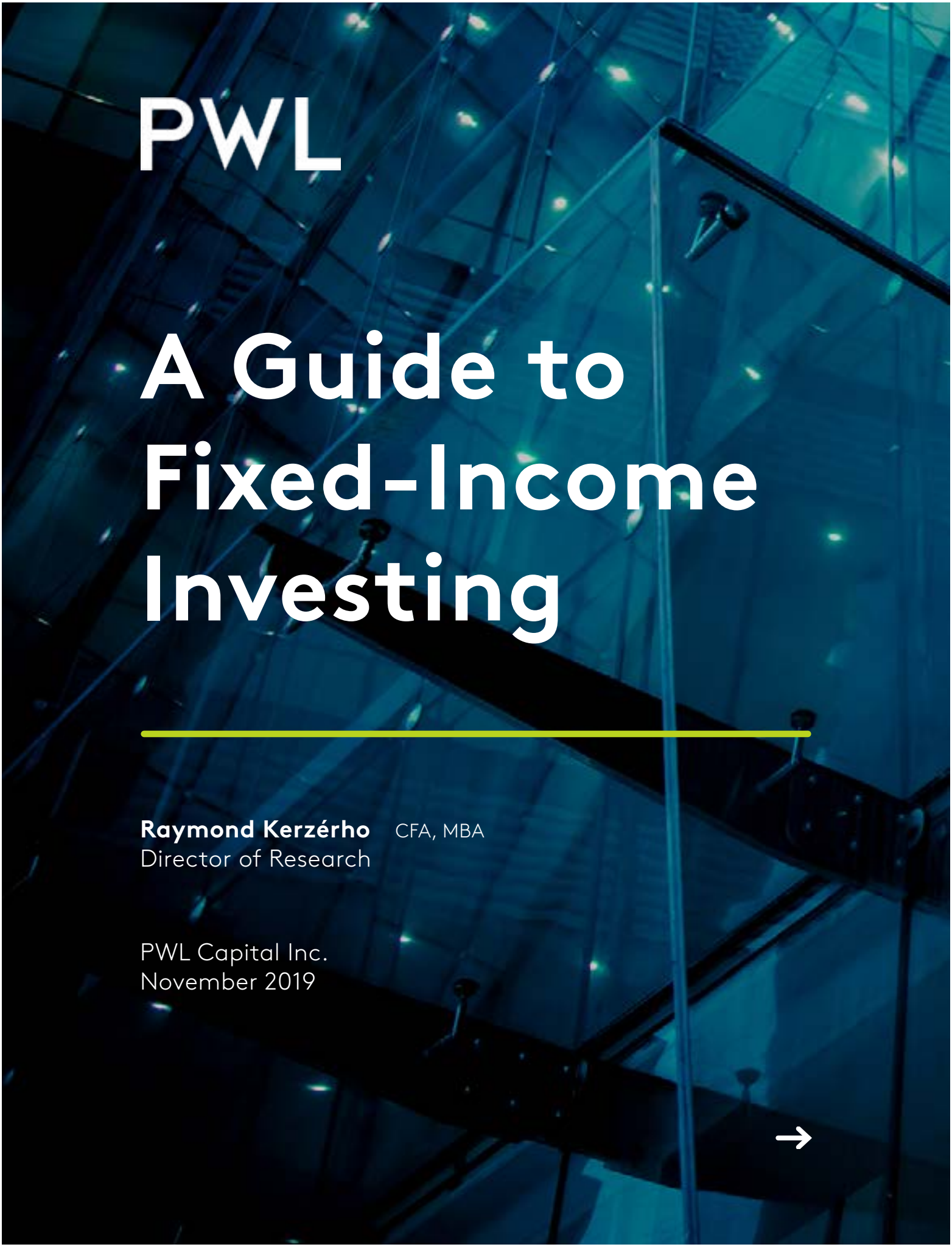

PWL

A Guide to Fixed-Income Investing

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This report was written by Raymond Kerzérho, PWL Capital Inc. The ideas, opinions, and recommendations contained in this document are those of the author and do not necessarily represent the views of PWL Capital Inc.

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1. The Basics

Bonds and other fixed-income securities do not receive much coverage in the media for a number of reasons. First off, bonds are a bit technical. While the drivers behind the ups and downs of a stock are easy to understand, those underlying bond returns are less straightforward. Secondly, everyone understands that with the current low interest rates available worldwide, future bond returns will likely be very modest, which isn't likely to make them a popular topic. And finally, there is far less publicly available information about bonds than stocks. Nonetheless, bonds and other fixed-income investments account for a major portion of most people's portfolios. This section aims to equip the reader with the basic tools to navigate the fundamentals of bond investing.

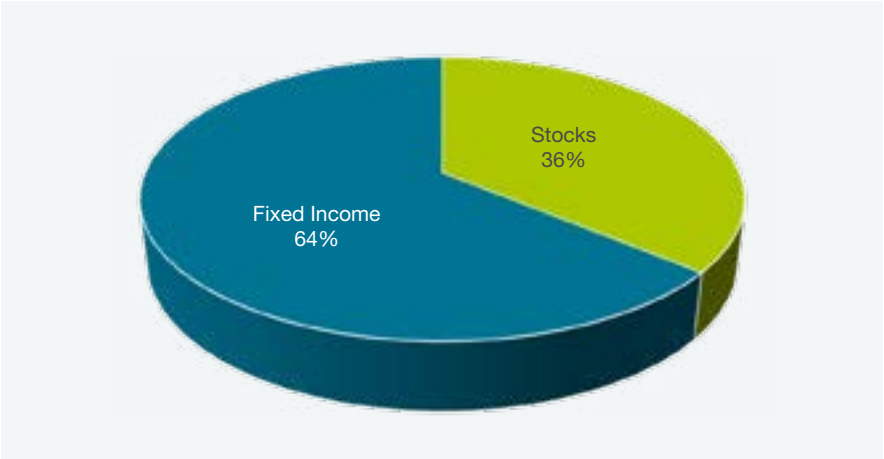
a. Bonds vs. Fixed-Income Securities

Bonds are interest-bearing securities with maturities extending beyond one year. Fixed-income securities include money market securities, which have maturities of one year or less, as well as bonds. For the sake of this article, we will use the terms "bonds" and "fixed-income securities" interchangeably, as bonds make up the bulk of the latter category.

b. Bonds are Big

The global fixed-income market accounts for 64% of all publicly traded securities ($102 trillion), compared to 36% for the global stock market ($58 trillion). In other words, the bond market is almost twice as big as the stock market.

Chart 1: The Global Public Market for Stocks and Bonds



Sources: Bank for International Settlements, Dimensional Fund Advisors

c. A Highly Fragmented Market

Unlike stocks, fixed-income transactions do not take place on a centralized market (an exchange). They mostly are realized through private transactions between securities dealers and investors. Furthermore, the variety of bond issues vastly surpasses that of equity securities. For example, the Royal Bank of Canada has only one common stock outstanding, but it has over 350 different bond issues.

d. Bonds vs. Stocks

A bond is a contract with a fixed payment schedule. Hence, a bond holder is able to estimate its future return if held to maturity. By contrast, a stock is a residual claim on whatever is left in a corporation once creditors have been fully paid out (accumulated and future earnings). Because the payment schedule of bonds is strictly defined, bonds are less volatile. As a rule of thumb, a broad market bond index will likely be three to four times less volatile than a broad market stock index.

e. Investment-Grade vs. High-Yield

About 52% of fixed-income securities are issued by corporations, and 48% by governments. The vast majority of corporate bonds are of investment grade: they carry a credit rating from agencies such as Moody's and Standard and Poor's of AAA to BBB and are considered very likely to make all their promised payments on time. A small percentage of the corporate bond market is of speculative grade (or "high-yield"): they involve a substantial probability of default, but in return, they pay a higher interest rate than do investment-grade securities. These bonds are rated between BB and CCC.

f. Coupon vs. Yield to Maturity

The "coupon" is the fixed nominal interest rate paid by a bond. This name goes back to the days when bonds were actual pieces of paper held by investors. In order to collect their interest payments, investors had to cut a coupon from the bond certificate and deliver it to the custodian on the scheduled date. By contrast, the yield to maturity of a bond is its market interest rate, which fluctuates in an inverse relationship with its price. We will discuss the price/yield relationship in the section on bond pricing. Just keep in mind that the coupon is fixed while the yield to maturity fluctuates with the supply and demand on the market.

g. Maturity Type

Bonds are typically classified as one of three maturity types. Short-term bonds have a term of one to five years. Mid-term bonds bear maturities longer than five years, up to a maximum of ten years. Finally, long-term bonds have maturities extending beyond ten years, often up to thirty years and sometimes even longer.

h. Premium, Discount and Par Bonds

Bonds that are valued at their full face value are said to be “at par.” Par bonds trade at a price of $100 per hundred dollars of face value. Bonds that are valued above $100 are said to be “at a premium.” Finally, bonds valued below par are “at a discount.”

i. Credit Spreads

A credit spread is the difference in yield between a top-quality bond (federal government or U.S. Treasury bonds, for example) and a bond of lesser quality (provincial, municipal or corporate bond).

Now that we have reviewed the “major components” of the bond market, the next section will look at how bond prices and yields are set.

2. Bond Pricing

What drives the ups and downs in bond prices? What makes some bonds more volatile than others? What are the key indicators that bond investors track in order to make decisions? This section addresses the drivers of bond returns.

a. Price/Yield Relationship

The coupon and maturity of a bond are set when it is issued and will remain the same for life. However, most bonds are not held to maturity by their initial holder. In order to make transactions possible, prices must be allowed to fluctuate. "Yield to maturity" is the market interest rate of a bond at a given point in time, taking into account its current price. Let's say an investor purchases a 10-year bond featuring a 3% coupon for a price of $95 (which means they are paying only 95% of its nominal value). The yield to maturity will then be more than 3%, since the investor paid less than the full face value to get the same income and, in addition, they pocket a 5% capital gain at maturity (100%–95%). The opposite is true for investors who pay $105 for the same bond. In general, bond prices and yields move in opposite directions. Table 1 below illustrates the price/yield relationship.

Table 1: Yields on a 10-year bond with a 3% coupon at various price levels

Coupon	Price	Yield to maturity
3%	95 (at 5% discount)	3.60%
3%	100 (at par)	3.00%
3%	105 (at 5% premium)	2.43%

Source: PWL Capital

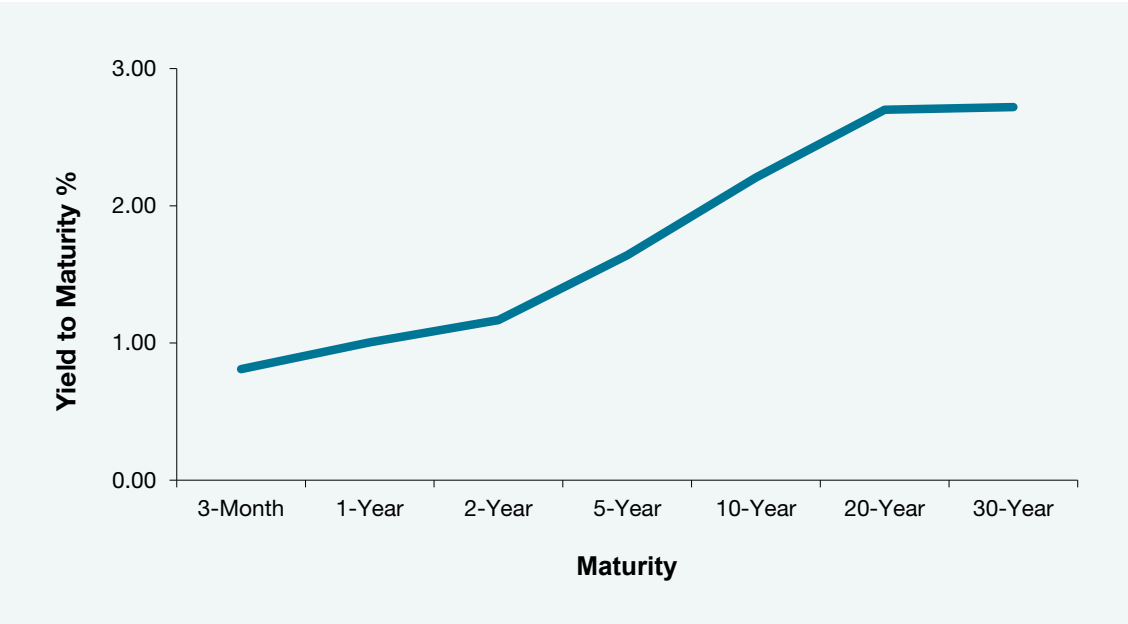
b. Bond Duration and the Opportunity for Profit or Loss

Duration is a measure of the average maturity of a bond's interest and principal repayment. The duration of a bond is always shorter than its maturity, since a lot of the cash flow (coupon payments) generated by a bond occur before its maturity. For example, a 10-year bond will likely have a duration of 8 to 9 years. The longer is the bond's duration, the more profit or loss it can generate when its yield fluctuates: a security with a longer maturity represents a greater commitment from the investor; therefore, long-duration bonds are much more volatile than short ones.

c. Yield Curve

The yield curve is a chart that depicts the yields for bonds from a same issuer but for various maturities. When experts discuss "the yield curve," they usually refer to the rates on top-quality government bonds. Most times, yields increase along with maturity. The longer the duration, the riskier the bond. As a result, it should command a higher yield. But on rare occasions, the yield curve will become flat or even inverted, meaning that longer-duration securities will carry a lower yield.

Chart 2: Sample "Normal" Yield Curve



Source: PWL Capital

d. Credit Ratings

When bond traders are making the decision of how much they are willing to pay for a bond, they will look at the yields of other bonds of similar maturity and quality. While bond investors are likely to make their own assessment of the creditworthiness of a particular issue, they will also pay attention to the credit ratings, which are letter codes issued by a bond rating agency. Credit ratings are illustrated in Table 2.

Table 2: Credit Ratings

	Investment-Grade				Speculative-Grade			Distressed Debt		Defaulted
S&P	AAA	AA	A	BBB	BB	B	CCC	CC	C	D
Moody's	Aaa	Aa	A	Baa	Ba	B	Caa	Ca	C	-

Sources: Standard and Poor's, Moody's

While professional bond investors pay close attention to the credit ratings of corporate bonds, they are also fully aware that credit ratings are quite slow to adapt to changing business conditions. Rating agencies are reluctant to change ratings too quickly because the ratings need to be minimally stable to remain credible. Professionals watch bond issuers' stock prices as an early indicator in real time of a bond's financial health. A plunging stock price can sometimes (but not always) be indicative of a decline in the issuer's creditworthiness going forward.

e. Sources of Bond Returns

Bond returns are calculated from the current coupon income and capital gains or losses. For example, a bond with a 3% coupon that is purchased at par at the beginning of the year and that appreciates to $105 by the end of the year has produced a return of (105-100+3)/100 = 8%.

This section has discussed how bond returns are generated. In addition to the current income, the capital appreciation or depreciation will have a key role in the bond's realized returns. These gains or losses in bond value are triggered by changes in the yield to maturity. The longer is the duration of a bond, the greater will be the profit or loss triggered by a given change in yield.

In the next section, we will discuss risk in fixed-income investing and the associated risk premiums.

3. Bond Risks

While bonds are generally less risky than stocks, they do face risks of their own. Let's look at these risks and their associated premiums.

a. Interest Rate Risk / Term Premium

As explained in the previous section, the longer is the duration of a bond, the more sensitive it is to changes in yield. In other words, longer bonds are riskier.

There are few certainties in finance. One of them is that longer-maturity bonds offer a higher yield than shorter ones most of the time. In the last 30 years, 10-year federal government bonds have yielded more than have 2-year securities 92% of the time. The former are roughly 4 times more volatile; it is to be expected that they will yield more.

This positive difference in yield between long- and short-dated bonds is called the "term premium."

b. Credit Risk / Credit Risk Premium

Corporate, provincial and municipal bonds have a higher default risk than federal government bonds (which are often considered credit risk–free). Even though so-called "credits" rarely default (except for speculative-grade securities), they offer a higher yield. This difference in yields is called the credit risk premium or credit spread.

c. Liquidity Risk

Liquidity risk applies primarily to corporate bonds and other "credits." Corporate bonds are far less liquid than Government of Canada securities. While the latter securities are few and well structured, the market for corporate bonds is highly fragmented, with a multitude of issues. This liquidity risk, in addition to default risk, explains the credit premium for the most part.

d. Asset-Liability Mismatch Risk

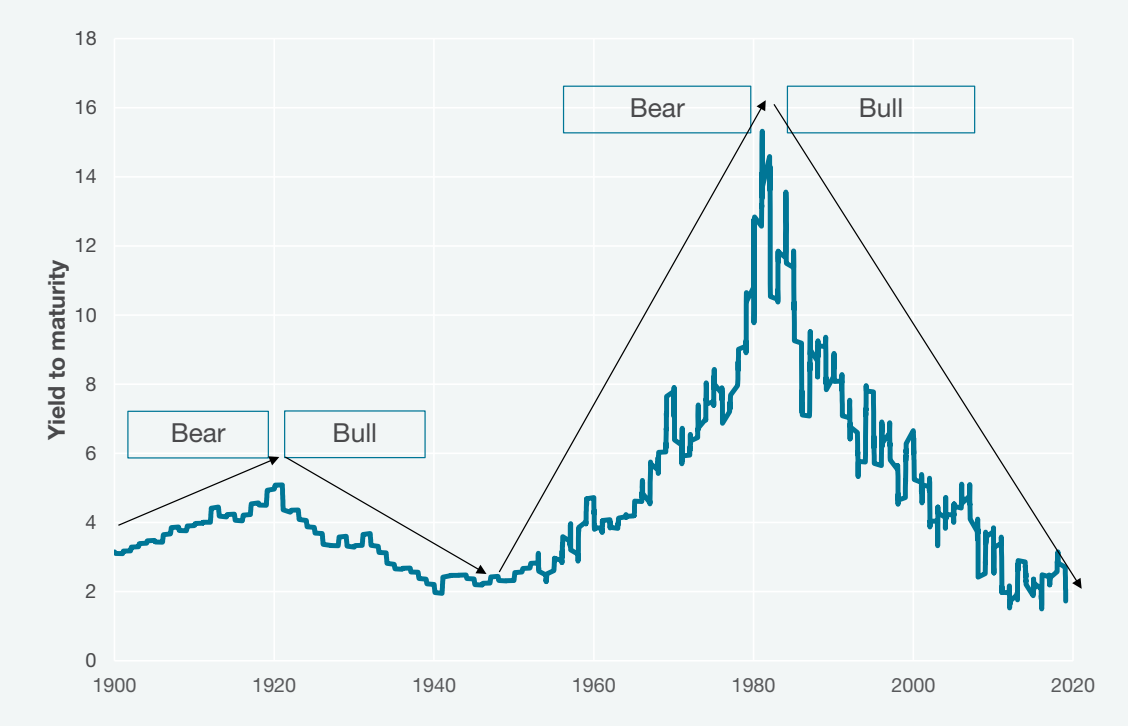
Bonds are often labelled as a risk-management asset class. Financial institutions are familiar with the notion of selecting bonds with maturities that match those of their financial engagements. In some instances, individual investors can do the same when they have a specific goal, for instance purchasing a secondary home, paying for university tuition or planning for retirement income. On the other hand, if asset maturities are very

different from the schedule for the use of funds, a shortfall can occur. For example, if someone who is saving and investing to finance the purchase of a cottage 3 years from now invests in 10-year bonds, a large capital loss could defer or derail the project. Using 3-year bonds at par, the investor knows the principal will be received in a timely manner, with zero gains or losses.

e. The Cycle of Bond Investing

Another risk that is seldom discussed is the cycle of fixed-income investing. While a full equity market cycle is often no more than 10 years from the beginning of a bear market to the end of the following bull market, bond cycles are much longer: there has been only two complete cycles in the last century. We are currently in the bull phase of the post-war bond cycle: after 36 years of underperformance, from 1946 to 1982, bond yields have mostly declined since 1982, leading long-duration bonds to outperform. Keep in mind that a decline in yields drives bond prices upwards. As a result, bonds have been appreciating most of the time since 1982. While we can't predict when the current positive environment for bonds will end, 37 years of abnormally high returns may have created a false sense of comfort with longer-dated issues. Portfolio managers must take that risk into account.

Chart 3: U.S. Treasury Bond Yield Cycle 1900–2019[1]



Source: Yale University

[1] Bear and bull market dates are documented with: Homer, S., Sylla, R., A History of Interest Rates, Wiley, 2005

4. Taxation of Fixed-Income Returns

Bond returns come primarily from interest income and capital gains. Let's look at how they are taxed.

a. Interest Income

Bond coupons are taxed at the full ordinary income tax rate.

b. Capital Gains/Losses

In Canada, bond capital gains are taxed at the capital gains income tax rate, with the 50% inclusion factor. Capital gains can arise from two sources. First, a decline in the market yield will trigger a price increase. Second, a bond purchased at a discount will converge toward its par value as it seasons, since its final principal payment is $100. Conversely, a capital loss can occur either after an increase in yield or if the bond was purchased at a premium.

c. After-Tax Yield to Maturity

When a bond is purchased at a discount, there will be a taxable capital gain if held to maturity, even without a decline in bond yields. By contrast, when a bond is purchased at a premium, there will be a tax loss at maturity, which could be applied against existing or future capital gains on other positions in the portfolio.

The after-tax yield to maturity on a bond is calculated in two steps: first, the expected tax cost will be removed from bond cash flows (after-tax coupon and principal repayment), and second, a yield-to maturity calculation is applied to the after-tax cash flows.

Of course, the after-tax yield is also a function of the investor's marginal tax rate. For an investor with a very low tax rate, the after-tax yield will not be far below the yield to maturity. By contrast, an investor with a high tax rate will obtain an after-tax yield that is much lower than the yield to maturity. Table 3 provides a simple example of after-tax yield calculation for a discount bond with a one-year maturity. At 1.87%, the after-tax yield is a little bit more than half the pre-tax yield to maturity of 3.03%.

Table 3: After-tax yield on a 1-year bond with a 2% coupon priced at $99, with a 46% marginal tax rate

After-tax coupon: 2% X $100 X (100%-46%) = $1.08

After-tax capital gain: ($100-$99) X (100%-(46%/2) = $0.77

Invested capital: $99

After-tax yield: $1.08 + $0.77 / $99 = 1.87%

5. Bond Portfolio Management

a. Active Strategies

The active management of equity portfolios requires that the manager be able to anticipate what the market will do. The same principle applies to active bond portfolios. Active bond management also relies on the assumption that markets are inefficient, which is a fancy way of saying that bond prices are wrong. Outperforming with active strategies suggests that interest rates and changes in the creditworthiness of bond issuers can be predicted.

i. Duration calls

As discussed in section 2, the duration of a bond measures how long you'll wait on average to get back the money you are owed. The longer it takes, the more volatile the bond's price is. Keep in mind that if you buy a 30-year bond, you're locking in your money for that period of time. You can sell the bond before maturity, but you will then have to accept whatever the market is willing to pay at that point in time.

Usually, bond managers work with a target duration. It will often be the Market Index duration. In Canada, the most widely used bond benchmark is the FTSE Canada Bond Universe Index, which has an average duration of eight years. A "duration call" rests on a forecast of the general direction of bond yields. If managers expect yields to fall, they will increase the duration of the portfolio above target to benefit from extra capital appreciation. If, by contrast, they anticipate a rise in bond yields, they will shorten the duration of the portfolio below the target to reduce capital losses. In either situation, if the prediction is correct, the portfolio will likely outperform the index.

ii. Yield curve calls

There are many ways to achieve the target duration of a portfolio. If someone is looking to invest for a duration of eight years, this can be done by buying many securities with a duration close to the target (a bullet strategy). It can also be done by investing with a combination of bonds with very short and very long durations (barbell strategy). There are infinite possible combinations. A yield curve call requires that a forecast be made about which maturities will perform best in the future and that the portfolio be positioned to take advantage of this forecast.

iii. Credit selection calls

Credit spreads tend to be wider for securities with a higher default risk. Corporate bonds issued by a company whose financial position is improving (a rise in earnings, a major new contract, the fall of a major competitor) will see its credit spreads narrow. The narrowing of credit spreads will drive bond prices up: the bonds from this issuer are going to outperform. Credit selection calls are about selecting the bonds from the issuers with the best financial outlook.

iv. The evidence on active bond investing

Many people believe that while the stock market is unpredictable, the bond market is somehow different, and that, as a result, active management is effective for bonds. An article published by Standard and Poor's in 2019[2] suggests otherwise: the authors studied active bond pools offered to pension funds and other institutional clients in the U.S. over the 10-year period ending December 31, 2018. Gross of fees, the majority of actively managed funds failed to outperform the benchmark index in 9 of 17 categories. After fees, active funds underperformed in 10 of 15 categories. In a nutshell, the evidence points out that opting for active rather than passive fixed-income funds is likely to reduce returns.

b. Passive Strategies

In contrast to active management, passive bond management assumes that security prices are mostly correct; therefore, it focuses on replicating the market structure and on controlling costs.

i. Bond indices

The most-used bond indices are constructed along the same principles as their equity counterpart: all publicly traded bond issues above a minimum size threshold are included in the index and are weighted according to their free-float market value. The best-known Canadian bond index is the FTSE Canada Universe Bond Index.

Bond indices can be sliced into sub-indices that focus on a particular characteristic. For example, the above index can be split into short-term (one- to five-year maturities), mid-term (five to ten years) and long-term (over ten years) sub-indexes. The index can also be split by type of issuer: federal government, provincial governments and corporations. Finally, the index can be split with a

[2] Liu, B., Preston, H., SPIVA® *Institutional Scorecard: How Much Do Fees Affect the Active versus Passive Debate?*, Standard and Poor's, 2019

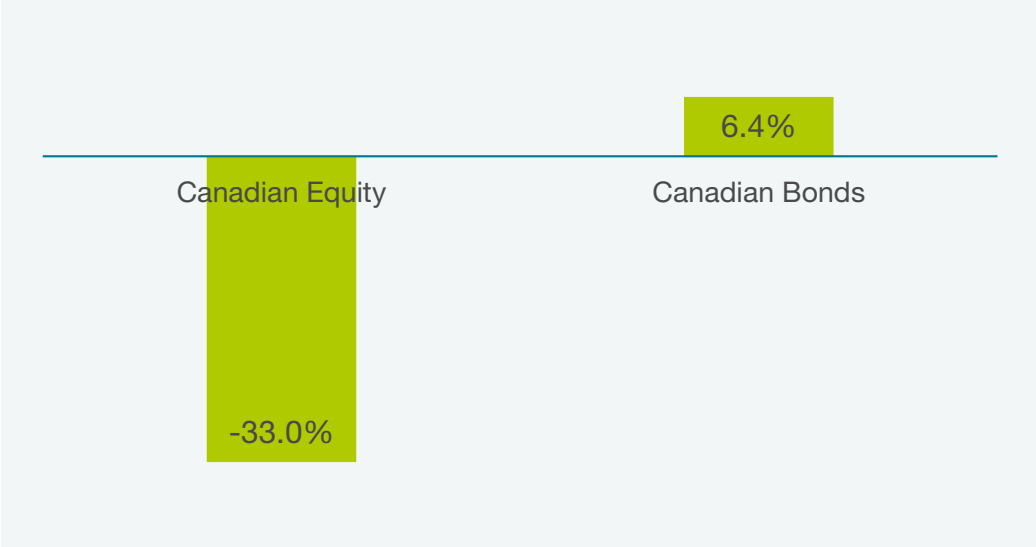
combination of maturities and issuer type. For example, a short-term corporate bond index would include all liquid corporate bonds with maturities ranging between one and five years.

ii. The logic of passive bond investing

Investing passively with bonds does not differ much from doing it with equity: it rests on the well-documented assumption that, at any given point in time, the market does a good job of putting the right price on securities, and that, as a result, the vast majority of active managers fail to consistently outguess the market. Therefore, the most efficient way to manage a portfolio is to capture the market's rate of return.

Some active managers argue that passive bond portfolios are dangerous because the largest borrowers are also the most indebted, and therefore, heavily weighted in bond indexes. To our knowledge, this claim is not backed by evidence. For example, in 2008, when credit stress was at a post-war high, the FTSE Canada Universe Bond Index performed well, with a 6.4% return.

Chart 4: 2008 Canadian Stock and Bond Index Returns[3]



Source: Morningstar

[3] Canadian equity is measured by the S&P/TSX Composite Index and Canadian bonds are measured by the FTSE Canada Universe Bond Index.

iii. How have passive Canadian Bond ETFs performed so far?

Another argument that is routinely put forward against passive funds is that, since they nearly match the market rate of return (after fees), they offer a mediocre performance. To verify that assertion, we've looked at the returns of the Canadian Bond ETF with the longest history: the iShares Core Canadian Universe Bond Index ETF (ticker: XBB). Here are the facts: when compared to its peers (other Canadian bond funds), this ETF ranks in the first quartile over 1, 3, 5, 10 and 15 years. More precisely, over 15 years, this ETF outperformed 87% of the fund universe.[4] Since XBB has served as the blueprint for other best-selling bond ETFs, we conclude that this argument about the underperformance of passive bond ETFs is a myth.

c. Conclusion

We have read countless times that active management does not work for stocks, but it does for bonds. In our experience, these claims are not backed by evidence. It is true that the performance of active management is not as dismal for bond funds as it is for equity funds. Nevertheless, active fixed-income funds tend to underperform over time. By contrast, passive bond ETFs provide extreme diversification at a low cost in a highly fragmented market. Bonds are no more predictable than stocks. Empirical evidence shows that the performance of low-cost passive bond ETFs is extremely hard to beat.

[4] Sources: Morningstar and Fundata. Data as of August 31 2019.

6. Fixed-Income Vehicles

a. Individual Bonds

Individual bonds, in and of themselves, are fine investments. However, because of the fragmented nature of the market, they are very costly to acquire. With the current low interest rates, the transaction cost of building a diversified portfolio of individual bonds is likely to eat most of the returns.

Default risk is another flaw of individual bonds. Aside from federal government bonds, which pay the lowest yields, most bonds entail a risk of default. This risk has a low probability, but if it materializes, it has a high impact: most bonds are worth 40 cents on the dollar or less following a default.

A handful of individual bonds do not offer a proper cushion against default risk. Only a broadly diversified set of issuers can dilute the impact that a default would have on a portfolio. Because of the diversification they offer, we believe bond ETFs and mutual funds are, in most instances, superior investments to individual bonds.

b. Passive Bond ETFs

By contrast to individual bonds, bond ETFs benefit investors with broad diversification at a low cost. While commissions on bond transactions are expensive for individuals, institutions (especially the large ones) benefit from huge bargaining power. Therefore, bond ETFs can provide investors with extreme diversification at an extremely low cost.

c. Passive Mutual Funds

The main advantage of bond mutual funds is that they allow investors to make systematic contributions (for savers) or withdrawals (for retirees). On the minus side, mutual funds charge higher fees than do passive ETFs. For example, the TD E-Series Canadian Bond Index Fund (one of the lowest-cost passive bond funds in Canada) has an average Management Expense Ratio (MER) of 0.50%, compared to the 0.09% for the BMO Aggregate Bond Index ETF (the largest and one of the least expensive bond ETFs in Canada).

Another advantage of mutual funds over ETFs is the ease of acquiring them: you just ask your advisor to buy shares of the mutual fund and you will pay exactly the same price as other investors on that day: the shares' net asset value at closing. On the other hand, purchasing shares of an ETF involves entering a trade on the stock exchange, which is more complicated.

In a nutshell, passive mutual funds provide the benefits of discipline for savers and simplicity for retirees. For those with small amounts to invest, the discipline benefits of mutual funds will probably outweigh the cost advantage of ETFs. For example, a 0.41% cost advantage on a $10,000 investment will only cost $41 per annum, which is possibly worth the benefits of staying on track with your savings plan. When the portfolio gets much larger, the cost advantage of ETFs becomes more significant.

d. GICs

GICs have advantages and drawbacks. First, if you have only a small amount to invest (let's say $5,000), your institution is unlikely to offer you its best interest rate. By contrast, if you can benefit from the best GIC rates in the market, you're likely to obtain yields that resemble those of corporate bonds, while enjoying a credit quality similar to that of federal government bonds, since GICs are insured by the Canadian Deposit Insurance Corporation (CDIC). Please note that only GICs denominated in Canadian dollars and with original maturities of five years or less are insured. The insurance only covers a maximum of $100,000 per financial institution and per type of account. For more details: https://www.cdic.ca/your-coverage/protecting-your-deposit/

There is another important drawback to keep in mind: GICs are not liquid, and your capital is, under most circumstances, frozen until maturity.

7. The Strategic Role of Fixed Income in a Diversified Portfolio

Bond yields have been stuck at extremely low levels for over a decade. At the time of writing, 10-year Government of Canada bonds are yielding less than 1.5%. In most European countries, bonds yields are negative. Why do investors still buy bonds? The simple answer is this: in times of high stress in the market, high-quality fixed-income securities hold their value.

Investors can reduce the volatility of their portfolio by increasing the number of stocks they hold, due to the imperfect correlation across securities. For example, as of August 2019, the average 250-day volatility of the S&P/TSX Composite Index was 10%, as compared to an average of 31% for its constituents. However, during periods of high stress in the stock market, bonds are an indispensable tool for risk management. Since the timing of these high-stress periods is unpredictable, most investors hold bonds at all times.

Another important fact is that high-quality bonds behave as a safe haven in times of high stress, that is, they tend to appreciate when investors need it most: when stocks plummet. Bottom line: investors keep holding bonds despite the low yields because they act as a floor on the value of their portfolio when stocks plunge. Table 4 displays the returns on bonds during the nine bear markets for Canadian equity since 1956. Bonds have delivered positive returns seven out of nine times.

Table 4: The Performance of Canadian Bonds during Bear Markets in Canadian Equity from 1956 to 2019

Contraction Start Date	Contraction End Date	Canadian Equity	Canadian Bonds
1957-05-31	1957-12-31	-26.9%	6.9%
1969-05-31	1970-06-30	-25.4%	2.1%
1973-10-31	1974-09-30	-35.0%	-9.8%
1981-06-30	1982-06-30	-39.2%	11.3%
1987-07-31	1987-11-30	-25.4%	2.1%
1989-12-31	1990-10-31	-20.1%	2.5%
1998-04-30	1998-08-31	-27.5%	-0.1%
2000-08-31	2002-09-30	-43.2%	18.5%
2008-05-31	2009-02-28	-43.3%	3.8%

Source: Morningstar

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