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# Yield and Taxes: A Look at Municipal Bond Investing

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## KEY TAKEAWAYS

- ▶ Taxable-equivalent yield and break-even tax rate could help investors compare municipal bonds against Treasury and corporate bonds.
- ▶ Municipal bonds' tax benefit over Treasury and corporate bonds is dependent on the tax rate assumption.
- ▶ Dynamically allocating between municipal and corporate bonds could improve after-tax returns for investors.

The coupons on municipal bonds (“munis”) are exempt from federal income tax, while the coupons on Treasury and corporate bonds are not.<sup>1</sup> In rational capital markets, this may or may not lead to a better after-tax return for investors in municipal bonds. Demand from tax-sensitive investors will push the prices of municipal bonds up and their yields down. However, since different investors are subject to different marginal and effective tax rates, they are likely to demand different yields for municipal bonds. As a result, the after-tax yield on otherwise identical corporate and municipal bonds might or might not end up the same. Moreover, a one-size-fits-all asset allocation approach between munis and taxable bonds might not offer all investors the highest after-tax expected return. In this article, we show that incorporating investors’ tax rates in the comparison of yields can improve expected after-tax returns.

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## Taxable-Equivalent Yield

To directly compare the tax-exempt muni yields against taxable bond yields, we need to calculate munis’ taxable-equivalent yield, defined as the following:<sup>2</sup>

$$\text{Taxable-Equivalent Yield} = \frac{\text{Municipal Bond Yield}}{(1 - \text{Income Tax Rate})}$$

The calculation of the taxable-equivalent yield is dependent on an investor’s income tax rate. Exhibit 1 shows the taxable-equivalent yield on municipal bonds compared to the yield on Treasury and corporate bonds with similar duration characteristics, assuming the highest federal and state income tax rates. Note that as Treasuries are exempt from state income taxes, we also calculate taxable-equivalent yield for Treasuries using historical federal and state income tax rates.

We see that the taxable-equivalent yield on munis has been generally higher than that of Treasuries and corporates with similar duration risk.<sup>3</sup> Furthermore, to control the credit quality, we compare municipal bonds’ taxable-equivalent yields to Treasuries and corporate bonds with similar credit ratings. With the highest tax rate assumption, we still find municipal bond yields to be relatively higher on average across rating groups, as shown in the summary statistics table in Exhibit 1.

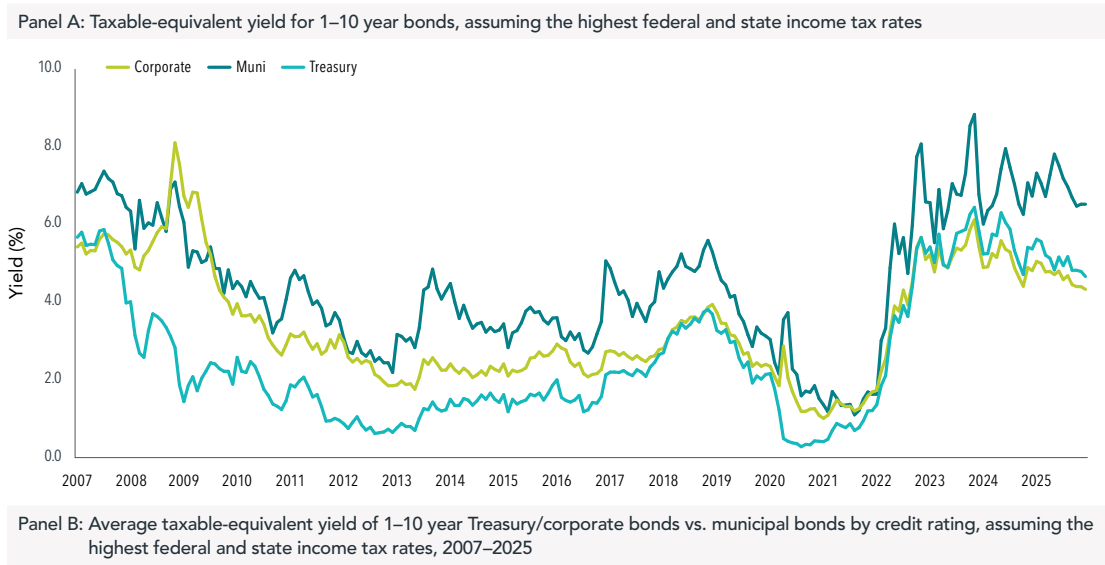
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1. In many states, coupons of municipal bonds could be exempt from state income tax. Our taxable-equivalent yield analysis incorporates state income tax in addition to federal income tax.

2. Bloomberg Municipal Index returns data shows coupon income return comprises on average 96% of index total return from 1980 to 2023; therefore, we focus primarily on income tax instead of capital gains tax in adjusting a municipal bond’s yield.

3. For simplicity, we do not consider the differences in liquidity between different types of bonds. In general, municipal and corporate bonds are less liquid than US Treasury bonds.

**EXHIBIT 1: Taxable-Equivalent Yield: Municipal vs. Treasury and Corporate Bonds, Highest Tax Rates**



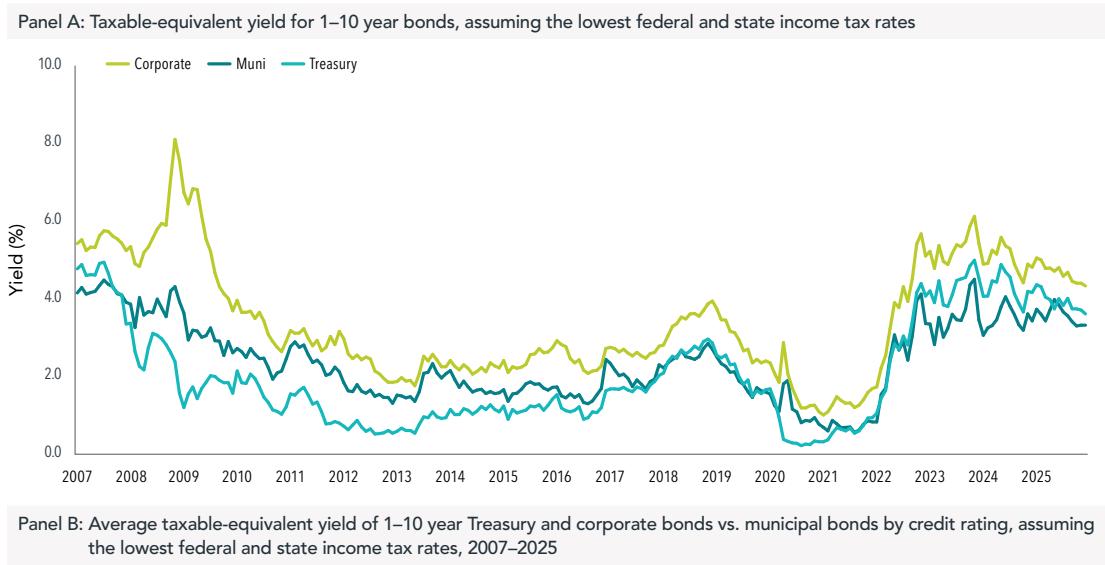
Past performance is not a guarantee of future results. Indices are not available for direct investment; therefore, their performance does not reflect the expenses associated with the management of an actual portfolio.

Source: Treasury and corporate bond yields are based on the Bloomberg US Treasury and Credit Index data. Municipal bond yields are based on tax-exempt municipal bonds in the Bloomberg US Municipal Bond Index universe, excluding sinkable and puttable bonds. Taxable-equivalent yield for munis = muni yield / (1 - federal and state income tax rate). Taxable-equivalent yield for Treasuries = Treasury yield \* (1 - federal income tax rate) / (1 - federal and state income tax rate). We use the highest marginal federal and state income tax rates each year to calculate the muni and Treasury taxable-equivalent yields. Historically, the highest federal income tax rates are: 2007–2012, 35.0%; 2013–2017, 43.4%; 2018–2025, 40.8%. The highest state income tax rates historically are: 2007–2008, 10.3% (California); 2009–2012, 11.0% (Hawaii); 2013–2025, 13.3% (California).

While munis have on average higher taxable-equivalent yields compared to Treasury and corporate bonds, the difference in taxable-equivalent yields varies over time, based on the market environment. The tax rate assumption is important in the comparison of munis to Treasuries and corporates. **Exhibit 2** shows that when we assume the lowest federal and state income tax rates, muni taxable-equivalent yields have been lower than corporate bond yields on average and similar to Treasury yields in recent years.<sup>4</sup> Controlling for credit rating, the taxable-equivalent yields on AAA rated munis are similar to Treasury yields. In addition, under the same income tax assumption, munis have generally lower taxable-equivalent yields than corporates, for the same credit quality group.

4. As there are several US states with no income tax (such as Texas), we assume 0% for the lowest state income tax rate.

**EXHIBIT 2: Taxable-Equivalent Yield: Municipal vs. Treasury and Corporate Bonds, Lowest Tax Rates**



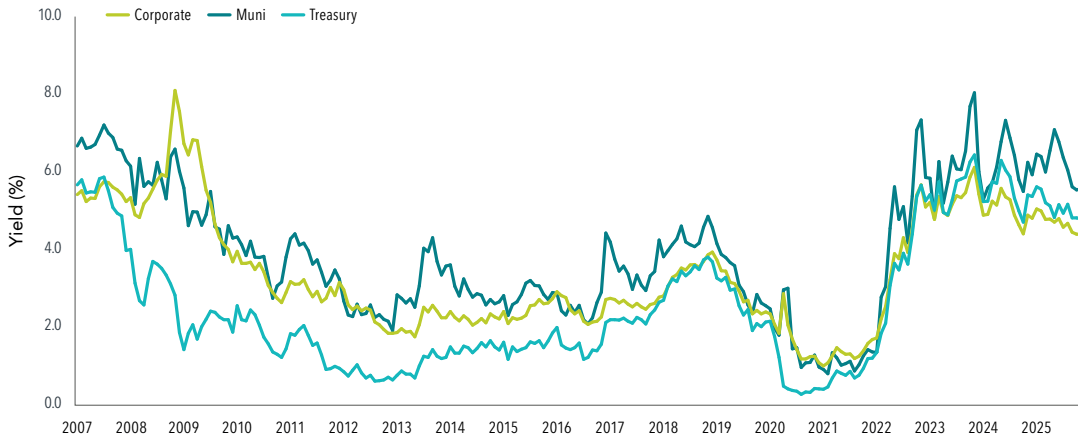
Past performance is not a guarantee of future results. Indices are not available for direct investment; therefore, their performance does not reflect the expenses associated with the management of an actual portfolio.

Source: Treasury and Corporate bond yields are based on Bloomberg US Treasury and Credit Index data. Municipal bond yields are based on tax-exempt municipal bonds in the Bloomberg US Municipal Bond Index universe, excluding sinkable and puttable bonds. Taxable-equivalent yield for munis = muni yield / (1 - federal and state income tax rate). Taxable-equivalent yield for Treasuries = Treasury yield \* (1 - federal income tax rate) / (1 - federal and state income tax rate). We use the lowest marginal federal and state income tax rates each year to calculate the muni and Treasury taxable-equivalent yields. Historically, the lowest federal income tax rate is 10.0%, 2007–2025. The lowest state income tax rate historically is 0%, 2007–2025.

As the interest on municipal bonds is generally exempt from state income taxes only if the issuer is from an investor’s home state, the taxable-equivalent yield of municipal bonds can be overstated for investors holding a national municipal bond portfolio and living in a state with state income tax. Hence in **Exhibit 3**, we compare the taxable-equivalent yield of a California-only municipal bond portfolio against Treasury and corporate bonds using the tax rates faced by California residents. This provides a more accurate comparison for California-based investors. **Exhibit 4** repeats this analysis for investors based in New York. Similar to our findings using national munis, the taxable-equivalent yield comparison between munis and taxable bonds is dependent on the tax rate assumption and varies over time based on the market environment. Most recently, taxable-equivalent yields of California and New York munis have exceeded those of corporate bonds for investors in the highest tax bracket.

**EXHIBIT 3: Taxable-Equivalent Yield: California Municipal Bonds vs. Treasury and Corporate Bonds, 2007-2025**

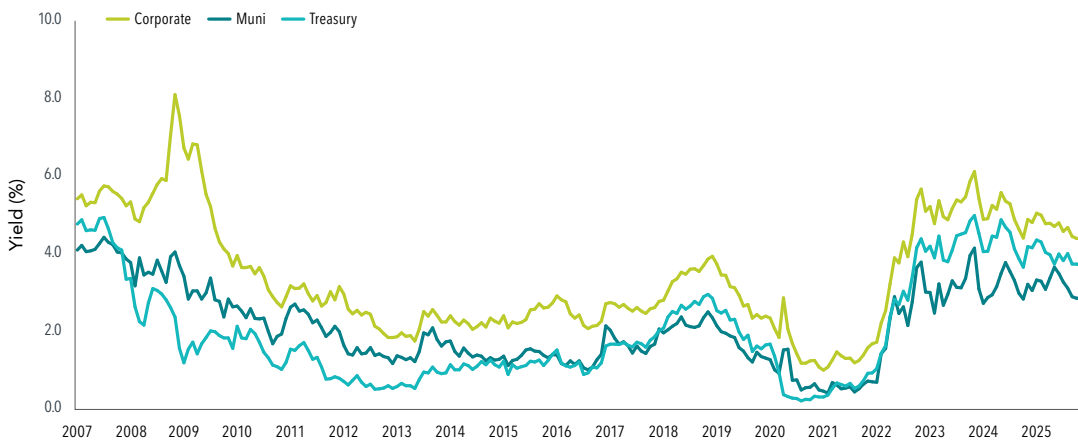
**Panel A: Taxable-equivalent yield for 1–10 year bonds, assuming the highest federal and California state income tax rates**



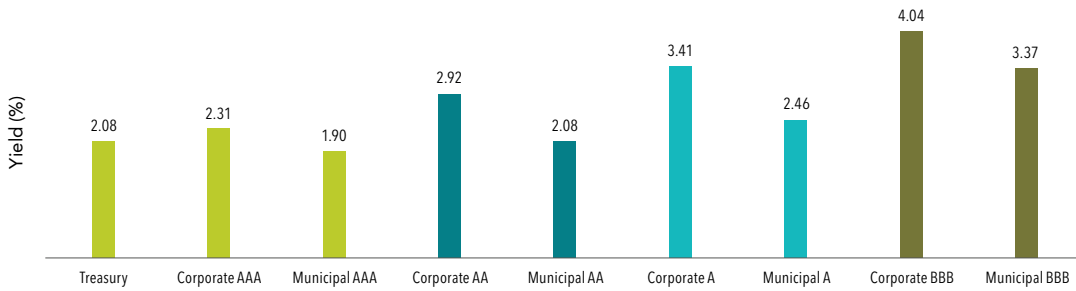
**Panel B: Average taxable-equivalent yield of 1–10 year Treasury/corporate bonds vs. California municipal bonds by credit rating, assuming the highest federal and California state income tax rates, 2007–2025**



**Panel C: Taxable-equivalent yield for 1–10 year bonds, assuming the lowest federal and California state income tax rates**



Panel D: Average taxable-equivalent yield of 1–10 year Treasury/corporate bonds vs. California municipal bonds by credit rating, assuming the lowest federal and California state income tax rates, 2007–2025

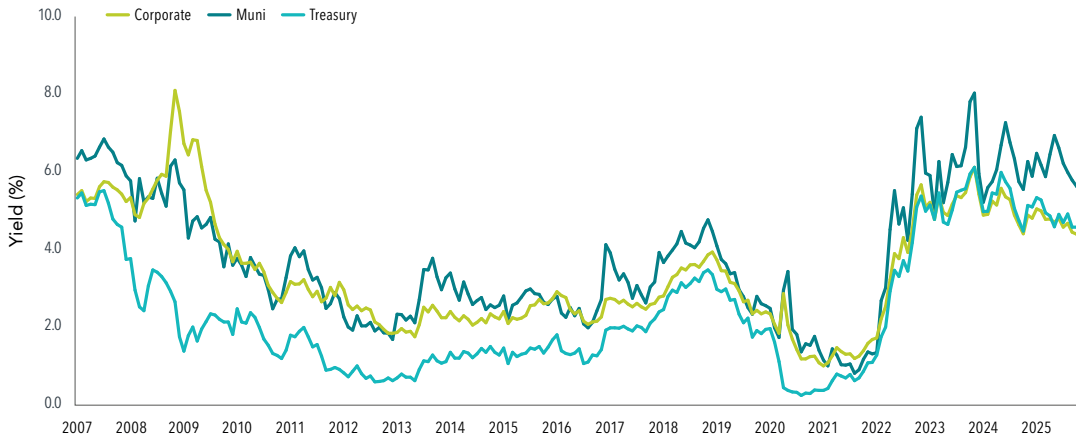


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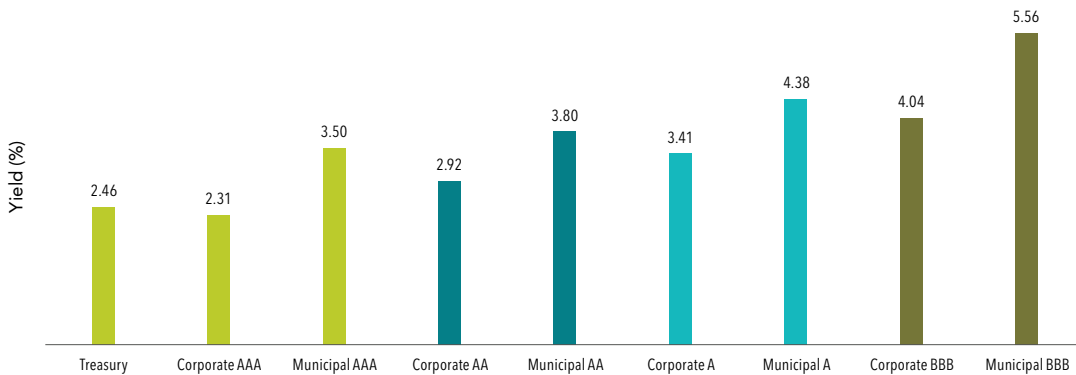
Source: Treasury and corporate bond yields are based on the Bloomberg US Treasury and Credit Index data. Municipal bond yields are based on tax-exempt municipal bonds issued in the state of California in the Bloomberg US Municipal Bond Index universe, excluding sinkable and puttable bonds. Taxable-equivalent yield for munis = muni yield / (1 - federal and California state income tax rate). Taxable-equivalent yield for Treasuries = Treasury yield \* (1 - federal income tax rate) / (1 - federal and California state income tax rate). We use the highest and lowest marginal federal and California state income tax rates each year to calculate the muni and Treasury taxable-equivalent yields. Historically, the highest federal income tax rates are: 2007–2012, 35.0%; 2013–2017, 43.4%; 2018–2025, 40.8%. The highest California state income tax rates are: 2007–2008, 10.3%; 2009–2010, 10.6%; 2011–2012, 10.3%; 2013–2025, 13.3%. The lowest federal income tax rates are: 2007–2025, 10.0%. The lowest California state income tax rates are: 2007–2008, 1%; 2009–2010, 1.25%; 2011–2025, 1%.

EXHIBIT 4: Taxable-Equivalent Yield: New York Municipal Bonds vs. Treasury and Corporate Bonds, 2007–2025

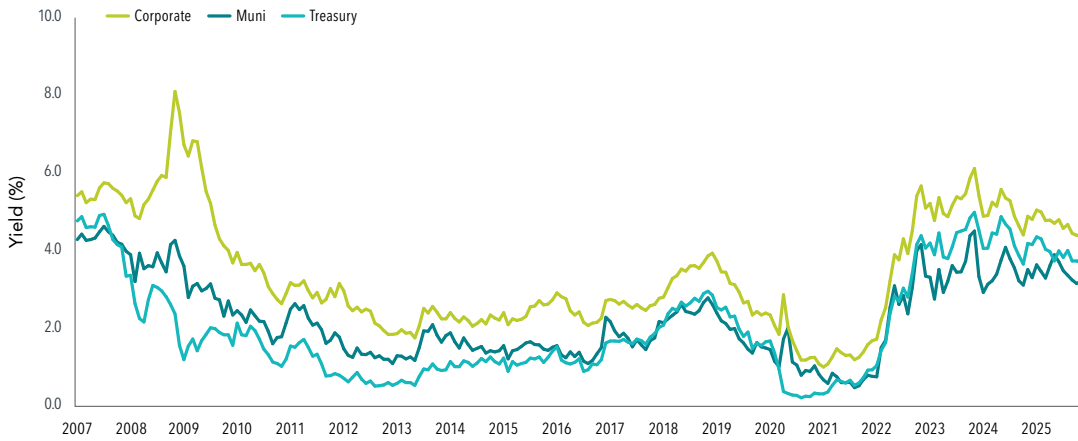
Panel A: Taxable-equivalent yield for 1–10 year bonds, assuming the highest federal and New York state income tax rates



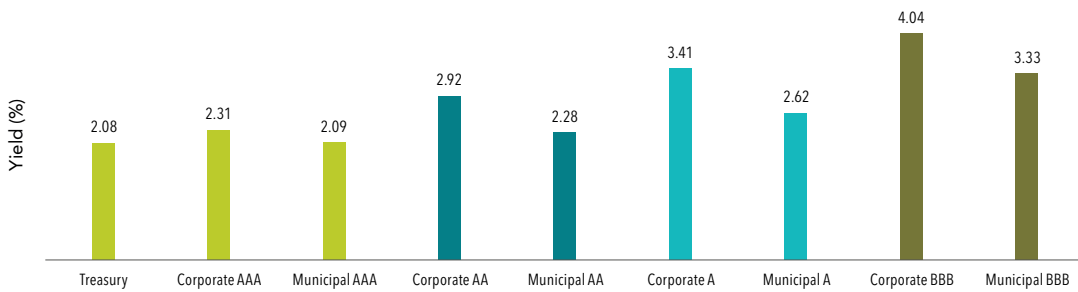
Panel B: Average taxable-equivalent yield of 1–10 year Treasury/corporate bonds vs. New York municipal bonds by credit rating, assuming the highest federal and New York state income tax rates, 2007–2025



Panel C: Taxable-equivalent yield for 1–10 year bonds, assuming the lowest federal and New York state income tax rates



Panel D: Average taxable-equivalent yield of 1–10 year Treasury/corporate bonds vs. New York municipal bonds by credit rating, assuming the lowest federal and New York state income tax rates, 2007–2025



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Source: Treasury and corporate bond yields are based on the Bloomberg US Treasury and Credit Index data. Municipal bond yields are based on tax-exempt municipal bonds issued in the state of New York in the Bloomberg US Municipal Bond Index universe, excluding sinkable and puttable bonds. Taxable-equivalent yield for munis = muni yield / (1 - federal and New York state income tax rate). Taxable-equivalent yield for Treasuries = Treasury yield \* (1 - federal income tax rate) / (1 - federal and New York state income tax rate). We use the highest and lowest marginal federal and New York state income tax rates each year to calculate the muni and Treasury taxable-equivalent yields. Historically, the highest federal income tax rates are: 2007–2012, 35.0%; 2013–2017, 43.4%; 2018–2025, 40.8%. The highest New York state income tax rates are: 2007–2008, 6.85%; 2009–2011, 8.97%; 2012–2021, 8.82%; 2022–2025, 10.9%. The lowest federal income tax rates are: 2007–2025, 10.0%. The lowest New York state income tax rates are: 2007–2025, 4%.

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## Break-Even Tax Rate

In addition to the taxable-equivalent yield, investors can also use the break-even tax rate to compare munis and taxable bonds.<sup>5</sup> The break-even tax rate is defined as follows:

$$\text{Break-Even Tax Rate} = 1 - \frac{\text{Municipal Bond Yield}}{\text{Taxable Bond Yield}}$$

Investors can compare their federal income tax rate against the break-even tax rate when allocating between munis versus Treasuries, and their combined federal and state income tax rates against the break-even tax rate when allocating between munis versus corporates. For example, if the break-even tax rate for munis versus corporates is 30%, investors whose combined federal and state income tax rates are above this level would find munis yielding more than corporate bonds on a tax-adjusted basis. Historically, the average break-even tax rate for AAA rated munis versus Treasuries has been around 10%, while the average break-even tax rate for munis versus corporates has been around 30%, as shown in **Exhibit 5**.<sup>6</sup> As bond yields changed over time, the break-even tax rate of munis versus Treasuries or corporates has fluctuated as well.

Furthermore, money market funds have become an attractive option for income-seeking investors during the recent US interest rate hiking period from 2022 to 2024. For investors deciding between keeping their investments in cash versus putting money to work in tax-exempt bonds, we calculate the break-even tax rate for short-term munis versus 1-month Treasury bills in **Panel C** of **Exhibit 5**. Historically, this break-even rate has averaged around 10% and shown fluctuations based on market conditions and monetary policy.

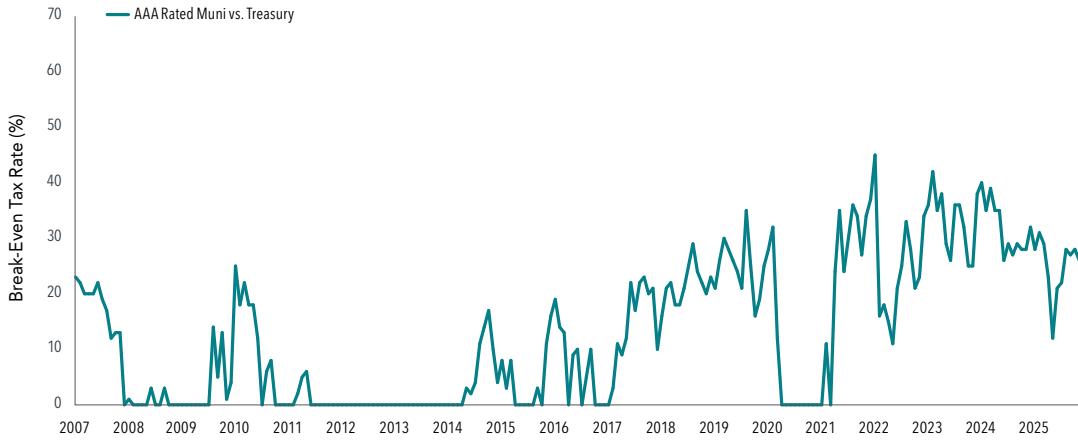
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5. If the muni yield is higher than the Treasury or corporate yield, we assume the break-even tax rate to be zero.

6. We compare the AAA rated muni yield to the Treasury yield for the muni versus Treasury break-even tax rate calculation, as the default rates in AAA rated municipal bonds have been very low historically.

EXHIBIT 5: Break-Even Tax Rate, 2007-2025

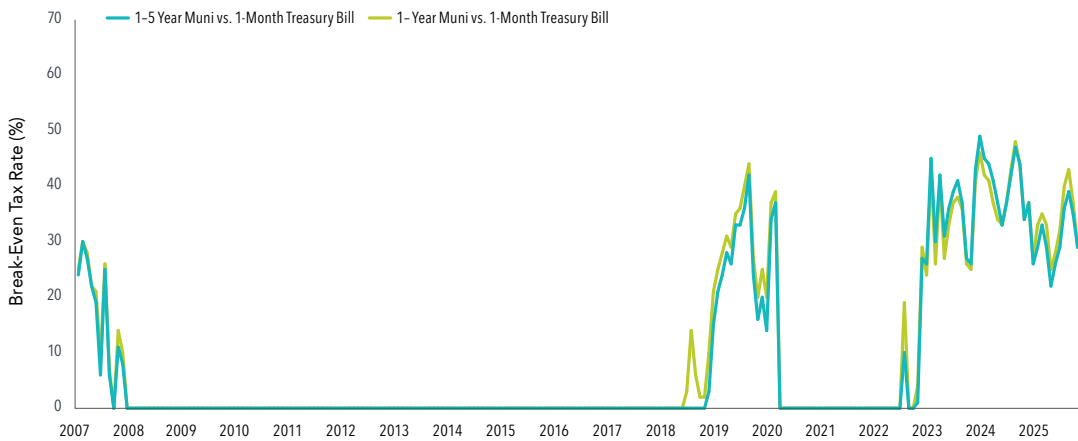
Panel A: 1-10 year AAA rated munis vs. Treasuries



Panel B: 1-10 year munis vs. corporates



Panel C: Short-term munis vs. money market

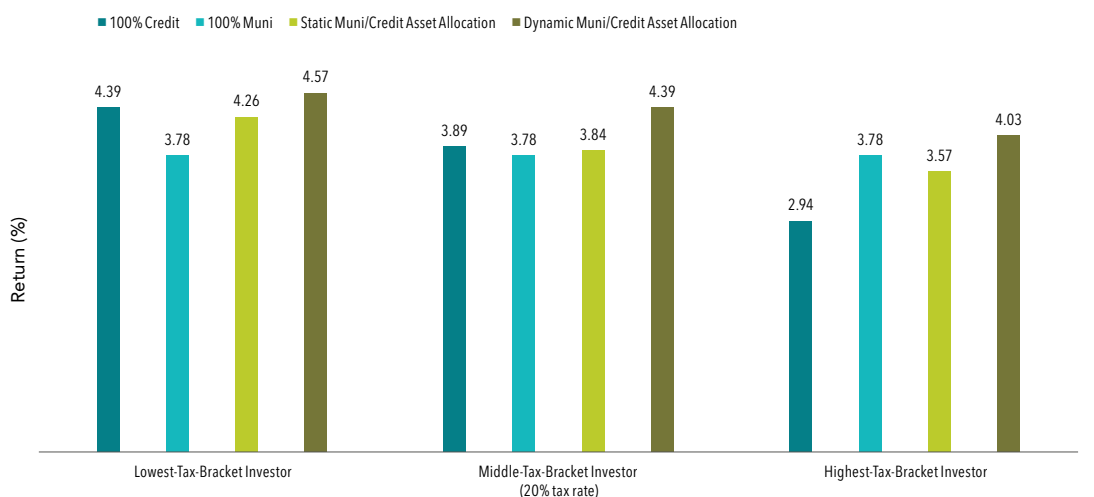


Source: Treasury and corporate bond yields are based on Bloomberg US Treasury and Credit Index data. Municipal bond yields are based on tax-exempt municipal bonds in the Bloomberg US Municipal Bond Index universe, excluding sinkable and puttable bonds. 1-Month T-bill discount rate from Federal Reserve Bank of St. Louis converted to semiannually compounded yield. Break-even tax rate = 1 - muni yield / Treasury (or corporate) yield.

## Applying Insights to Asset Allocation

So far, we have observed that both the taxable-equivalent yield spreads and break-even tax rates between munis and taxable bonds vary over time. Subsequently, the after-tax expected return (yield) differences between munis and taxable bonds change over time. Should investors consider this expected return difference when managing their asset allocation? Previous research has shown there is a reliably positive relation between current yield (forward rate) and future return across municipal and corporate bonds.<sup>7</sup> Our portfolio analysis adds context by showing investors with different tax situations could potentially benefit from diversifying their fixed income portfolios with both taxable corporate bonds and tax-exempt munis. In **Exhibit 6**, we look at the after-tax (adjusting for federal tax) performance of 100% allocations to Bloomberg 1–10 year US credit and muni indices, a static constant weight asset allocation between these two assets, and a dynamic asset allocation based on the difference between the muni taxable-equivalent yield and the credit yield.<sup>8</sup> For each tax bracket, the static and dynamic asset allocation approaches target the same weights in munis and credit on average.<sup>9</sup>

**EXHIBIT 6: Performance Comparison, 1994-2025**  
Annualized after-tax returns by investor tax bracket



Past performance is not a guarantee of future results. Indices are not available for direct investment; therefore, their performance does not reflect the expenses associated with the management of an actual portfolio.  
Source: Bloomberg US 1-10 Year Municipal and Credit Index data.

Exhibit 6 shows that between 1994 and 2025, investors in the highest income tax bracket experienced the highest after-tax returns by staying 100% in munis, while credit outperformed

7. For existing Dimensional research on corporate and municipal bonds, please see the following papers: Marlena I. Lee, Savina Rizova, and Samuel Yusun Wang, “[The Cross-Section of Global Corporate Bond Returns](#),” (research paper, March 2022); Samuel Yusun Wang, “[The Cross-Section of Municipal Bond Returns](#),” (research paper, April 2022). Furthermore, we observe a reliably positive relation between the current (tax-equivalent) yield differences and the future after-tax return differences of muni and credit in regression analysis.

8. For more details about portfolio construction and after-tax return calculation, please refer to the appendix, “Definitions and Portfolio Construction.” As states have very different income tax brackets and capital gains tax treatments, we focus on federal-income and capital-gains taxes in our after-tax return calculations. Furthermore, to reduce the turnover and transaction costs, the static and dynamic asset allocations are rebalanced annually.

9. On average, the weights of munis and corporates in the static and dynamic asset allocations for different tax brackets are: highest tax bracket, 75% munis, 25% corporates; middle tax bracket, 50% munis, 50% corporates; lowest tax bracket, 25% munis, 75% corporates.

muni on an after-tax basis for investors in the lowest income tax bracket.<sup>10</sup> Regardless of the investor's tax rate, a dynamic asset allocation approach delivered meaningfully higher after-tax returns compared to the 100% single asset approach or static constant weight asset allocation.<sup>11</sup> This shows that incorporating the latest information embedded in market prices into asset allocation decisions can improve after-tax outcomes for investors.

Our empirical results suggest investors should take their unique tax situation and current yields on a tax-equivalent basis into account when making asset allocation decisions between municipal bonds and other taxable bonds. A dynamic asset allocation between municipal bonds and corporate bonds can provide higher after-tax returns compared to static asset allocation approaches for investors across different income tax brackets. As with many other things in life, one size does not fit all, but a financial professional who stays on top of changes in a client's tax bracket and tax laws can help find the right size and improve outcomes in the long run.

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## Definitions and Portfolio Construction

**Puttable bond:** A type of bond that provides the holder the right, but not the obligation, to force the issuer to redeem the bond before its maturity date.

**Sinkable bond:** A type of bond that is backed by a fund set aside by the issuer. The issuer draws upon the fund to buy back a portion of the bond periodically over time.

**Taxable-equivalent yield:**  $\text{Taxable-Equivalent Yield} = \frac{\text{Municipal Bond Yield}}{1 - \text{Income Tax Rate}}$

**Break-even tax rate:**  $\text{Taxable-Equivalent Yield} = \frac{\text{Municipal Bond Yield}}{1 - \text{Income Tax Rate}}$

**Static municipal/credit allocation:** The static asset allocation approach targets constant weights in the Bloomberg US 1–10 year municipal index and Bloomberg US 1–10 year credit index. For the highest income tax bracket, the static asset allocation maintains 75% weight in the Bloomberg US 1–10 year municipal index and 25% weight in the Bloomberg US 1–10 year credit index from January 1994 to December 2025. For the middle tax bracket, the static asset allocation maintains 50% weight in the Bloomberg US 1–10 year municipal index and 50% weight in the Bloomberg US 1–10 year credit index from January 1994 to December 2025. For the lowest tax bracket, the static asset allocation maintains 25% weight in the Bloomberg US 1–10 year municipal index and 75% weight in the Bloomberg US 1–10 year credit index from January 1994 to December 2025. The static asset allocation is annually rebalanced.

10. The highest income tax bracket is defined as the highest marginal federal income tax rate historically. 1994–2000: 39.6%; 2001: 39.1%; 2002: 38.6%; 2003–2012: 35.0%; 2013–2017: 43.4%; 2018–2025: 40.8%. The lowest income tax bracket is defined as the lowest marginal federal income tax rate historically. 1994–2025: 10%. The middle income tax bracket is defined as the 24% marginal federal income tax rate as of 2025. This corresponds to a household filing taxes jointly with taxable income up to \$394,000. We assume a constant effective tax rate of 20% in the after-tax return calculation for investors in the middle tax bracket.

11. Annual transaction cost estimates for the static and dynamic asset allocations for different tax brackets are: highest tax bracket: 0.28 basis points (static), 6.3 bps (dynamic); middle tax bracket: 0.42 bps (static), 11.2 bps (dynamic); lowest tax bracket: 0.28 bps (static), 7 bps (dynamic). For more details about transaction cost estimates, please refer to the appendix.

**Dynamic municipal/credit allocation:** The dynamic asset allocation approach varies weights between the Bloomberg US 1–10 year municipal index and Bloomberg US 1–10 year credit index based on the difference in the taxable-equivalent yield between the two indices. At the beginning of each calendar year, depending on the magnitude of the taxable-equivalent yield difference between the municipal and credit indices, the dynamic asset allocation assigns 100% weight to either the Bloomberg US 1–10 year municipal index or the Bloomberg US 1–10 year credit index. For the highest income tax bracket, the dynamic asset allocation has 75% weight in the Bloomberg US 1–10 year municipal index and 25% weight in the Bloomberg US 1–10 year credit index on average from January 1994 to December 2025. For the middle income tax bracket, the dynamic asset allocation has 50% weight in the Bloomberg US 1–10 year municipal index and 50% weight in the Bloomberg US 1–10 year credit index on average from January 1994 to December 2025. For the lowest income tax bracket, the dynamic asset allocation has 25% weight in the Bloomberg US 1–10 year municipal index and 75% weight in the Bloomberg US 1–10 year credit index on average from January 1994 to December 2025. The dynamic asset allocation is annually rebalanced.

**After-tax return for Bloomberg US 1–10 year credit index:**  $R_t^{After-Tax} = R_t^{Pre-Tax} - \text{Income Tax}_t$

The after-tax return of the credit index is calculated by subtracting the income tax on the index’s coupon return in year  $t$  from the index’s pre-tax total return in that year. The income tax is calculated by multiplying the investor’s federal income tax rate with the index’s coupon return. We assume there’s no capital gain or loss from index rebalancing.

**After-tax return for Bloomberg US 1–10 year municipal index:**  $R_t^{After-Tax} = R_t^{Pre-Tax}$

As tax-exempt municipal bonds are not subject to federal income tax on bonds’ coupons, we treat the pre-tax total return in year  $t$  as its after-tax return. We assume there’s no capital gain or loss from index rebalancing.

**After-tax return for the static and dynamic municipal/credit asset allocations:**

$$R_t^{After-Tax} = R_t^{Pre-Tax} - \text{Income Tax}_t^{Credit} - \text{Capital Gains Tax}_t^{Credit} - \text{Capital Gains Tax}_t^{Municipal}$$

We first calculate the portfolio’s pre-tax total return in year  $t$  as the weighted average of the credit and muni allocations’ total returns in that year. We then calculate the income tax on the credit allocation’s coupon return in year  $t$  by multiplying the investor’s federal income tax rate with the credit allocation’s coupon return. In addition, we calculate capital gains tax from the sale of the credit allocation during portfolio rebalancing as the product of the investor’s federal income tax rate, the credit allocation’s price return in year  $t$ , and the sale of the credit allocation from rebalancing. The same methodology applies to the calculation of capital gains tax from the sale of the portfolio’s muni allocation. We take the conservative approach by treating the capital gains as short term and taxable at the investor’s income tax rate and do not harvest tax losses. The after-tax return of the portfolio is calculated by subtracting the income tax on the credit allocation and capital gains tax on the sale of credit and muni allocations from the portfolio’s pre-tax total return.

**Transaction cost estimate for the static and dynamic municipal/credit asset allocations:** We estimate the portfolio's annual transaction cost as the portfolio's annual two-way turnover divided by two, then multiplied by the sum of the bid-ask spread in municipal and corporate bonds. The average annual two-way turnover for the static and dynamic asset allocations are: highest tax bracket, 2% for static asset allocation and 45% for dynamic asset allocation; middle tax bracket, 3% for static asset allocation and 80% for dynamic asset allocation; lowest tax bracket, 2% for static asset allocation and 50% for dynamic asset allocation. The dynamic portfolios on average have around 30% annual two-way turnover between the component US credit and muni indices, compared to 4% turnover for the static equal-weight portfolios. Here we ignore the reconstitution/rebalancing within each component index, assuming the impact would be similar to the portfolios. We use 20 basis points for the bid-ask spread in municipal bonds, based on estimates of municipal bond trades with par value over \$1 million from the paper "What Has Driven the Surge in Transaction Costs for Municipal Securities Investors Since 2022?" (Wu and Ostroy 2023).<sup>12</sup> We use 8 bps for the bid-ask spread in corporate bonds, based on the estimate for corporate bond trades with a trade size of \$1 million in the paper "Corporate Bond Market Transparency and Transaction Costs" (Edwards, Harris, and Piwovar 2007).<sup>13</sup> Following their methodology, we find similar transaction costs in investment-grade corporate bond trades around \$1 million using TRACE data from 2010 to 2019. For investors in the highest tax bracket, the annual transaction cost for the static asset allocation is estimated as  $1\% \times 20 + 1\% \times 8 = 0.28$  bps, and for the dynamic asset allocation is estimated as  $22.5\% \times 20 + 22.5\% \times 8 = 6.3$  bps. For investors in the middle tax bracket, the annual transaction cost for the static asset allocation is estimated as  $1.5\% \times 20 + 1.5\% \times 8 = 0.42$  bps, and for the dynamic asset allocation is estimated as  $40\% \times 20 + 40\% \times 8 = 11.2$  bps. For investors in the lowest tax bracket, the annual transaction cost for the static asset allocation is estimated as  $1\% \times 20 + 1\% \times 8 = 0.28$  bps, and for the dynamic asset allocation is estimated as  $25\% \times 20 + 25\% \times 8 = 7$  bps. While smaller, retail-sized trades below \$1 million would incur higher transaction costs, we assume managers can bundle client trades to reduce transaction costs.

12. Simon Z. Wu and Nicholas J. Ostroy, "What Has Driven the Surge in Transaction Costs for Municipal Securities Investors Since 2022?" Municipal Securities Rulemaking Board, August 2023.

13. Amy K. Edwards, Lawrence E. Harris, and Michael S. Piwovar, "Corporate Bond Market Transaction Costs and Transparency," *The Journal of Finance* 62, no. 3 (June 2007): 1421–1451.

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