Invesco

Primer on Municipal Bonds

What investors need to know

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In this primer, we highlight several attributes that we believe make the municipal bond market a stand out among other large fixed income markets.

Municipal bonds are often thought of as tax-exempt vehicles appropriate only for investors who fall into higher tax brackets. However, municipal bonds can offer potential advantages to investors of all income brackets. In this primer, we highlight several attributes that we believe make the municipal bond market a stand out among other large fixed income markets.

These attributes include:

Low refinancing risk	Municipal debt is typically self-amortizing where periodic debt service payments consist of both principal and interest. This structure enables repayment of principal with less reliance on future market access.
High credit quality	These issues tend to be highly rated.
Low default rates	Compared to other fixed income asset classes, municipal bonds have had low historical default rates.
Diversification	These issues have had a low historical correlation with other major asset classes.
Attractive yields	Municipal bond yields compare favorably to major fixed income segments, even exclusive of their tax advantage.

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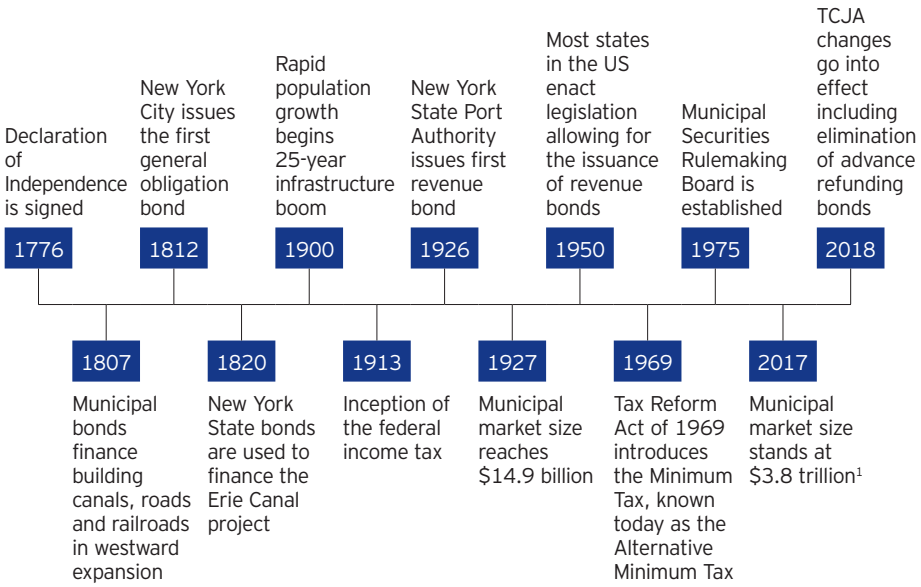
Brief history of municipal bonds

Municipal bonds have played a vital role in building the framework of America's modern infrastructure. As illustrated in the timeline below, municipal bonds were a major source of financing for canals, roads and railroads during the country's westward expansion in the 1800s. Today, the proceeds from municipal debt continue to fund a wide range of state and local infrastructure projects including schools, hospitals, universities, airports, bridges, highways, and water and sewer systems.

Figure 1: Municipal bonds have financed vital infrastructure throughout the US for over 200 years
Notable events in history for the municipal bond market



Source: "The Handbook of Municipal Bonds" by Feldstein Fabozzi, copyright 2008

02

What are municipal bonds?

Municipal bonds are issued by US state and local governments (municipalities) and eligible not-for-profit corporations. Municipal bonds can also be issued by territories and possessions of the US (i.e. Puerto Rico, Guam, the US Virgin Islands and American Samoa). When an investor purchases a municipal bond, he or she is lending to build schools, highways, hospitals, sewer systems and a myriad of other public projects.

Traditionally, municipal bond interest payments are exempt from federal income taxes and state income taxes for in-state residents. For taxpayers, to determine the desirability of a given municipal issue, it is necessary to calculate the tax-equivalent yield and then compare it with its taxable counterpart in the US Treasury, agency, corporate or sovereign bond market.

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Understanding tax-equivalent yield

Yields on municipal bonds are typically quoted in terms of their tax-equivalent yield, which represents the equivalent yield on a fully-taxable bond. Because of their tax-exempt status, municipal bonds typically offer a lower yield than their taxable counterparts. For US taxpayers, assessing the tax-equivalent yield of a municipal bond will help when comparing municipal bond yields with yields on their taxable investment options. The taxable equivalent yield formula (TEY) is expressed as:

$$\text{Taxable equivalent yield} = \frac{\text{Tax-exempt yield}}{(1 - \text{marginal tax rate})}$$

Tax-exempt yield = municipal bond yield
Marginal tax rate = percentage tax rate paid on last dollar of taxable income

Figure 2 below shows two tax-brackets and their tax-equivalent yields. For example, an investor in the 40.80% marginal federal income tax bracket holding a municipal bond that yields 5.00% would need to earn a yield of 8.45% on a taxable investment to produce an equivalent amount of after-tax interest income. Another example below shows an investor in the 35.80% marginal federal income tax bracket holding a municipal bond that yields 5.00% would need to earn a yield of 7.79% on a taxable investment to produce an equivalent amount of after-tax interest income.

Figure 2: The tax-equivalent yields of municipal bonds can make them more appealing than taxable bonds

Tax bracket	Tax-free yield	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50	5.00
40.80%	Taxable equivalent	1.69	2.53	3.38	4.22	5.07	5.91	6.76	7.60	8.45
35.80%	Taxable equivalent	1.56	2.34	3.12	3.89	4.67	5.45	6.23	7.01	7.79

Based on 2019 federal tax rates. Taxable equivalent = (tax-deferred interest rate) x [1/(1 −tax bracket)]. The 40.8% tax bracket consists of the 37% Federal Tax Rate + 3.8% NIIT. The 35.8% tax bracket consists of the 32% Federal Tax Rate + 3.8% NIIT. 2018 37% tax rate for single taxpayers with more than $500,000 in taxable income or couples with $600,000 or more. 2018 33% tax rate for single taxpayers with $157,501 to $200,000 in taxable income or couples with $315,001 to $400,000. NIIT is the Net Investment Income Tax of 3.8% on investment income for single taxpayers with more than $200,000 in taxable income or couples with $250,000 or more. Numbers presented are hypothetical and for illustrative purposes only and do not represent future yields. Actual yields may be lower or higher than the examples shown. Income exempt from regular federal income tax may be subject to the US federal alternative minimum tax, as well as state and local taxes.

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Two basic types of municipal bonds

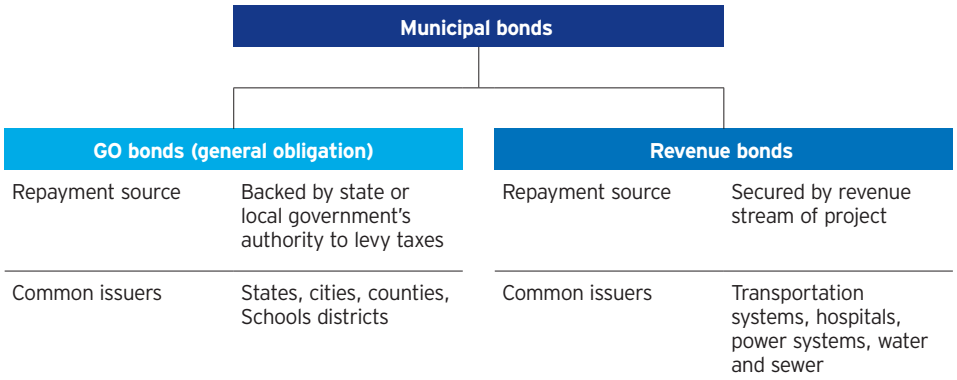
In general, municipal bonds fall into one of two categories: General obligation bonds and revenue bonds. The primary distinction between the two is the source of revenue that secures their principal and interest payments.

General obligation bonds
General obligation bonds at the state level are secured by the state government's pledge to use all legally available resources to repay the bond. At the local government level, general obligation bonds are backed by an ad valorem tax[2] pledge that can be either "limited" or "unlimited."

+ Limited tax: Secured by a pledge to levy taxes annually "within the constitutional and statutory limitations provided by law."
+ Unlimited tax: Secured by a pledge to levy taxes annually "without limitation as to rate or amount" to ensure sufficient revenues for debt service.
+ Examples of issuers of general obligation bonds include states, cities, counties and school districts.

Revenue bonds
+ Revenue bonds are secured by a specific source of revenue earmarked for repayment of the revenue bond.
+ *Enterprise* revenue bonds are typically issued by water and sewer authorities, electric utilities, airports, toll roads, hospitals, universities and other not-for-profit entities.
+ *Tax* revenue bonds are backed by dedicated tax streams, such as sales taxes, utility taxes or excise taxes.

Figure 3: Types of municipal bonds



Source: Invesco. For illustrative purposes only.

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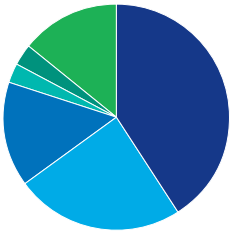
Comparing fixed income markets

Size
The municipal bond market has $3.8 trillion of debt outstanding versus the corporate and foreign bond markets which have $12 trillion of debt outstanding.[3] While the municipal market is smaller in terms of total debt outstanding, there are far more municipal issuers than corporate and foreign bond issuers.

Investors
The municipal bond investor base versus the investor breakdown for corporate and foreign bonds is shown in **Figure 4**, below.

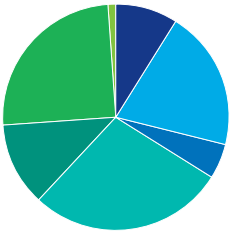
Figure 4: The $3.8 trillion municipal market is dominated by retail investors

Ownership of municipal securities and loans



	Billions	% of total
Household	1874.9	47
Mutual funds and ETFs	1001.1	25
Banks and credit unions	497.6	12
Rest of the world	100.6	2
Other	57.5	1
Insurance companies	493.2	12
Total	3815.8*	100

Ownership of corporate and foreign bonds



	Billions	% of total
Household	1201.3	9
Mutual funds and ETFs	2672.3	20
Banks and credit unions	652.5	5
Rest of the world	3737.5	28
Other	1578.5	12
Insurance companies	3415.4	25
Local, state & federal governments	170.9	1
Total	13,502.6**	100

Source: Federal Reserve, as of June 6, 2019 (latest available data). *Accounts for reporting discrepancies of -209.1. **Accounts for reporting discrepancies of 74.2

Unlike the corporate and foreign bond markets, the municipal market is largely dominated by retail investors because of its federally tax-exempt status. Through both direct investment in individual municipal securities and indirect investment via mutual funds and ETFs, individual investors represent a combined 72% of total municipal bond ownership.

Some of the key attributes that attract retail investors to the municipal bond market are the strong credit quality, tax-free income and ability to potentially add diversity to a broader portfolio. However, individual investor demand has been historically cyclical, meaning that demand has risen following periods of strong returns and declined after weak performance periods. This highly cyclical pattern of retail investor demand is somewhat unique to the municipal market.

Banks represent nearly 12% of total municipal bond market ownership. These institutions typically buy municipal bonds as a portion of their broader fixed income portfolio when municipal yields become more attractive compared to taxable alternatives, or when the bank believes it will benefit from tax-exempt interest. Insurance companies represent approximately 12% of total municipal bond market ownership.[3] Historically, insurance companies have owned municipal bonds as a way to increase fixed income portfolio diversification. Property and casualty insurers have tended to purchase short and intermediate maturity municipal bonds while life insurance companies have typically focused on longer duration bonds to match the long-term nature of their policies. Bank and insurance company demand for municipal bonds has historically been driven by long-term secular trends which have been less correlated with retail investment.

Other non-typical buyers such as hedge funds and foreign investors have generally purchased municipal bonds when they are cheap relative to corporate bonds, even though these investors do not receive the tax benefit.

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Debt structure

The typical municipal bond structure includes level debt service payments and annual principal amortization (similar to consumer mortgage lending). These payments are relatively level from year to year, allowing an issuer to better align reoccurring revenue streams with annual debt service payments. This structure lowers refinancing risk, meaning municipal bondholders may be less concerned when systemic risk is elevated. In comparison, the typical corporate and sovereign bond structures include interest-only payments and a balloon principal payment at maturity. This structure is more vulnerable to refinancing risk if the issuer chooses to refinance the balloon payment.

When structuring a municipal debt offering, an issuer must take into account a broad range of legal, policy and financial objectives. The majority – 67% – of municipal debt outstanding is backed by a dedicated revenue pledge.[4] Investors typically want assurance that pledged revenues will be sufficient for debt service payments, so as part of the structuring process a bond ordinance or trust indenture will explicitly outline provisions governing the flow of funds securing the debt and bond covenants.

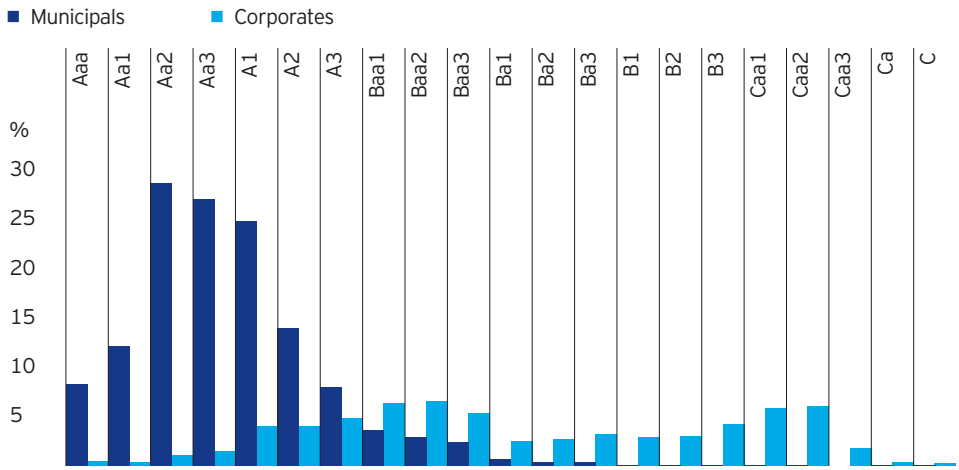
Callable securities generally offer a stated maturity, but allow the issuer an option to redeem (or "call") the bonds prior to the maturity date after an initial non-call period. The majority of longer-dated municipal bonds carry a 10-year call provision. When interest rates fall, an issuer is more likely to exercise a call provision to retire what has become high-interest debt and reissue new debt at the prevailing lower rate.

07

Credit quality

The majority of state and local governments are highly rated, whereas corporate credits tend to have lower average ratings. As shown in Figure 5 below, 92% of municipal issuers rated by Moody's are currently rated single-A or higher. By comparison, only 24% of global corporate issuers are rated single-A or higher.[5]

Figure 5: Reflecting their low propensity to default, nearly all municipal issuers have investment grade ratings



Source: Moody's Investors Service, US Municipal Bond Defaults and Recoveries as of Dec. 31, 2018 (latest available data). Municipals are represented by the Bloomberg Barclays Municipal Bond Index. Corporates are represented by the Bloomberg Barclays Global Aggregate Credit Index.

08

Historical default rates

Municipal debt financing tends to utilize relatively secure debt structures compared to other fixed income asset classes. The result is that municipal default rates are exceptionally low, especially when compared with US corporate bonds. In fact, the 10-year average cumulative default rate for high yield corporate bonds is more than three times higher than the high yield municipal bond default rate **Figure 6**. Even more pronounced is the magnitude of the corporate investment grade default rate relative to the municipal investment grade default rate at 23 times.

Since 1970, there has never been an Aaa-rated municipal bond default. Similarly, in the same time frame, only 0.02% has defaulted with an Aa-rating. By contrast, Aa-rated corporate issuances have had an 0.78% default rate since 1970.

Figure 6: Municipal default rates have historically been lower than those of corporate bonds
10-year average cumulative default rates

Rating categories	Municipal bonds %	Corporate bonds %
Aaa	0.00	0.37
Aa	0.02	0.78
A	0.11	2.10
Baa	1.13	3.70
Ba	3.65	15.48
B	17.91	34.28
Caa-C	25.75	48.23
All investment grade	0.10	2.28
All high yield	7.47	28.79
All rated securities	0.16	10.13

All rated municipal bonds have a lower 10-year cumulative default rate than Aaa-rated corporate bonds.

Source: Moody's Investor Services ("Moody's"), as of December 2018 (latest available data). Past default rates are no assurance of future default rates. Data shown for the time period 1970 through 2018 is the most recent data available. 2018 data may increase cumulative default rates for both municipal and corporate bonds. A credit rating is an assessment provided by a nationally recognized statistical rating organization of the creditworthiness of an issuer with respect to debt obligations, including specific securities, money market instruments or other debts. Ratings are measured on a scale that generally ranges from Aaa (highest) to C (lowest); ratings are subject to change without notice. For more information on rating methodologies, please visit moodys.com and select `Rating Methodologies' under "Research & Ratings" on the homepage.

09

Diversification potential

Municipal bonds offer potential diversification advantages, making them attractive to foreign as well as domestic investors. Advantages may exist because municipal bonds have historically exhibited very low correlation to other asset classes, including equities and US Treasuries, as shown in **Figure 7** below.

Figure 7: Municipal bonds historically low correlation to other asset classes
10-year asset class correlations

		1	2	3	4	5	6	7	8	9	10	11
1	Russell 2000 Index	1.00	0.89	0.64	0.71	-0.45	0.66	-0.26	0.04	-0.29	-0.04	-0.16
2	S&P 500 Index	0.89	1.00	0.74	0.85	-0.40	0.71	-0.17	0.14	-0.22	0.03	-0.11
3	MSCI Emerging Markets Index	0.64	0.74	1.00	0.83	-0.21	0.77	0.04	0.35	-0.09	0.20	0.06
4	MSCI EAFE Index	0.71	0.85	0.83	1.00	-0.32	0.78	-0.07	0.27	-0.16	0.11	-0.01
5	Bloomberg Barclays U.S. Government Index	-0.45	-0.40	-0.21	-0.32	1.00	-0.16	0.94	0.68	0.86	0.51	0.71
6	Bloomberg Barclays U.S. Corporate High Yield Index	0.66	0.71	0.77	0.78	-0.16	1.00	0.13	0.50	0.03	0.31	0.13
7	Bloomberg Barclays U.S. Aggregate Bond Index	-0.26	-0.17	0.04	-0.07	0.94	0.13	1.00	0.87	0.87	0.60	0.75
8	Bloomberg Barclays U.S. Corporate Index	0.04	0.14	0.35	0.27	0.68	0.50	0.87	1.00	0.75	0.59	0.66
9	Bloomberg Barclays Municipal Index Taxable Bonds	-0.29	-0.22	-0.09	-0.16	0.86	0.03	0.87	0.75	1.00	0.64	0.79
10	Bloomberg Barclays Municipal HY Bond Index	-0.04	0.03	0.20	0.11	0.51	0.31	0.60	0.59	0.64	1.00	0.82
11	Bloomberg Barclays Municipal Bond Index	-0.16	-0.11	0.06	-0.01	0.71	0.13	0.75	0.66	0.79	0.82	1.00

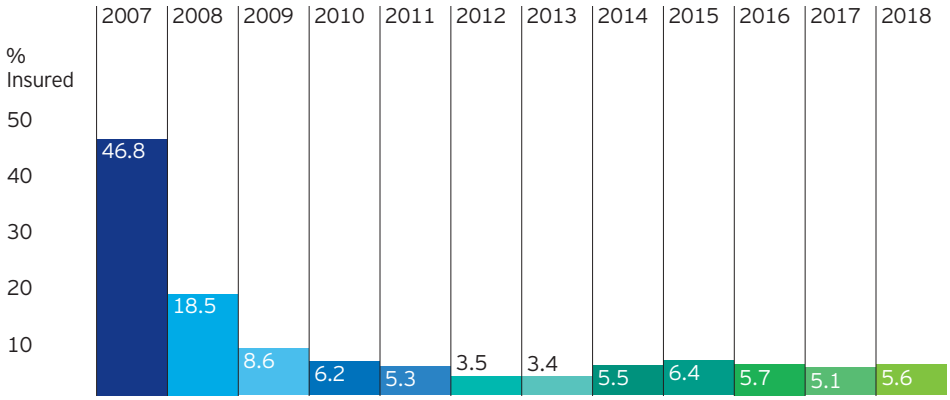
Source: Zephyr StyleADVISOR, for the period August 2009 to July 31, 2019. Past performance cannot guarantee future results. An investment cannot be made directly into an index. Correlations highlighted in blue illustrate the difference between corporate and municipal bonds' correlation in relation to the S&P 500.

10

Importance of active management

The municipal bond market continues to grow in complexity with over 37,000 government and non-government obligors. Now more than ever, investing in this market requires in-depth analysis. Prior to the global financial crisis, the overwhelming majority of municipal bonds were insured, meaning they were viewed as having the same credit risk as the insurer as opposed to the underlying borrower. Following the financial crisis, the municipal market began to place more weight on the fundamentals of the underlying borrower rather than the insurers' credit quality. This change in investment approach has made the municipal market more credit-driven and less rates-driven than in the past. Additionally, as shown in **Figure 8** below, there are currently very few insured bonds coming to market, which has led to a greater need for municipal credit analysis.

Figure 8: Insured new issue municipal debt has decreased since 2007
Insured debt as a percent of total new issuance



Source: The Bond Buyer, Thomson Reuters, January 2007 to December 2018

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Why Invesco?

These features include:

Hands-on team approach	Finding exceptional investment opportunities requires exceptional research. To that end, the Municipal Fixed Income team performs its own hands-on credit analysis, reviewing and rating each and every credit owned.
Specialists	At Invesco, our Municipal Fixed Income team of dedicated municipal bond professionals have more than 20 years of industry experience.
Market leaders	As of June 30, 2019, the Municipal Fixed Income team manages $55.4 billion on behalf of our clients and is ranked among the top 10 municipal bond managers by assets.[6]
Active investing	Our investment experts make informed decisions by combining experience-based knowledge with market trends to discover and exploit relative value opportunities.

About risk

Fixed income investments are subject to credit risk of the issuer and the effects of changing interest rates. Interest rate risk refers to the risk that bond prices generally fall as interest rates rise and vice versa. An issuer may be unable to meet interest and/or principal payments, thereby causing its instruments to decrease in value and lowering the issuer's credit rating. Junk bonds involve a greater risk of default or price changes due to changes in the issuer's credit quality. The values of junk bonds fluctuate more than those of high quality bonds and can decline significantly over short time periods.

Municipal securities are subject to the risk that legislative or economic conditions could affect an issuer's ability to make payments of principal and/or interest.

Treasury securities are backed by the full faith and credit of the US government as to the timely payment of principal and interest.

Income may be subject to state and local taxes and to the alternative minimum tax (AMT).

An investment in emerging market countries carries greater risks compared to more developed economies.

Smaller companies offer the potential to grow quickly, but can be more volatile than larger-company stocks, particularly over the short-term.

Returns of large capitalization companies could trail the returns of smaller companies.

Corporate bonds may offer a higher yield than government bonds, but are often considered riskier because they're not issued by the government. The interest of these bonds is taxable.

1 Source: Federal Reserve, as July 31, 2019.
2 An ad valorem tax is based on the assessed value of real estate or personal property.
3 Source: Federal Reserve, as of June 6, 2019 (latest available data)
4 Source Sifma, Municipal Bond Credit Report, Fourth Quarter 2018 (latest available data)
5 Moody's Investors Service. US Municipal Bond Defaults and Recoveries, 1970-2018 (latest available data)
6 Strategic Insight Simfund/MF Desktop, based on assets under management as of June 30, 2019.

This does not constitute a recommendation of any investment strategy or product for a particular investor. Investors should consult a financial professional before making any investment decisions.

Diversification does not guarantee a profit or eliminate the risk of loss.

The opinions expressed are those of the portfolio managers, are based on current market conditions and are subject to change without notice. There is no guarantee the outlooks mentioned will come to pass. These opinions may differ from those of other Invesco investment professionals.

Bloomberg Barclays Global Aggregate Credit Index measures the global investment grade local currency, corporate, and government-related bond markets. This multi-currency benchmark includes fixed-rate bonds from both developed and emerging markets issues. **Bloomberg Barclays Municipal High Yield Bond Index** is an unmanaged index considered representative of non-investment grade bonds. **Bloomberg Barclays Municipal Bond Index** is an unmanaged index considered representative of the tax-exempt bond market. **Bloomberg Barclays Municipal Index Taxable Bonds** is a rules-based market-value-weighted index engineered for the long-term taxable bond market. **Bloomberg Barclays U.S. Aggregate Bond Index** in an unmanaged index considered representative of the US investment grade, fixed-rate bond market. **Bloomberg Barclays U.S. Corporate High Yield Index** is an unmanaged index considered representative of fixed-rate, non-investment grade debt. **Bloomberg Barclays U.S. Corporate Index** is an unmanaged index considered representative of publicly issued, fixed-rate, nonconvertible, investment grade debt securities. **Bloomberg Barclays U.S. Government Index** is an index that measures the performance of all public US government obligations with remaining maturities of one year or more. **MSCI EAFE Index** is an unmanaged index considered representative of stocks of Europe, Australasia and the Far East. The index is computed using the net return, which withholds applicable taxes for non-resident investors. **MSCI Emerging Markets Index** is an unmanaged index considered representative of stocks of developing countries. The index is computed using the net return, which withholds applicable taxes for non-resident investors. **Russell 2000 Index** is an unmanaged index considered representative of small-cap stocks. The Russell 2000 Index is a trademark/service mark of the Frank Russell Co. Russell® is a trademark of the Frank Russell Co. **S&P 500 Index** is an unmanaged index considered representative of the US stock market. Past performance is no guarantee of future results. An investment cannot be made directly in an index.

Correlation indicates the degree to which two investments have historically moved in the same direction and magnitude. **Duration** is a measure of the sensitivity of the price (the value of principal) of a fixed income investment to a change in interest rates. Duration is expressed as a number of years. Rising interest rates mean falling bond prices, while declining interest rates mean rising bond prices.

Past performance is no guarantee of future results.

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