Quadrant
ASSET MANAGEMENT

Bond Basics

QAM Perspectives – September 2017

Quadrant's regular newsletter that highlights topics we believe will affect markets or are important in understanding them.

"Know what you own, and know why you own it."

- Peter Lynch

(Portfolio Manager, the Magellan Fund, Fidelity Investments, 1977-1990, highly regarded investor, author, and philanthropist)

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"Bonds are a great investment. I sold a vintage 007 doll on eBay for $900!"

An IOU or a promise to repay - ultimately that is what a bond represents. This is a concept many of us know well given our experiences with bank loans, car loans, mortgages, or other types of borrowing we may have accessed. But when it comes to being on the other side of the borrowing equation and providing the loan (which is what investing in bonds represents), the waters of understanding can get murky. Given the topical nature of interest rates in the financial markets today, it's a good time to provide a refresher on bonds; what they're all about, how they're priced and what role they play in your investment portfolio.

It's important to understand this asset class, which is a fundamental part of a balanced portfolio. As such, we have devoted the next few pages to carefully walking you through the key concepts. As you read on, please note that the use of "bonds" is meant to cover a wide range of fixed income investments such as term deposits, GICs, and other similar instruments (unless otherwise noted).

Basic Characteristics

- A bond is simply a loan or a promise to repay a fixed dollar amount on a specific date in the future (i.e. the maturity date). The fixed dollar amount to be repaid on the maturity date is called the face, or par, value.

- During the period of time that the bond is outstanding, it pays interest to the holder of the bond. This can be thought of as compensation paid to the bondholder for not having use of their money. The interest rate that the bond issuer agrees to pay to the bondholder is called the coupon or yield of a bond. The coupon/yield is expressed as a percentage of the face value.

Example:
Par Value: $1,000 (amount paid on the maturity date)
Maturity date: 5 years from today
Coupon: 10%

Bondholder will receive $100 in interest each year for the next 5 years. At the end of year 5, the bondholder will also receive $1,000 (the par value or maturity value).

A bond's coupon/yield is affected by the following:

	Characteristics associated with:	
Factors	**Higher Yield**	**Lower Yield**
General interest rate environment	Higher general interest rates (economic expansion)	Lower general interest rates (economic retraction)
Maturity date	Longer maturity date (e.g. 30 years)	Shorter maturity date (e.g. 2 years)
Risk of not being repaid at maturity	Lower credit quality of issuer (e.g. ABC Company)	Higher credit quality of issuer (e.g. Government of Canada)

General interest rates – At issuance, a bond's coupon/yield will be reflective of current market interest rates. For example, if the yield at issuance is less than general interest rates for comparable bonds, investors would not be willing to buy the bond as they could get a higher yield elsewhere.

Maturity date – All else being equal, an investor would expect to be paid a higher level of interest to provide the loan for a longer period of time.

Risk of not being repaid at maturity – This is where the concept of credit spreads comes into play. Issuers of bonds include the federal government, provinces, companies, and infrastructure projects (e.g. airports), among others (this list is by no means exhaustive). Bonds issued by the federal government are considered to be the safest of bond investments in Canada and their interest rates are referred to as benchmark interest rates (also called risk-free rates). In looking at the interest rates of other issuers such as companies and provinces, portfolio managers and analysts evaluate interest rate levels of issuers relative to the risk-free rate to assess how much additional compensation is being paid for the lower credit quality.

Example:

5-year Bank of Montreal bond yield is	2.50%
5-year Government of Canada bond yield is	2.00%
Additional yield	0.50% or 50 basis points

Common market terminology would refer to the 5-year Bank of Montreal credit spread as being 50 basis points. This means that bondholders are expecting an additional 0.50% for investing in 5-year Bank of

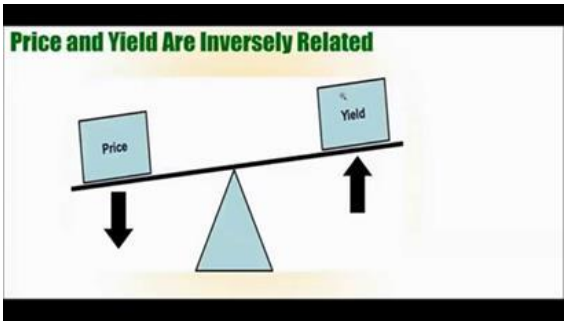
Montreal bonds versus a 5-year Government of Canada bond (the risk free rate). We will come back to this example shortly.

Bond Pricing

Here's where the murkiness may lie for some.

Up to this point, our discussion has assumed that the bond is bought at issuance and held to maturity. Unlike GICs and term deposits, most bonds trade in the fixed income market (referred to as the Over the Counter or OTC market) among a network of investment dealers/banks. As a result of this market, and again unlike GICs and term deposits, bonds are priced on a daily basis like equity securities that trade on an exchange. Consequently, at any time a bondholder can buy or sell bonds in the open market.

The yield to maturity (or YTM) of a bond is another way of considering a bond's price. YTM is the total return expected on a bond based on its current market price while taking coupon payments into account. It can be thought of as the true rate of return on a bond (based on current market prices and the maturity date). The formula to calculate YTM is complex but it is useful in evaluating the attractiveness of one bond versus another for bond selection decisions. The key takeaway from this formula is that when interest rates go up, bond prices go down and when interest rates go down, bond prices go up. This has the effect of equalizing the interest rate on the bond with prevailing market rates and vice versa.



Not surprisingly, the factors that impact bond prices are the same as those listed earlier that influence coupon rates on bonds issued.

1. General interest rate levels
2. Credit spreads
3. Maturity date

The discussion that follows will highlight how each of these factors directly impact bond prices, beginning with an example that illustrates how general interest rate changes impact the price of a bond.

Example:

An investor purchases a Bank of Montreal 5-year bond with a coupon/yield of 5.00% at a price of $100.00 (per $100 par amount). Based on a $1,000 investment the bond will pay $50 in interest each year and the par amount will be repaid at the end of year 5.

One year passes by and the bond has 4 years remaining. It continues to pay interest at the 5.00% coupon rate (as this rate is fixed at issuance). The investor decides that he/she wants to sell the bond and not hold it until maturity.

Over the past year, interest rates in general have risen 0.50%. The Bank of Montreal is currently issuing 4-year bonds at a coupon rate of 5.50% given the current market.

As market interest rates have changed, the investor can no longer sell their bond for $100.00 at a 5.00% yield as the same bond can now be purchased for $100.00 with a higher yield of 5.50%.

Therefore, in order for the investor to sell their bond, the purchase price must be reduced to a point that produces a yield to maturity equal to 5.50%. This would allow the investor to sell their bond at a level that reflects current market prices. Otherwise, the investor would not be able to sell the bond, as investor #2 will choose the bond with a yield of 5.50% all else being equal.

Using the YTM formula for the Bank of Montreal 4-year bond to be sold based on a term of 4 years, a 5.00% coupon rate and a YTM of 5.50% results in a bond price of $98.23 (per $100 par amount). This is the price at which investor #2 will be indifferent between the two Bank of Montreal bonds; he/she can either purchase the investor's 4-year bond at a price of $98.23 and receive 5.00% coupon payments or pay $100.00 for 5.50% coupon payments.

Given the relationship between interest rates and bond prices, market participants' assessments regarding the future direction of interest rates is important. These opinions are formed by how well the economy is performing, whether inflationary conditions are expected and how monetary policy is being managed. As discussed in our previous newsletter ("Interest Rate Politics"), leading comments by Bank of Canada officials (who ultimately make decisions that increase or decrease Canadian interest rates) can have a significant impact on bond market values.

Credit spreads (the difference in yields between a particular company's bonds and equivalent Government of Canada bonds) also fluctuate in financial markets based on the market's view of particular companies/sectors. Using our earlier example, let's assume the Bank of Montreal announced that they had made several bad loans and the profits of the bank were going to be substantially lower than forecast. This would reduce the credit quality of the Bank of Montreal bonds which would lead to a higher yield to maturity (as bondholders would expect to be paid a higher level of interest for buying the bonds). As we know, an increase in yield to maturity means that the bond price must decrease to account for this change in yield.

Example:

5-year Bank of Montreal bond yield	2.80% (2.50% in our earlier example)
5-year Government of Canada bond yield	2.00%
Additional yield	0.80% or 80 basis points (0.50% in our earlier example)

The Bank of Montreal bond price at a yield of 2.50% was $100.00. Using the YTM formula and a YTM of 2.80%, the bond price is now $98.61. This lower price is attributable to credit quality deterioration or a widening credit spread.

Risk Measurement

A common way to estimate the interest rate risk of a bond due to maturity is by its duration. The duration of a bond is an estimate of how much the price will change if interest rates change. A bond's riskiness depends on how many years into the future it will mature, the cash flows promised and the price that an investor paid for the bond. Duration represents the price sensitivity to interest rate changes, which is not a linear relationship. For example, a bond with a long maturity date will have greater sensitivity to changes in interest rates than a shorter maturity date. This concept is illustrated in the following examples:

Effect of Rising Interest Rates

Government of Canada Bond	5-Year Bond	10-Year Bond	30-Year Bond
Bond Price (per $100 par amount)	$96.40	$90.59	$106.80
Yield to maturity	1.76%	2.08%	2.44%
Duration (in years)	4.8	9.1	21.1
Interest rate increase	+0.25%	+0.25%	+0.25%
Price depreciation due to interest rate increase	(1.20%)	(2.28%)	(5.28%)
Lower bond price due to interest rate increase	$95.24	$88.52	$101.16

As can be seen, for a 0.25% increase in interest rates, the price of a 5-year bond declines by 1.20% while for the same change in interest rates the price of a 30-year bond declines by 5.28%.

The Role of Fixed Income in Your Portfolio

Fixed income securities are an important part of a balanced portfolio. Over the long term, this asset class provides income and reduces return volatility as compared to equities but there can still be short-term pricing volatility, which reflects current interest rate and credit spread market dynamics. That said, short of default by an issuer, an investor can expect to receive their interest and principal payments for holding bonds.

In the management of your portfolio, we remain cognizant of the current interest rate environment which suggests that interest rates may continue to increase. As such, we continue to maintain a shorter duration in fixed income holdings to position your portfolio defensively against a rising interest rate environment while providing a relatively high yield (as compared to alternative fixed income products). Having a lower duration will reduce bond price volatility while still providing a stable income stream.

As always, QAM maintains a long term view and focuses its efforts on asset allocation policy, manager selection, and systematic rebalancing in light of each client's individual financial circumstances.

If you or someone you know could benefit from our services, please have them contact our offices at 204-944-8124 or email us at inquiries@quadasset.com.

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