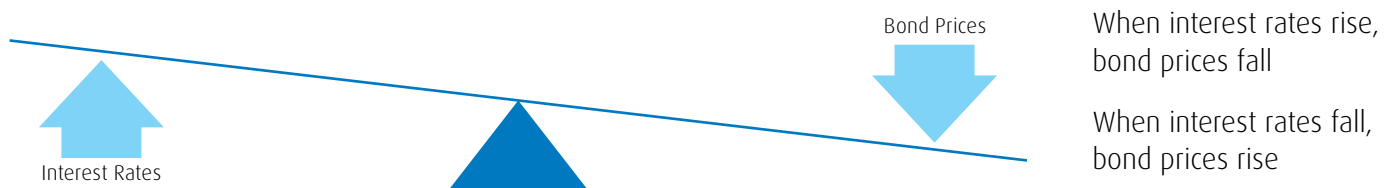


Fundamentals of Fixed Income

The Canadian bond market has just gone through the worst years on record with data going back to 1980, with the FTSE Canada Universe Bond Index returning -11.69% between January 1 and December 31, 2022. Fixed income prices have fallen largely due to inflation concerns, which have caused central banks to be more hawkish on expected overnight interest rates and has also shifted the interest rate curve higher across the maturity spectrum as markets adjust. There is a hidden benefit though, as interest rates have increased, the yield to maturity (YTM)¹ on bond portfolios has also increased, which both shortens the recovery period on losses and provides potentially higher return going forward. To understand this, one must understand the fundamentals of fixed income investing.

There exists an inverse relationship between interest rates and bond prices

In general, when one goes up the other goes down and vice versa:



Why does this happen?

When new bonds are issued their coupon rate is typically close to market interest rates. Using the example, assuming no maturity date, suppose interest rates are 3% and you buy Bond A for \$1,000 with an annual fixed coupon rate of 3%, paying \$30/year in interest. Interest rates rise to 4% and new bonds are still being sold for \$1,000 but they pay a higher coupon rate of 4%, or \$40/year in interest (Bond B).

You want to sell Bond A, but no one wants to buy it for \$1,000 since they can buy Bond B for the same price while receiving \$40 instead of \$30.

The price of Bond A must fall to an amount where the bonds' yield is the same as Bond B.

Example: Rates rise from 3% to 4%

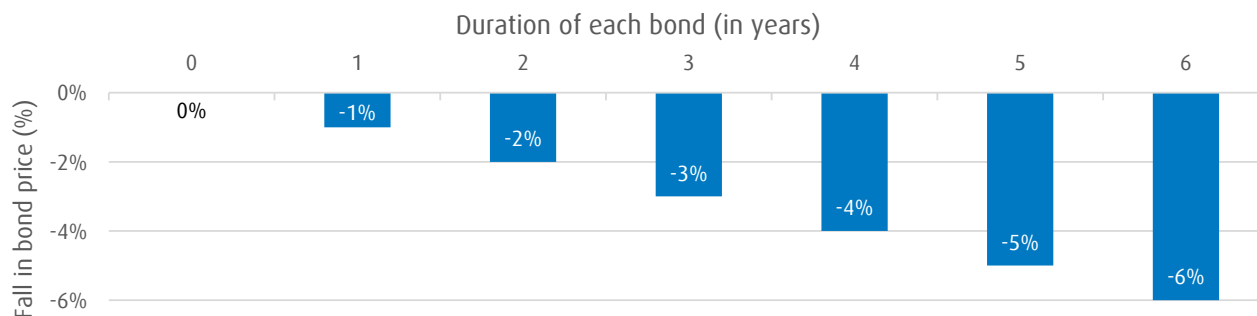
	Bond A: Rates at 3%	Bond B: Rates at 4%
Original Price	\$1,000	\$1,000
Coupon Rate	3%	4%
Annual Coupon	\$30	\$40
Bond Yield	3% (\$30/\$1000)	4% (\$40/\$1000)
New Price	\$750 (\$30/3%)	-
New Bond Yield	4% (\$30/\$750)	-

Duration vs. Interest Rates

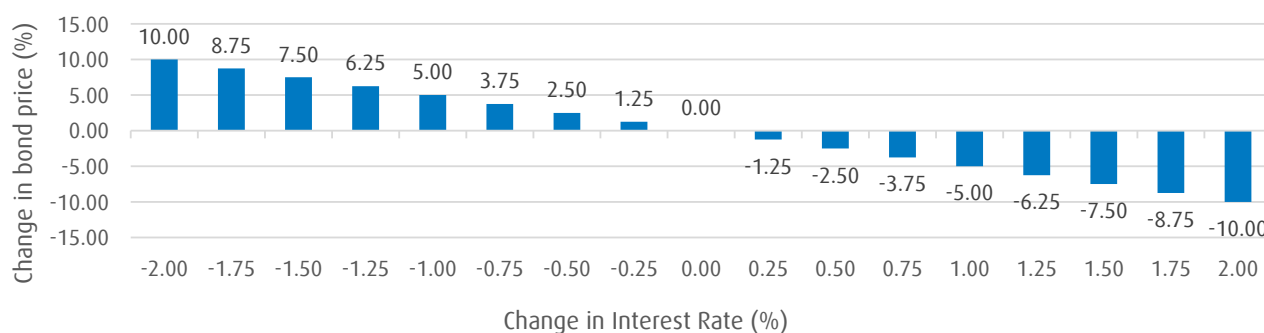
Bonds with longer durations will be impacted more than bonds with shorter durations.

Duration can be used to approximate how much the price of a bond will drop (rise) if rates rise (drop) by 1% (remember it's an inverse relationship). Duration is a measurement that indicates how many years it will take for an investor to recoup the value of their initial investment; it also measures how sensitive a bond is to changes in interest rates.

The following demonstrates how a 1% rise in rates² affects bonds with different durations:



The following shows the impact of changes in rates² on a bond with a duration of 5.



What affects duration?

1. Maturity of a bond: The longer the bond's maturity the greater its duration³

Bonds with longer maturity dates will be impacted by changing rates more than bonds with shorter maturity dates. The longer the maturity of a bond the longer it will take an investor to recoup the value of their initial investment. Also, a bond with longer maturity generally has higher coupon payments to compensate investors for holding these longer-term bonds.

2. Coupon Rates: The lower the coupon rates the greater its duration³

Bonds with lower coupon rates will be impacted by changing rates more than bonds with higher coupon rates. The following example, assuming no maturity date, shows how Bond A, a bond with a lower coupon rate, must adjust its price by a greater amount than Bond X, \$333.33 compared to \$167.67, in response to a 1% increase in interest rates.

Coupon rate from 2% to 3%

	Bond A	Bond B
Original Price	\$1,000	\$1,000
Coupon Rate	2%	3%
Annual Coupon	\$20	\$30
Bond Yield	2% (\$20/\$1000)	3% (\$30/\$1000)
New Price	\$666.67 (\$20/3%)	-
New Bond Yield	3% (\$20/\$666.67)	-

Coupon rate from 5% to 6%

	Bond X:	Bond Y:
Original Price	\$1,000	\$1,000
Coupon Rate	5%	6%
Annual Coupon	\$50	\$60
Bond Yield	5% (\$50/\$1000)	6% (\$60/\$1000)
New Price	\$833.33 (\$50/6%)	-
New Bond Yield	6% (\$50/\$833.33)	-

Credit Quality & Coupon Rates

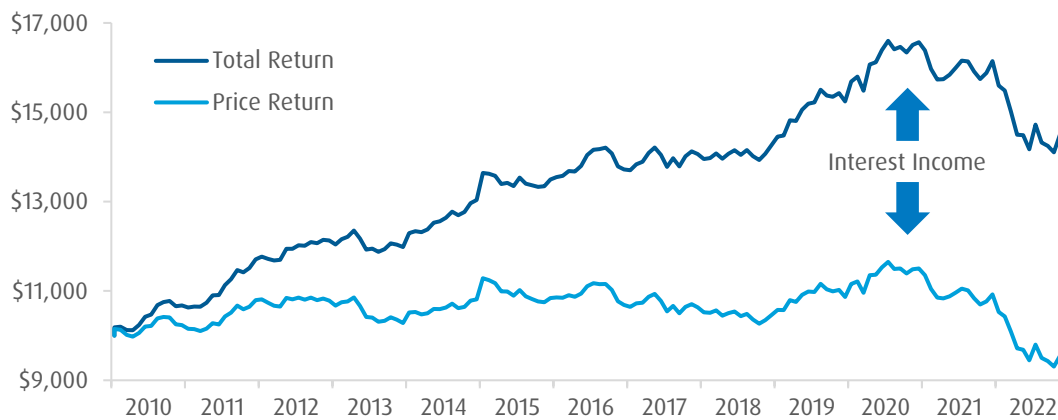
Coupon rates tend to be inversely related to credit quality, meaning coupon payments are higher for bonds with lower credit quality to compensate investors for holding riskier bonds, while they are lower for bonds with higher credit quality as it is less risky to hold these bonds. A bond with no coupon, or a zero-coupon bond, does not pay interest over time and instead trades at a deep discount to par (\$1,000). For this type of bond, there is a positive return only from the increase in price, as it converges to par over time, and not from interest income.

From a valuation perspective, bond prices change in response to interest rate changes and longer-dated, lower coupon paying bonds will be impacted more, therefore long-dated zero-coupon bonds are more responsive to interest rate changes and move up significantly when rates are cut. However, the interest rate risk is incredibly high for zero-coupon bonds and the price will fall significantly when rates are increased with no income stream to compensate for losses prior to maturity.

Price Return vs. Total Return

A bond's total return is determined not only by its price return but also by income return. Income return is the return an investor gets from coupon payments. While interest rates have an inverse relationship with bond prices, they have a positive one with income since coupon payments can be reinvested, taking advantage of compound interest over time, adding to total return. This benefit to income return is increased when coupons are reinvested into new higher paying bonds and receive higher coupon payments.

These two sources of bond returns can be seen in the graph below, where the difference between the total return and the price return is the income generated by Canadian fixed income. It is important to note that the long-term total return of a bond held to maturity is not impacted by changes in interest rates since the payments are set at the time of purchase.



Source: Bloomberg. The chart illustrates the impact to an initial investment of \$10,000 dollars from January 1, 2010, to December 31, 2022, in the FTSE Canada Universe Bond Index, Total Return and Price Return. Index returns do not reflect transactions costs, or the deduction of other fees and expenses and it is not possible to invest directly in an Index. Past performance is not indicative of future results.

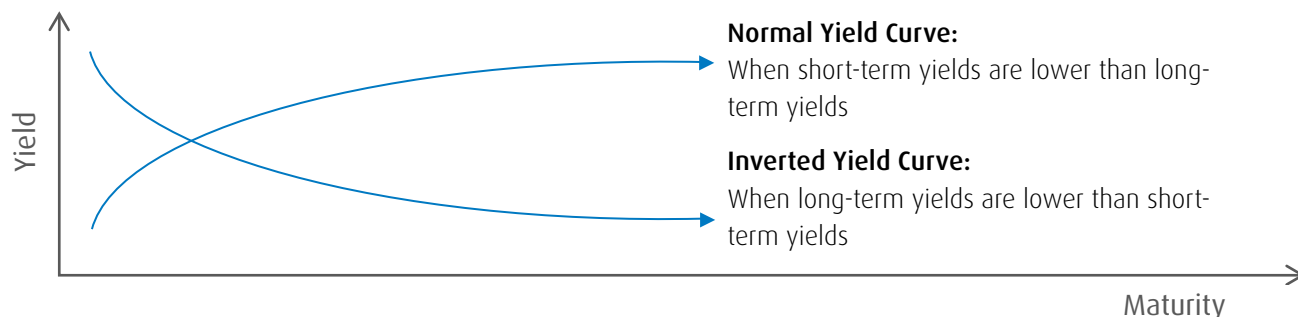
Global Corporate & High Yield Effective Yield & Duration by Credit Rating

Rating	Effective Yield (%)	Effective Duration (Years)
AAA	4.48	9.09
AA	4.35	6.75
A	4.84	6.03
BBB	5.49	6.01
BB	7.23	4.07
B	9.51	3.53
CCC or Lower	17.47	3.21

Source: Intercontinental Exchange, Inc. (ICE Indices), as of December 31, 2022. AAA represented by ICE BofA AAA Global Corporate Index, AA by ICE BofA AA Global Corporate Index, A by ICE BofA Single-A Global Corporate Index, BBB by ICE BofA BBB Global Corporate Index, BB by ICE BofA BB Global High Yield Index, B by ICE BofA Single-B Global High Yield Index, and CCC or Lower by ICE BofA CCC & Lower Global High Yield Index. It is not possible to invest directly in an Index.

Monetary policy doesn't affect all rates equally

When central banks conduct monetary policy, they are directly impacting short-term rates, however, their impact on long-term rates is more limited as those are affected predominantly by macroeconomic factors such as inflation expectations, risk premiums and investor preferences. As such, long-term bonds will be less impacted by these short-term rate changes. Changes to monetary policy is one of the reasons the yield curve may invert; for example, interest rate hikes increase short-term rates, and the normal upward slope of the yield curve flattens. Long-term rates are less impacted and may remain stable or decline to a lesser extent as investors seek less risky assets as recessionary concerns increase, which tends to increase prices and reduce yields, forming an inverted yield curve.



Holding a bond vs. holding a bond fund

A bond fund invests in many different bonds providing investors a cheaper method of achieving diversification than purchasing several bonds themselves. Bond funds rarely hold bonds until maturity for various reasons, including changes in active positioning, relative positioning to a benchmark index and cash flow requirements. They are continuously reinvesting coupon payments and the proceeds of any sold bonds into new bonds. In a rising rate environment this means that these coupons and proceeds will be reinvested into higher yielding bonds, which increases its income return. If inflation has peaked, and policy rates with it, then the likelihood of future upward rate shocks is reduced. Furthermore, if rates start falling, for example due to orderly disinflation or recessionary conditions, that will provide a tailwind for fixed income returns. Bond fund managers have expertise in navigating the large and complex bond market to find opportunities. They have multiple tools to manage a fund's duration to protect against fixed income risks and increase yields by investing across the credit and maturity spectrum.

Current Yield vs. Yield to Maturity

Current yield is the annual coupon income divided by the current price. The benefit of current yield is simple. It expands on coupon rate to take into account a bond's market value. However, it only reflects income, with no adjustment for capital gains and losses or the compounding effect of reinvesting income. Moreover, current yield only represents a snapshot in time. Because of these limitations, we advise investors not to use current yield as the only means of comparison when considering fixed income investments. **Yield to maturity** is a calculation that represents the anticipated total return earned by an investor who: (a) buys a bond at the market price, (b) receives all coupon payments, (c) reinvests those coupon payments at the same rate of return, and (d) holds the bond to maturity. Yield to maturity is a forward-looking measure and allows for fair comparison of bonds with different coupon rates, prices, and maturity dates. If a bond trades at a premium to par value, the yield to maturity will be lower than its coupon rate. Conversely, a bond trading at a discount to par value will have a yield to maturity greater than its coupon rate.

When bonds are trading at a premium, the current yield will be higher than the yield to maturity. When bonds are trading at a discount, the current yield will be lower than the yield to maturity. For a bond purchased at par (\$1,000), the current yield, yield to maturity and coupon rate are all equal.

Income Generation: Bonds or GICs?

The increase in bond yields has created an opportunity for investors to purchase fixed income assets and GICs (Guaranteed Investment Certificates) at attractive yields, but which is the better option? The key benefit of a GIC is that your original investment is guaranteed. Additionally, the average GIC rate has increased significantly over the last 5 years from as low as 0.6% to around 4%, depending on the institution and term.⁴

	Downside Protection	Liquidity	Probability of Positive Real Return	Offset to Inflation	Market Risks
Locked in GICs	100% of original investment is guaranteed	Penalty for early withdrawal	Lower	Traditionally Low	Secured investment ⁵
Active Fixed Income Fund	No guarantee of return of capital	Trade day + 2 business days	Higher	Traditionally High	Credit & Interest-rate risk

However, there are disadvantages too. GICs have no upside potential, penalties for early withdrawal, and sacrifice long-term real capital preservation. This is because, in recent years, GICs yields have lagged inflation, meaning your real return, the return after considering taxes and inflation, would be negative, and future cash flows will have lower purchasing power if inflation remains above the GIC rate.

GIC Returns

Relative to other asset classes, 1952 - 2021

	Return	Growth of \$1,000
Canadian Stocks	9.4%	\$554,184
Canadian Bonds	6.7%	\$90,935
GICs	5.7%	\$49,599
Inflation	3.4%	\$10,094

Source: The Big Picture, Investments Illustrated, Inc. All returns are compound annual returns and all values are expressed in Canadian dollar terms. Canadian Stocks represented by S&P/TSX Composite Index TR, Canadian Bonds represented by Canada 10-year Government Bond Index TR, Inflation represented by the Canadian Consumer Price Index. Index returns do not reflect transactions costs, or the deduction of other fees and expenses and it is not possible to invest directly in an Index. Past performance is not indicative of future results.

Ultimately, the choice between bonds or GICs is situational and comes down to an individual's overall portfolio, risk tolerance, investment objectives and time horizon. However, in general and over longer periods of time, bonds offer a greater return potential, superior liquidity, and higher offset to inflation.

Bonds & Taxation: Registered accounts help eliminate tax drag

Income is the least-efficiently taxed distribution, as it is taxed at the holder's marginal tax rate instead of the lower tax treatment of dividend income or capital gains. While minimizing one's tax burden is always important, it is paramount in volatile markets when every basis point counts. To minimize the potentially large negative drag that tax can have on returns, investors should place their fixed income in non-taxable accounts (registered accounts such as RRSP and TFSA) whenever possible as these accounts shelter income from taxation.

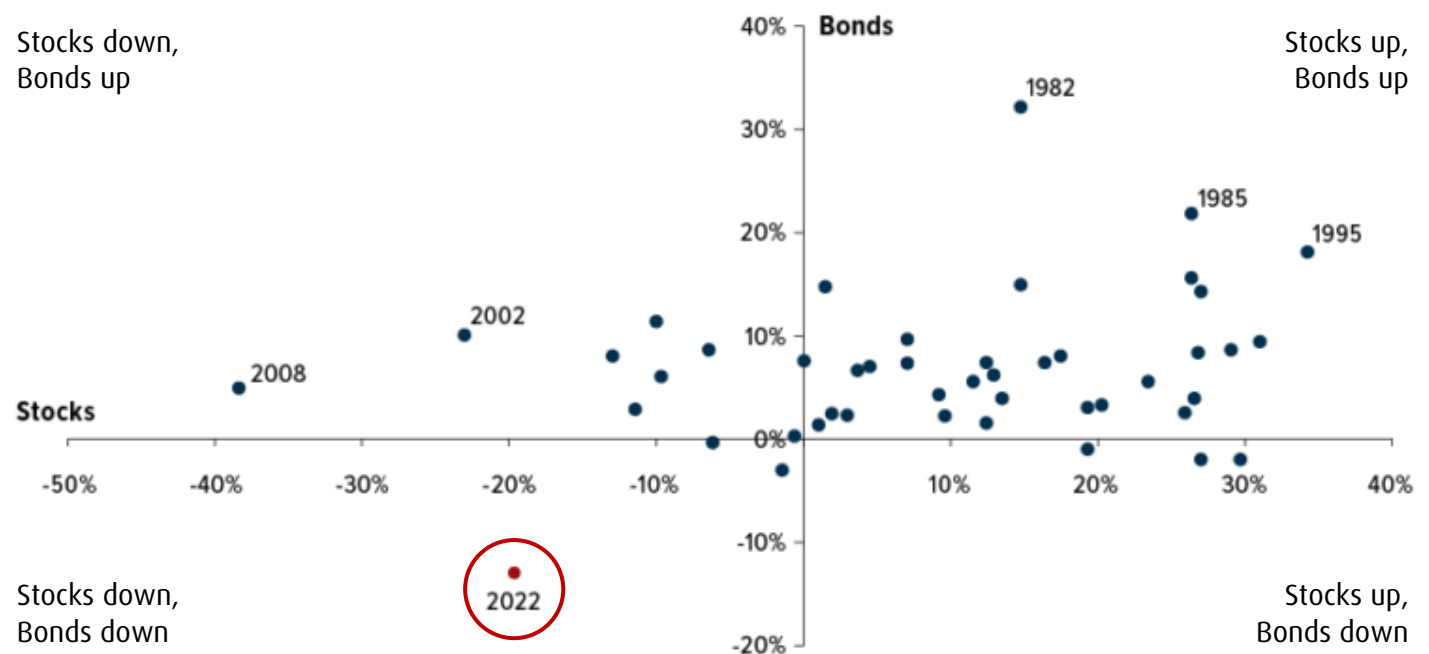
Diversification & Correlation

In today's rapidly rising rate environment, investor returns have suffered, and some have questioned the need for fixed income in their portfolios. It's true that 2022 was one of the worst years for bonds, however it was significantly harder for diversified investors as both stocks and bonds were down.

The below graph illustrates not only how difficult the markets have been, but also how much this year was an anomaly, with 2022 ranking as one of the worst years for stocks and the worst year for bonds.

2022 Was the Worst Year for U.S. Stocks and Bonds

Total Returns, 1977 - 2022



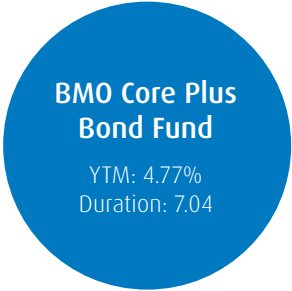
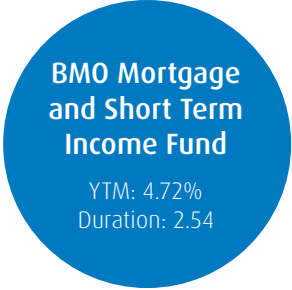
Source: Bloomberg, U.S. Global Investors. Stocks represented by the S&P 500 Index and Bonds represented by the Bloomberg U.S. Aggregate Bond Index. Index returns do not reflect transactions costs, or the deduction of other fees and expenses and it is not possible to invest directly in an index. Past performance is not indicative of future results.

Investors should remember the primary role of this asset class is to provide a safety net to portfolio volatility when combined with riskier asset classes, such as equities. Normally, the diversification benefits can be substantial, regardless of the market environment, and become even more pronounced when equity markets have experienced sharp declines. While rising rates do impact bonds negatively in the short-term, they also lead to a positive long-term impact as coupons and new money can be invested in bonds with higher coupons.

As inflation becomes more under control, the bond markets should stabilize. Bond markets can absorb measured interest rate increases and still produce positive returns based on current yields. It is important to remember that as long as market expectations are in line with central bank actions the impact is already priced into the market. Market movements typically happen if the central banks do something that the market is not expecting.

Rate Scenarios Under Higher Yields

Markets are forward-looking, and current bond prices reflect the anticipated rate changes ahead. However, uncertainty endures because the future path of rates ultimately depends on inflation and central bank commitment to returning it to target levels. Given the wide range of potential outcomes, now is a good time to take stock of alternative rate scenarios and what they might mean for fixed income returns going forward.

		SCENARIO 1 100 basis point move higher (Rate movement: +1.0%)	SCENARIO 2 100 basis point move lower (Rate movement: -1.0%)
 <p>BMO Core Plus Bond Fund YTM: 4.77% Duration: 7.04</p>	Impact to Bond Prices Bond Price Movement	-7.0%	7.0%
	New Yield to Maturity Yield Movement	5.8%	3.8%
	Total Return One Year	-1.7%	11.1%
	Payback Period Recovery Time (Years)	1.3	-
 <p>BMO Mortgage and Short Term Income Fund YTM: 4.72% Duration: 2.54</p>	Impact to Bond Prices Bond Price Movement	-2.6%	2.6%
	New Yield to Maturity Yield Movement	5.7%	3.7%
	Total Return One Year	3.0%	6.4%
	Payback Period Recovery Time (Years)	0.5	-

For illustrative purposes table figures and calculations assume a parallel yield curve shift and no change to credit spreads. YTM and Duration (years) is as of December 31, 2022. Total Return and Payback Period are calculated using compound returns.

If rates were to unexpectedly increase by another 100 basis points (bps) beyond what is already priced in, the BMO Core Plus Bond Fund would be expected to produce a total one-year return of approximately -1.7%, with the price loss recouped in 1.3 years. The breakeven threshold – the magnitude of the rate shock that would result in the portfolio breaking even at a 0% full-year return – is 74 bps. If, however, rates were to reprice lower by 100 bps, the fund would experience price gains in addition to the contribution from higher yield, for an estimated one-year total return of 11.1%.

The BMO Mortgage and Short-Term Income Fund is less sensitive to interest rate movements, and therefore better positioned to generate positive returns in the face of further rate increases. The fund is expected to generate a positive one-year return of approximately 3.0% if yields were to jump by another 100 bps, with the price loss paid back in about 5-6 months. The breakeven rate shock for this fund is approximately 273 bps. Under the upside rate scenario, a 100 bps rate decrease would result in a one-year total return of approximately 6.4%.

Current market yields are higher than they have been for over a decade. If inflation has not yet peaked, those yields provide enhanced protection from further shocks. This improved environment due to higher yields serves to reinforce the case for fixed income's role within a portfolio.

Segments of the Fixed Income Market

Different fixed income classes react differently to various economic changes. Diversification can help reduce uncertainty and can potentially increase returns. Fixed income returns are affected by term-to-maturity and duration, credit quality and issuer specific risks. Using individual securities increases liquidity concerns and trading costs; these risks can be managed by using BMO's fixed income mutual funds to meet your fixed income needs.

Calendar year returns (%) of different fixed income classes, represented by indices from 2010 to 2022.

2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Avg.	
HY Bonds 18.5	Long-Term 18.13	Emerging Markets 15.91	Floating Rate 13.27	Long-Term 17.48	Emerging Markets 21.4	HY Bonds 13.81	HY Bonds 8.39	Floating Rate 10.25	Long-Term 12.71	Long-Term 11.90	Floating Rate 4.50	Floating Rate 5.04	Floating Rate 6.66	Highest Returns ↑
Long-Term 12.52	Emerging Markets 11.15	HY Bonds 14.03	HY Bonds 5.35	Emerging Markets 15.04	Floating Rate 19.47	Emerging Markets 6.38	Long-Term 7.03	World Gov't 8.09	HY Bonds 10.41	Corporate 8.74	HY Bonds 4.47	Cash 1.80	HY Bonds 6.62	
Corporate 7.34	Canadian Gov't 10.2	Floating Rate 7.01	World Gov't 2.44	Floating Rate 11.25	World Gov't 15.64	Floating Rate 6.08	Corporate 3.38	Emerging Markets 3.98	Emerging Markets 8.63	Canadian Gov't 8.69	Cash 0.17	Short-Term -3.13	Emerging Markets 6.45	
Canadian Gov't 6.51	World Gov't 8.99	Corporate 6.22	Balanced Portfolio 1.78	Canadian Gov't 9.29	Balanced Portfolio 7.83	Corporate 3.73	Balanced Portfolio 2.37	Balanced Portfolio 3.31	Corporate 8.05	HY Bonds 8.47	Short-Term -0.93	HY Bonds -5.92	Long-Term 4.99	
Balanced Portfolio 6.5	Corporate 8.24	Balanced Portfolio 5.88	Short-Term 1.74	World Gov't 8.49	Canadian Gov't 3.84	Balanced Portfolio 3.63	Canadian Gov't 2.18	Short-Term 1.91	Canadian Gov't 6.42	World Gov't 8.18	Balanced Portfolio -1.18	Balanced Portfolio -5.92	Balanced Portfolio 4.04	
Emerging Markets 6.19	Balanced Portfolio 7.67	Long-Term 5.21	Cash 1.01	Balanced Portfolio 8.36	Long-Term 3.80	Long-Term 2.47	Emerging Markets 2.14	HY Bonds 1.56	Balanced Portfolio 5.96	Balanced Portfolio 6.28	Corporate -1.34	Corporate -7.14	Corporate 3.80	
Floating Rate 4.24	Short-Term 4.65	Canadian Gov't 2.65	Corporate 0.84	Corporate 7.58	Corporate 2.71	Short-Term 1.01	Cash 0.56	Canadian Gov't 1.53	Short-Term 3.10	Short-Term 5.29	Emerging Markets -2.35	Emerging Markets -8.34	Canadian Gov't 2.93	
Short-Term 3.56	Floating Rate 4.34	Short-Term 2.01	Emerging Markets -0.31	Short-Term 3.06	Short-Term 2.61	Canadian Gov't 0.89	World Gov't 0.43	Cash 1.38	Floating Rate 2.71	Emerging Markets 4.02	Canadian Gov't -2.97	Canadian Gov't -9.10	World Gov't 2.40	
Cash 0.54	HY Bonds 3.02	Cash 1.01	Canadian Gov't -2.00	HY Bonds 2.94	HY Bonds 1.09	Cash 0.51	Short-Term 0.08	Corporate 1.10	Cash 1.65	Floating Rate 0.98	Long-Term -4.52	World Gov't -11.04	Short-Term 1.92	
World Gov't -0.32	Cash 1.00	World Gov't -0.6	Long-Term -6.16	Cash 0.91	Cash 0.63	World Gov't -1.91	Floating Rate -2.60	Long-Term 0.31	World Gov't 0.54	Cash 0.86	World Gov't -7.76	Long-Term -15.99	Cash 0.93	

Emerging Markets
JP Morgan Emerging Market Bond Index (EMBI) Global Index

High Yield (HY) Bonds
ICE Bank of America BB-B Canada High Yield Index

Corporate
FTSE Canada All Corporate Bond Index

Floating Rate
Credit Suisse Leverage Loan Index

Long-Term
FTSE Canada Long-Term Bond Index

Short-Term
FTSE Canada Short-Term Bond Index

Cash
FTSE Canada 91 Day T-Bill Index

Canadian Government
FTSE Canada All Government Bond Index

World Government
FTSE World Government Bond Index (WGBI)

Balanced Portfolio
Equally Weighted Fixed Income Portfolio

Source: Morningstar Direct, December 31, 2022. Currency in Canadian dollars.

For illustration purposes only. Index returns do not reflect transactions costs, or the deduction of other fees and expenses and it is not possible to invest directly in an index. The performance of various indices does not represent the performance of BMO Mutual Funds. Past performance is not indicative of future results.

BMO Fixed Income Funds

Building a fixed income portfolio can be difficult and time consuming. Let BMO Mutual Funds do it for you with our fixed income funds, designed with flexibility to offer clients exposure to different segments of the fixed income market.

Funds	Emerging Markets	HY Bonds	Corporate	Long-Term	Short-Term	Canadian Gov't	World Gov't	Cash
BMO Money Market Fund Risk Rating: Low								✓
BMO U.S. Dollar Money Market Fund Risk Rating: Low								✓
BMO Bond Fund Risk Rating: Low			✓	✓	✓	✓		
BMO Core Bond Fund Risk Rating: Low		✓	✓	✓	✓	✓		
BMO Core Plus Bond Fund Risk Rating: Low		✓	✓	✓	✓	✓		
BMO Crossover Bond Fund Risk Rating: Low		✓	✓		✓		✓	
BMO Emerging Markets Bond Fund Risk Rating: Low to Medium	✓	✓	✓	✓	✓		✓	
BMO Global Strategic Bond Fund Risk Rating: Low to Medium	✓	✓	✓	✓	✓		✓	
BMO Mortgage and Short-Term Income Fund Risk Rating: Low			✓		✓	✓		
BMO Sustainable Bond Fund Risk Rating: Low		✓	✓	✓	✓	✓		
BMO Sustainable Global Multi-Sector Bond Fund Risk Rating: Low	✓	✓	✓		✓			
BMO Tactical Global Bond ETF Fund Risk Rating: Low to Medium			✓	✓	✓	✓		
BMO U.S. Corporate Bond Fund Risk Rating: Low		✓	✓	✓	✓			
BMO U.S. High Yield Bond Fund Risk Rating: Medium		✓	✓		✓			
BMO World Bond Fund Risk Rating: Low			✓	✓	✓		✓	

Fund Codes & Fees

Fund Name	Series A	MER (%)*
BMO Money Market Fund	142	0.52
BMO U.S. Dollar Money Market Fund	801	0.47
BMO Bond Fund	143	1.60
BMO Core Bond Fund	160	1.16
BMO Core Plus Bond Fund	159	1.39
BMO Crossover Bond Fund	161	1.17
BMO Emerging Markets Bond Fund	158	1.84
BMO Global Strategic Bond Fund	736	2.23
BMO Mortgage and Short-Term Income Fund	141	1.00
BMO Sustainable Bond Fund	118	1.03
BMO Sustainable Global Multi-Sector Bond Fund	162	1.20
BMO Tactical Global Bond ETF Fund	220	1.64
BMO U.S. Corporate Bond Fund	129	0.99
BMO U.S. High Yield Bond Fund	737	1.59
BMO World Bond Fund	716	2.27

* Annual Management Expense Ratios (MERs) are as of September 30, 2022.



Any statement that necessarily depends on future events may be a forward-looking statement. Forward-looking statements are not guarantees of performance. They involve risks, uncertainties and assumptions. Although such statements are based on assumptions that are believed to be reasonable, there can be no assurance that actual results will not differ materially from expectations. Investors are cautioned not to rely unduly on any forward-looking statements. In connection with any forward-looking statements, investors should carefully consider the areas of risk described in the most recent simplified prospectus. This communication is for information purposes. The information contained herein is not, and should not be construed as, investment, tax or legal advice to any party. Particular investments and/or trading strategies should be evaluated relative to the individual's investment objectives and professional advice should be obtained with respect to any circumstance.

Commissions, trailing commissions (if applicable), management fees and expenses all may be associated with mutual fund investments. Please read the fund facts or prospectus of the relevant mutual fund before investing. Mutual funds are not guaranteed, their values change frequently and past performance may not be repeated. Distributions are not guaranteed and are subject to change and/or elimination. For a summary of the risks of an investment in BMO Mutual Funds, please see the specific risks set out in the prospectus.

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