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Roads, schools, and hospitals: A brief tour of the municipal bond market

- Municipal bonds (or "munis") are debt instruments offered by state and local governments that help fund projects that provide public benefits, such as infrastructure and schools. The municipal bond market in the U.S. is highly diverse, with over 1 million securities outstanding.
- Tax-exempt interest is a key feature of muni bonds. In the U.S., muni bonds tend to provide some of the highest after-tax risk-adjusted returns relative to other types of bonds. The value of this tax yield advantage tends to be significant for many investors.
- Muni bonds present interest rate risk and credit risk. Navigating interest rate risk can be nuanced due to features unique to munis. Analyzing credit risk, which is a multidisciplinary exercise involving finance, economics, federal and local politics, demographics, geography, and law, is also key to understanding muni bonds.

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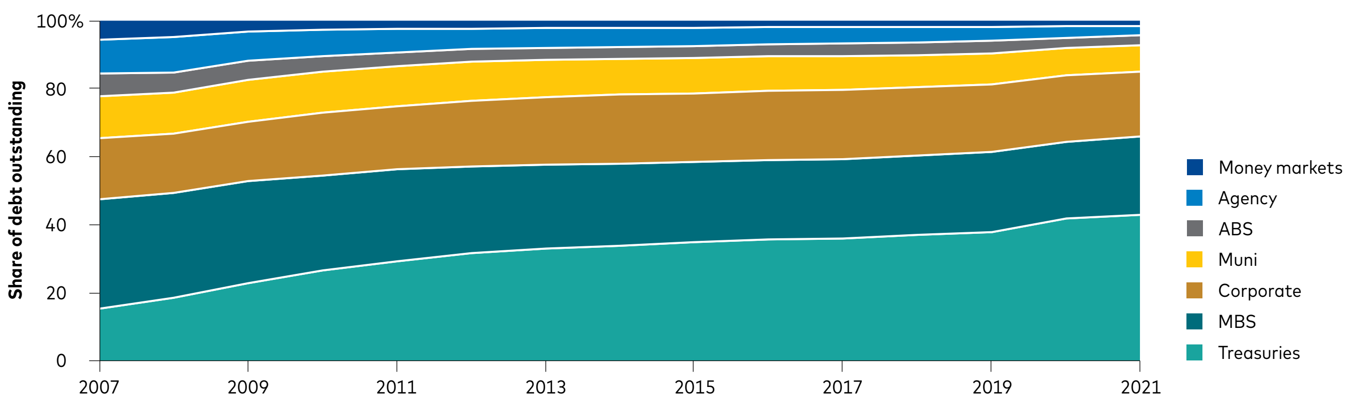
Introduction

The muni market has played a crucial role in financing America's public infrastructure for over two centuries. Since 1812, when the City of New York issued the first general obligation bond to build a canal, muni bonds have helped make possible free public education, U.S. westward expansion, and famous projects like the Golden Gate Bridge. Today, more than two-thirds of all U.S. infrastructure projects are financed in the muni market. At approximately $4 trillion, the asset class is the fourth-largest component of the broader U.S. fixed income market (see **Figure 1**).

Muni bonds are debt securities issued by state and local governments and related authorities as well as U.S. territories—collectively referred to as "municipalities." Municipalities issue debt for a variety of reasons, and the proceeds are used for public benefits, such as infrastructure, education, or health care. Municipalities primarily issue two kinds of bonds: general obligation (GO) bonds, which are paid from a municipality's general revenues,[1] and revenue bonds, which are paid from the revenues generated by the project the bonds financed or entities such as water or electric utilities.

FIGURE 1

Relative size of fixed income markets



Note: Agency refers to federal agency securities, ABS refers to asset-backed securities, and MBS refers to mortgage-backed securities.
Source: The Securities Industry and Financial Markets Association, as of December 31, 2021.

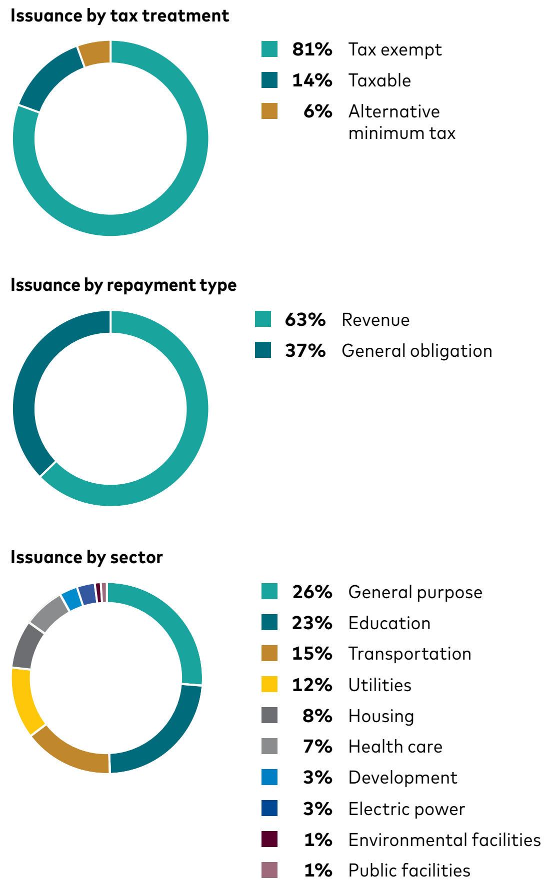
1 The issuer of general obligation bonds often pledges its "full faith and credit"—that is, all of its available resources—to pay the bonds. If the issuer does not pay, investors can seek a *writ of mandamus* to compel the issuer to raise taxes to repay the bonds. The issuer may also pledge specific *ad valorem* property taxes.

Entities that are not municipalities can access the municipal bond market through private activity bonds if they meet certain criteria under the Internal Revenue Code.[2] Nonprofit hospitals, for example, are a large and important part of the municipal bond market; approximately 2,900 such hospitals issue debt through the muni market.[3] Private activity bond issuers also include entities that fund qualified mortgage bonds for veterans or low- and moderate-income first-time homebuyers and those that provide capital for nonprofit charter schools and continuing care communities. **Figure 2** highlights the broad range of sectors in the municipal market.

There are over 90,000 local government units recognized by the Census Bureau, about one-third of which actively come to market to sell muni bonds. The result is a diverse market with over 1 million securities outstanding—three times the number in the corporate bond market. Most of the time bonds are issued for local projects, resulting in a skew toward small-scale issuance (see **Figure 3**).

FIGURE 2

Municipal bond issuance in 2022



Note: Percentages may not total 100% due to rounding.
Source: The Bond Buyer, as of December 31, 2022.

FIGURE 3

Number of muni bonds outstanding by issuance size

Sources: Vanguard calculations based on Bloomberg data, as of April 17, 2023.

2 Generally, private activity bonds are issued by municipalities on behalf of private entities where the activity or project, such as a nonprofit hospital or small college or university, provides a public benefit. For additional details, see IRS Publication 4078.

3 Source: The American Hospital Association, as of January 2024.

Tax-exempt income

For investors, the central feature of muni bonds is their advantageous tax treatment. While the Sixteenth Amendment to the U.S. Constitution permitted Congress to impose a federal income tax, it explicitly included an exemption for income from muni bonds—the so-called "gift of Congress." This was done to lower municipal borrowing expenses and encourage investment in public infrastructure.[4]

To do a like-for-like comparison of municipal yields to those of other fixed income assets, investors may calculate the tax-equivalent yield (TEY), which shows the yield needed on an otherwise identical taxable bond to obtain the same after-tax return as a muni bond. The TEY is computed as follows:

$$\textit{Tax-equivalent yield} = \frac{\textit{Municipal bond yield}}{\textit{1 – marginal tax rate}}$$

Figure 4 illustrates how TEYs vary depending on an investor's tax bracket. For any given yield, investors in higher tax brackets require a greater yield on taxable securities to meet or exceed the benefit of the tax exemption.

For instance, when a tax-exempt yield is 1%, the maximum additional after-tax yield earned thanks to the tax exemption is 69 basis points (bps). (A basis point is one-hundredth of a percentage point.) When a tax-exempt yield is 4%, the maximum additional after-tax yield earned is 276 bps. This is important in today's era of higher interest rates, where the value of the tax exemption is generally higher.

In many states, muni bond interest is also exempt from state (and often local) income taxes for resident investors. For instance, TEYs on bonds issued by the State of California are higher for California residents, incentivizing muni investors to "buy local."

FIGURE 4

Tax-equivalent yields rise with applicable marginal tax rate

		Federal marginal income tax rate				
		24%	**32%**	**35.8%**	**38.8%**	**40.8%**
Municipal bond yield	**1%**	1.32%	1.47%	1.56%	1.63%	1.69%
	2%	2.63%	2.94%	3.12%	3.27%	3.38%
	3%	3.95%	4.41%	4.67%	4.90%	5.07%
	4%	5.26%	5.88%	6.23%	6.54%	6.76%

Notes: Based on 2023 federal income tax brackets. The three rightmost columns include the 3.8% net investment income tax (NIIT), also known as the Medicare surtax, to fund Medicare expansion. All calculations exclude state and local income taxes.

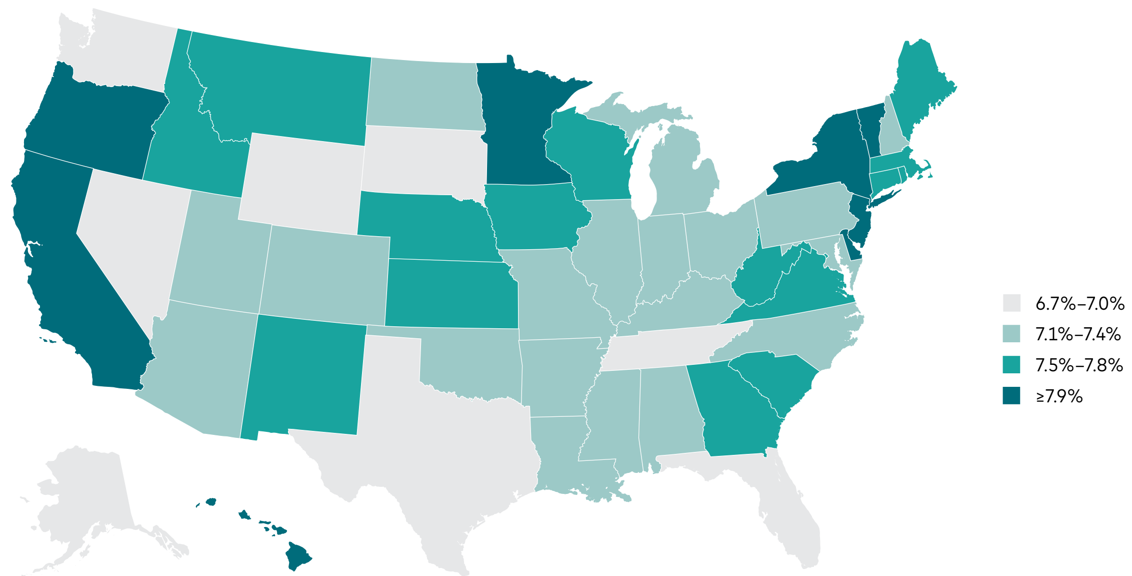
Source: Vanguard, as of April 17, 2023.

4 Investors in municipal bonds are still subject to capital gains taxes and, in certain circumstances, the alternative minimum tax (AMT).

Even if out-of-state bonds are not as attractive as in-state bonds, they still offer important diversification benefits in the context of an investor's overall portfolio. For illustrative purposes, **Figure 5** shows TEYs across the U.S. for in-state residents in the highest tax bracket.

FIGURE 5

Tax-equivalent yields on in-state municipal bonds yielding 4%



	Tax-equivalent yield		Tax-equivalent yield		Tax-equivalent yield
Alabama	7.4%	**Kentucky**	7.3%	**North Dakota**	7.1%
Alaska	6.8%	**Louisiana**	7.3%	**Ohio**	7.2%
Arizona	7.1%	**Maine**	7.7%	**Oklahoma**	7.3%
Arkansas	7.4%	**Massachusetts**	7.5%	**Oregon**	8.1%
California	8.7%	**Maryland**	7.4%	**Pennsylvania**	7.1%
Colorado	7.3%	**Michigan**	7.3%	**Rhode Island**	7.5%
Connecticut	7.7%	**Minnesota**	8.1%	**South Carolina**	7.6%
Delaware	8.1%	**Mississippi**	7.4%	**South Dakota**	6.8%
Dist. Of Columbia	7.6%	**Missouri**	7.4%	**Tennessee**	6.8%
Florida	6.8%	**Montana**	7.6%	**Texas**	6.8%
Georgia	7.5%	**Nebraska**	7.6%	**Utah**	7.4%
Hawaii	8.3%	**Nevada**	6.8%	**Vermont**	7.9%
Idaho	7.5%	**New Hampshire**	7.4%	**Virginia**	7.5%
Illinois	7.4%	**New Jersey**	8.3%	**Washington**	6.8%
Indiana	7.1%	**New Mexico**	7.5%	**West Virginia**	7.6%
Iowa	7.5%	**New York**	8.3%	**Wisconsin**	7.8%
Kansas	7.5%	**North Carolina**	7.3%	**Wyoming**	6.8%

Note: Calculations exclude local income taxes.

Sources: Vanguard calculations based on Bloomberg data, as of December 31, 2023.

Due to the tax benefits for investors who invest in their home state's bonds, almost half of all municipal debt is directly owned by households, creating a largely retail market (see **Figure 6**). Prior to tax reform in 1986, banks were large buyers of muni bonds, but new rules limiting the interest deduction made munis far less attractive for institutional buyers.

Around the same time, households increasingly began to hold bonds indirectly through mutual funds, money market funds, and, more recently, exchange-traded funds (ETFs).[5] These investment vehicles made munis more accessible, as many mutual funds and ETFs have low minimum investment requirements. Despite the growth of these investment types, retail investors who hold munis directly continue to be the largest investor category by far.

Investment risks

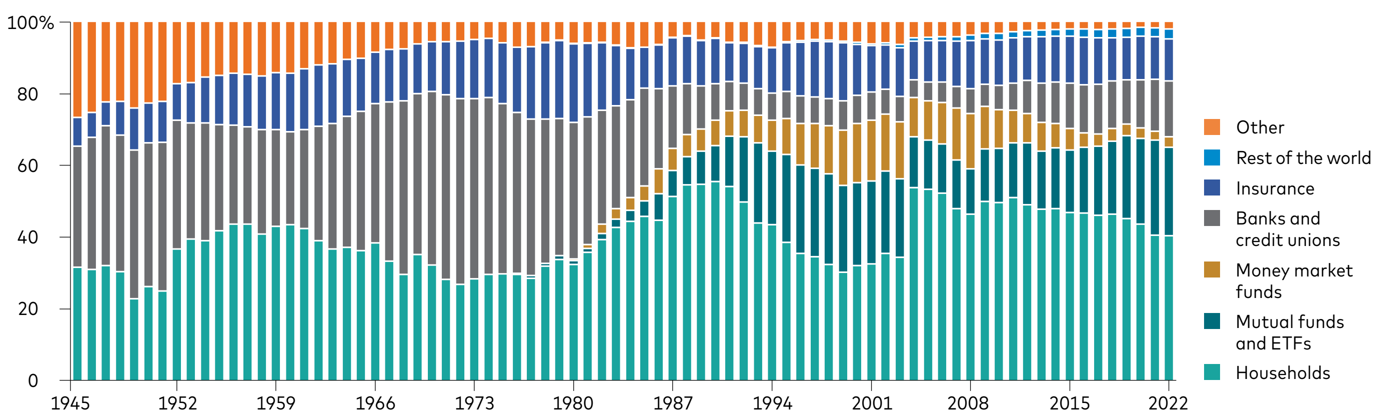
The primary drivers of risk in the municipal market are credit risk and interest rate risk. While these risks are not exclusive to muni bonds, there are some unique aspects worth noting.

Credit risk

Muni bonds are generally regarded as high quality—in other words, their risk of default is very low. Even so, munis' credit profile has evolved significantly since the 2008 global financial crisis (GFC). Prior to the GFC, specialized insurance companies guaranteed the majority of bond issuance, conferring their AAA ratings to bonds and commoditizing much of the market. When heavy losses during the GFC led to credit downgrades (and in some cases even receiverships) for insurance providers, the need for careful, bond-by-bond analysis returned.

FIGURE 6

Muni bond ownership by market capitalization



Source: The Federal Reserve, as of March 7, 2023.

5 These investment types include state-specific funds that enable in-state residents to reduce their state tax bills.

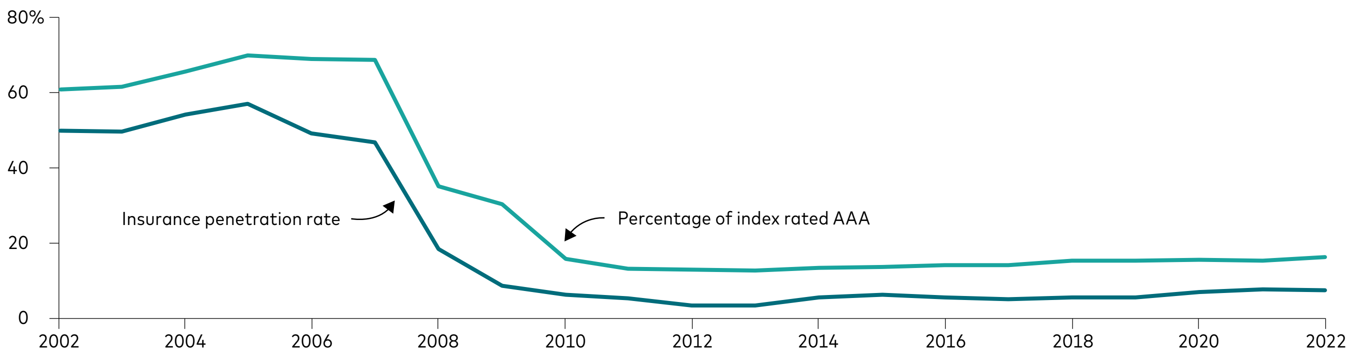
Figure 7 shows the drop in AAA-rated bonds since the GFC, which has increased the dispersion in ratings and further elevated the role of credit research when investing in munis.

Fortunately for investors, municipalities have a strong track record of paying back their debt in a timely manner. Moody's identified just 115 instances of default in its rated universe from 1970 through 2020, with zero defaults from AAA-rated issuers and only 30 defaults on GO bonds. Overall, municipalities recorded a 10-year cumulative default rate of 0.15%, compared with 10.5% for corporate bond issuers.[6]

Much of this gap is due to differences in ratings distribution. Compared to corporate bonds, a much greater share of muni bonds are investment grade, meaning they are rated Baa3 by Moody's (or BBB– by S&P) or higher (see **Figure 8**).

FIGURE 7

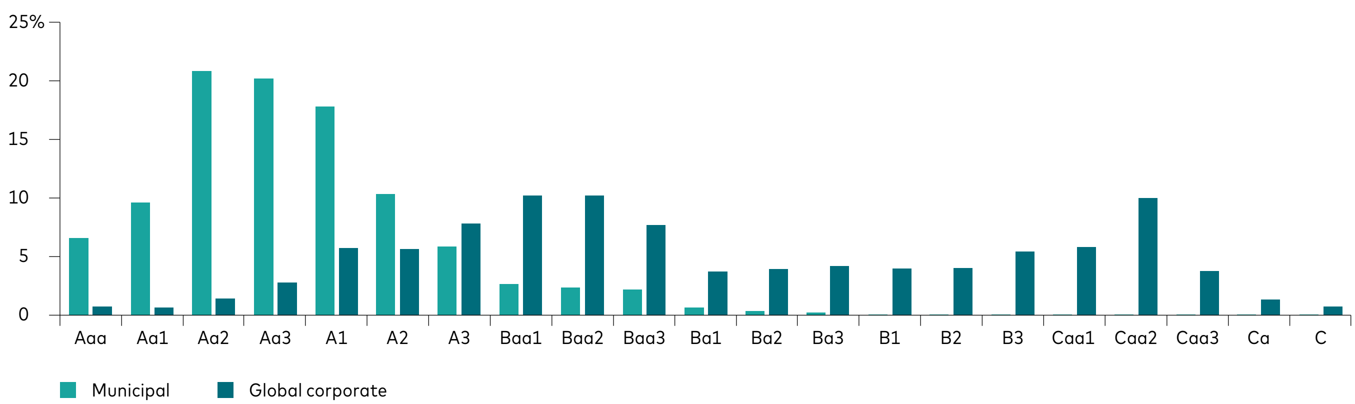
Muni bond insurance and the AAA-rated portion of the Bloomberg U.S. Municipal Index



Note: The insurance penetration rate is the ratio of insured debt to total market size.
Sources: The Bond Buyer and Vanguard calculations based on Bloomberg data, as of December 31, 2022.

FIGURE 8

Moody's ratings distributions for municipal and global corporate issuers at year-end 2020



Source: Moody's Investors Service, U.S. Municipal Bond Defaults and Recoveries, 1970–2020.

6 Source: Moody's Investors Service, U.S. Municipal Bond Defaults and Recoveries, 1970–2020.

While municipal bonds are generally high quality, pockets of elevated credit risk do exist in the muni market. Some instances of distress and even default have made headlines, though these have tended to be outliers. High-profile muni bankruptcies include Orange County, California, in 1994, the City of Detroit, Michigan, in 2013, and the muni market's largest bankruptcy to date, the Commonwealth of Puerto Rico in 2017.

These defaults do not happen overnight. Muni defaults typically occur after decades of mismanagement, overborrowing, or political corruption. When a muni default does occur, the impact tends to be contained within the distressed entity itself; at worst, it affects a few related entities. Even if a municipality goes bankrupt, recoveries for muni bondholders in these situations tend to be quite high. Orange County, Detroit, and Puerto Rico have all since returned to the muni market after restructuring their debt and were able to borrow again, indicating that the bankruptcy process worked as intended.

Municipal credit analysis: Considerations vary by issuance sector and type

In a market as diverse as muni bonds, investors must do their due diligence. Munis exist at the intersection of finance, politics, economics, geography, and law. Given these drivers and the range of issuer types, a team of analysts must possess deep expertise and broad experience.

One of the most straightforward types of borrowers is K–12 public school districts, of which there are more than 13,000 in the U.S.[7] Bonds issued by school districts are typically backed by property taxes. This means that the most important credit factors to a school district bond are the size and strength of the tax base in the district. If a bond is issued and the district's population or property values decline, the credit quality of the bond could deteriorate.

Hospital bonds can be more complex. Most are backed by the hospital's revenues, while some smaller or lower-rated hospitals are also secured by a mortgage on the facility itself. The largest revenue source for most hospitals is the federal government, through Medicare and Medicaid. For many hospitals, particularly smaller ones that are their community's sole health care provider, this leaves few ways to increase their revenues if they come under cost pressure.

This will lead experienced analysts to focus on factors beyond financial statements, such as possible new entrants into the market or the essentiality of the hospital. Further, if the hospital were to struggle, would the state step in and help, or could it merge with another hospital?

These varied considerations make investing in munis challenging, but excellent credit analysis can help investors avoid choosing bonds that underperform.

7 Source: National Center for Education Statistics, as of the 2022–2023 school year.

Interest rate risk

Most municipal bonds have a fixed coupon with a maturity of 10 to 30 years, so investors bear the risk of interest rates rising following their purchase, which causes the value of the coupon payments to decline. The most common way that investors measure interest rate risk is through duration, which measures the sensitivity of a bond's price to a change in interest rates.

A duration of 7, for instance, means that for a 100 bps change in interest rates, the price of the bond will change by approximately 7%. However, this calculation is more challenging in the municipal market because most bonds have embedded call options, giving the issuer the flexibility to redeem the bond ahead of its final maturity. This makes the interest rate risk less straightforward by giving muni bonds negative convexity.[8]

Performance

Muni bond investors are generally compensated for interest rate risk and credit risk. Even before considering taxes, muni bonds offer long-term returns comparable to other fixed income asset classes. **Figure 9** shows that, once taxes are considered and all else being equal, muni bonds are on average among the highest-grossing fixed income asset types.

FIGURE 9

Annualized returns across fixed income and equity asset classes, 2002–2022

	Time horizon	
	10 years	**20 years**
Munis	2.1%	3.6%
Muni high yield	3.5%	5.0%
MBS	0.7%	2.9%
ABS	1.2%	2.6%
Treasuries	0.6%	2.7%
Corporates	2.0%	4.1%
Corporate high yield	4.0%	7.3%
Aggregate	1.1%	3.1%
U.S. equities	12.6%	9.8%
Emerging markets	1.8%	9.1%
Tax-equivalent yield: Munis	**3.6%**	**6.1%**
Tax-equivalent yield: Muni high yield	**5.9%**	**8.5%**

Note: Indexes from top to bottom are the Bloomberg U.S. Municipal Index; the Bloomberg Municipal High Yield Bond Index; the Bloomberg U.S. Mortgage-Backed Securities Index; the Bloomberg U.S. Asset Backed Securities Index; the Bloomberg U.S. Treasury Index; the Bloomberg U.S. Corporate Index; the Bloomberg U.S. Corporate High Yield Index; the Bloomberg U.S. Aggregate Index; the Standard & Poor's 500 Index; and the MSCI Emerging Markets Index.

Sources: Vanguard calculations based on Bloomberg data from December 31, 2002, through December 31, 2022.

Past performance is no guarantee of future returns. The performance of an index is not an exact representation of any particular investment, as you cannot invest directly in an index.

8 With negative convexity, the duration of a bond lengthens as interest rates rise, amplifying losses, and shortens as interest rates fall, muting gains. Our recent paper (Brenninkmeijer et al., 2023) explores the importance of negative convexity in managing interest rate risk in the muni market.

In addition to their advantageous tax treatment and competitive historical performance, munis may be attractive to investors for another reason: The low correlation of muni returns to those of other asset classes—including stocks and bonds—can offer substantial diversification benefits to a portfolio (see **Figure 10**).

FIGURE 10

10-year return correlations across fixed income and equity asset classes, 2012–2022

	10-year correlation matrix									
	Munis	Muni high yield	MBS	ABS	Treasuries	Corporates	Corporate high yield	Aggregate	U.S. equities	Emerging markets
Munis	**1.00**	0.88	0.77	0.77	0.69	0.79	0.49	0.83	0.26	0.35
Muni high yield		**1.00**	0.60	0.71	0.49	0.74	0.57	0.68	0.33	0.43
MBS			**1.00**	0.67	0.83	0.72	0.34	0.91	0.23	0.28
ABS				**1.00**	0.65	0.81	0.48	0.80	0.18	0.33
Treasuries					**1.00**	0.67	0.09	0.92	–0.03	0.05
Corporates						**1.00**	0.71	0.89	0.51	0.55
Corporate high yield							**1.00**	0.43	0.79	0.70
Aggregate								**1.00**	0.26	0.33
U.S. equities									**1.00**	0.67
Emerging markets										**1.00**

Notes: Indexes from left to right are the Bloomberg U.S. Municipal Index; the Bloomberg Municipal High Yield Bond Index; the Bloomberg U.S. Mortgage-Backed Securities Index; the Bloomberg U.S. Asset Backed Securities Index; the Bloomberg U.S. Treasury Index; the Bloomberg U.S. Corporate Index; the Bloomberg U.S. Corporate High Yield Index; the Bloomberg U.S. Aggregate Index; the Standard & Poor's 500 Index; and the MSCI Emerging Markets Index.

Sources: Vanguard calculations based on Bloomberg data from December 31, 2012, through December 31, 2022.

Past performance is no guarantee of future returns. The performance of an index is not an exact representation of any particular investment, as you cannot invest directly in an index.

Passive investors who wish to replicate munis' performance may decide to track a high-level index, such as the Bloomberg U.S. Municipal Index. (See the accompanying box below.) While full benchmark replication can be a challenge for the muni market given its diversity, size, and retail orientation, index fund providers have developed sampling techniques to closely track indexes while keeping fees to a minimum. ETFs, meanwhile, are the fastest-growing segment of the market.

Investors who are comfortable with taking active risk may benefit from the additional levers available to actively managed muni funds, including professional credit research, liquidity management, tax analysis and tax-loss harvesting, and the flexibility to deviate from indexes in search of value.

Methodology for inclusion in the Bloomberg U.S. Municipal Index

The Bloomberg U.S. Municipal Index is one of the most widely used indexes to track the performance of municipal bonds. The index covers the investment-grade tax-exempt market, and includes GO bonds, revenue bonds, refunded bonds, insured bonds, and zero-coupon bonds.

To be considered for the index, muni bonds must be rated Baa3 by Moody's, BBB– by S&P, BBB– by Fitch, or higher. In addition, they must have at least one year until final maturity and meet various other size, liquidity, and maturity constraints.

Notable exclusions to the Bloomberg U.S. Municipal Index include the smaller sub-investment-grade universe (which is tracked separately by the Bloomberg Municipal High Yield Index), floating-rate bonds, and taxable muni bonds.

Conclusion

The municipal bond market is a diverse one, with over 1 million securities totaling $4 trillion in bonds outstanding. Not only is this market essential to the cost-effective funding of U.S. public infrastructure, but it is also a source of attractive investment opportunities.

Tax-exempt interest is a key feature of muni bonds. The value of the tax yield advantage offered by muni bonds can be very attractive, particularly to high-tax-bracket investors who reside in the state where the bonds are issued. The appeal of munis extends beyond just potential tax advantages—munis may offer attractive yields with low rates of default, which historically has resulted in strong long-term performance, both before and after tax. In addition, investors may value the ability to invest in projects that benefit their town, local school, or state.

Munis do present pockets of risk, however, so robust credit analysis is key when selecting the right bonds for a portfolio. Going forward, investors in muni bonds are increasingly likely to benefit from professional management as they navigate uncertainty in interest rates, credit cycles, and financial markets.

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Bond funds are subject to interest rate risk, which is the chance bond prices overall will decline because of rising interest rates, and credit risk, which is the chance a bond issuer will fail to pay interest and principal in a timely manner or that negative perceptions of the issuer's ability to make such payments will cause the price of that bond to decline.

Although the income from a municipal bond fund is exempt from federal tax, you may owe taxes on any capital gains realized through the fund's trading or through your own redemption of shares. For some investors, a portion of the fund's income may be subject to state and local taxes, as well as to the federal Alternative Minimum Tax.

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