relationship can be seen in the following Canadian Government bond yield curve chart that plots the yield for government bonds with different maturities.



World Government Bonds - <http://www.worldgovernmentbonds.com/country/canada/>

Government and investment grade corporate bonds will have higher durations versus high yield bonds with similar maturities. As such, their prices will be more responsive to changes in interest rates. The prices of high yield bonds, though still affected by changing rates, are more heavily impacted by the economic outlook, earnings and financial situation of the issuing company.

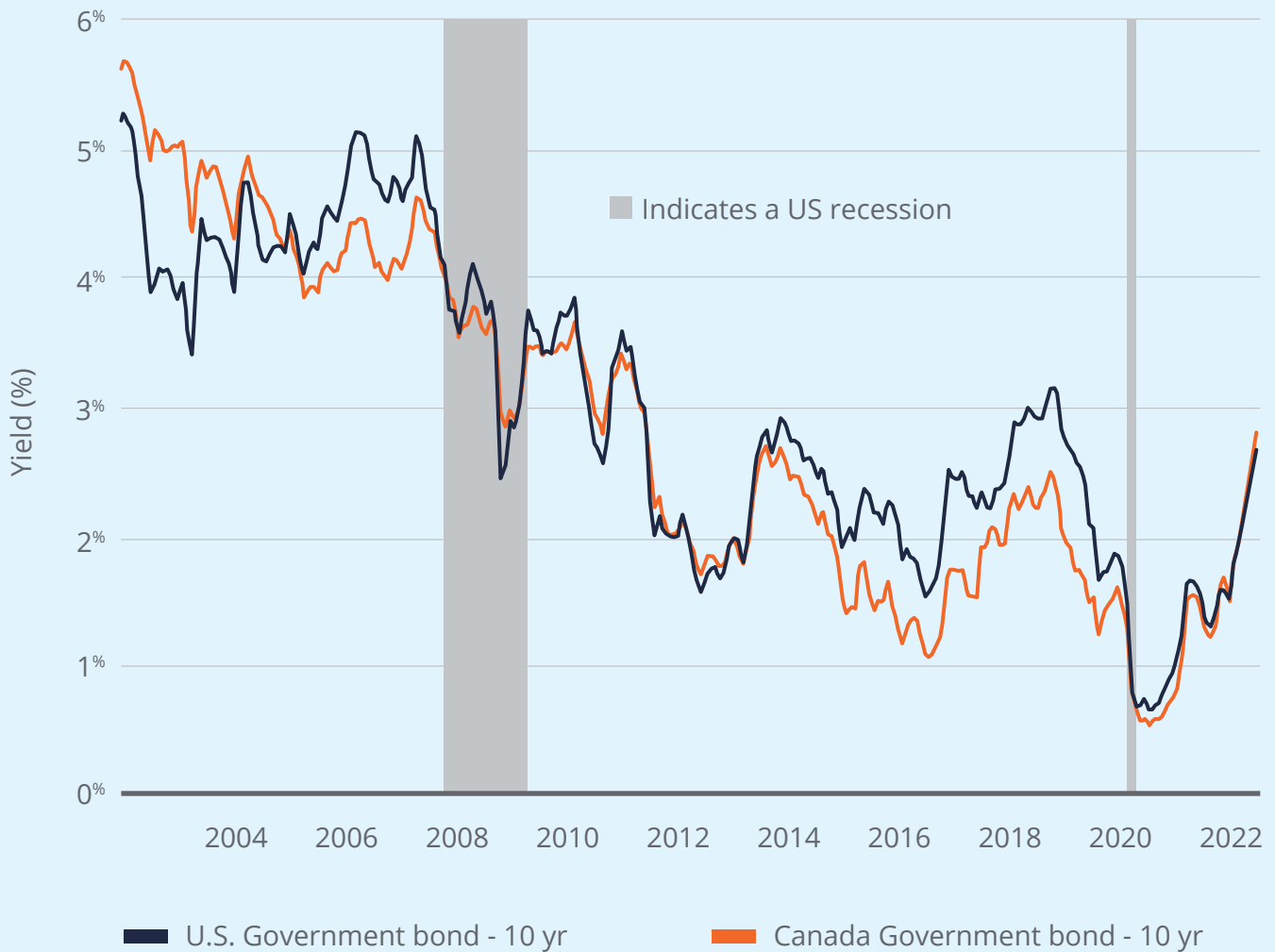


Why invest in bonds?

Since bond issuers such as governments and investment grade corporations typically repay their debts, investors are drawn to the relative safety of these investments. In addition, the regular interest payments provide investors with a stable source of income. Unfortunately, gone are the years where an investor could rely solely on high-quality bonds for a meaningful level of income. As recent as the period of 2000 to 2007, the yield of a 10-year Government of Canada bond was between 4.4 to 6.4%. At such levels, bonds could provide a substantial income with a low-risk profile—traits that were particularly attractive for retirees or investors with a lower tolerance for risk.

Then along came the global financial crisis of 2008 to 2009, which dramatically changed the investment landscape. In order to prop up the economy and ensure the financial system could continue to function, central banks cut interest rates, which largely contributed to driving down bond yields. The yields on a 10-year government bond spent much of the following decade fluctuating between 1 to 3%. The low-interest-rate environment worsened with the COVID-19 pandemic and the associated recession, which required further support from the central banks. In 2022, yields have been increasing rapidly but still remain quite low from a historical standpoint—especially in real terms after inflation is considered.

Historical 10 year government bond yields - April 30, 2002 - April 30, 2022



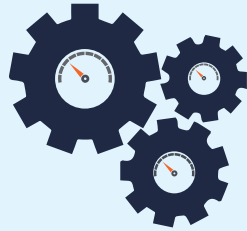
Organization for Economic Co-operation and Development, Long-Term Government Bond Yields: 10-year: Main (Including Benchmark) for the United States [IRLTLT01USM156N] and Canada [IRLTLT01CAM156N], retrieved from FRED, Federal Reserve Bank of St. Louis; <https://fred.stlouisfed.org>, May 3, 2022.



As previously discussed, the yield of a bond or bond portfolio provides the basis for the long-term return that should be expected. In today's environment of low but increasing yields, investors should be aware that the expected returns from their bond portfolios will be much lower than they were historically. Government bonds, which could provide a reliable income a decade ago, now struggle to provide a positive return after inflation and investment management fees are considered. Furthermore, bond prices have been falling with yields rising, due to both realized and expected rate increases from central banks.

Despite this increase, yields on corporate and investment grade bonds are not overly enticing—especially when inflation remains high. Paired with recent price declines, the purpose of including government and investment grade corporate bonds in a portfolio may be questioned. Even though meaningful real returns may no longer be expected, high-quality bonds can still act as a solid diversifier. This is because they typically exhibit low correlation to fluctuations in equity markets and therefore dampen portfolio volatility over time. This is due primarily to their inverse relationship with interest rates (which often decrease during market corrections) and the fact that investors tend to move money to lower-risk investments during market crashes, which can drive up their prices. This behavior helps to partially offset declining stock values and can reduce the risk of a portfolio.

Stock prices under pressure
due to a struggling economy



Stock
prices

Central banks will often
decrease interest rates to
help spur economic growth



Interest
rates

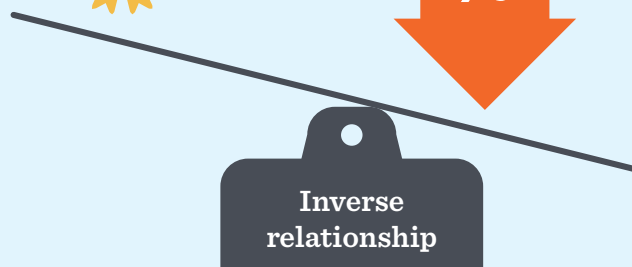
High quality bond prices
benefit from falling
interest rates



Bond
prices



Interest
rates



Final considerations

It's worth noting that the significant price appreciation seen from high-quality bonds in 2019 and 2020 was largely due to central banks decreasing their target interest rates to provide support to the economy. Conversely, declining prices in the later part of 2021 and so far in 2022 have been largely due to rate increases from central banks—both announced and expected—in order to help relieve inflationary pressures amid a strong economy and labour market. Unfortunately for investors, recent declines in bond prices have occurred alongside elevated stock market volatility and declines—a scenario, which has been historically uncommon.

The good news is that a bond's starting yield provides the basis for its long-term return, so despite the short-term pain of falling bond prices, higher yields could potentially set bond investors up with higher returns in the future. Additionally, bonds can still provide a cushion within a portfolio by reducing the exposure to equities and providing diversification while still generally earning a rate of return in excess of cash positions.

In order to maintain their return requirements, conservative investors may be tempted to migrate to poorer credit quality bonds or to increase their duration in search of greater yields. As examined, high-yield bonds tend to behave similar to equities, and higher yields come with greater risk, while bonds with greater duration will be more sensitive to changing interest rates. Decreasing the credit quality or increasing the duration of their bond portfolio may be a valid strategy for some investors, but it is one that will come with more risk and volatility. For this reason, it should be carefully considered by investors to ensure suitability.

With this, it's important to remember that all investors are unique and have their own tailored risk tolerance. Selecting the right asset mix—in which corporate and government bonds may play a role—can be a daunting task. Understanding the characteristics of these securities and how they have changed over time will better position an investor to reach their long-term financial goals.



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