

Vanguard Fixed Income Landscape

Financial Advisors Services—Portfolio Solutions

May 2025

Agenda

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- 15** Fixed Income Sectors
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Interest rates and the Fed

2024 saw a retraction in returns with High-Yield and Emerging Markets posting strong returns

Market index	2024 return	2025 YTD	OAS 12/31/2024	OAS 4/30/2025
U.S. Aggregate	1.25%	3.18%	33.80	39.77
U.S. Treasury	0.58%	3.57%		
U.S. MBS	1.20%	3.35%	42.82	43.34
U.S. Corporate IG	2.13%	2.27%	79.95	106.03
U.S. Corporate HY	8.19%	0.98%	286.83	384.13
AA Corporate	0.24%	2.49%	45.12	58.78
A Corporate	1.63%	2.53%	68.32	88.50
BBB Corporate	2.97%	1.99%	97.07	132.09
Emerging Market	6.58%	2.29%	220.44	255.21
Municipal Bond	1.05%	-1.03%		
Muni HY	6.32%	-0.98%		
AA Muni Index	0.79%	-1.04%		
A Muni Index	1.78%	-1.01%		
BBB Muni Index	2.87%	-1.16%		

Source: Bloomberg indices and FactSet, as of April 30, 2025. See important information.

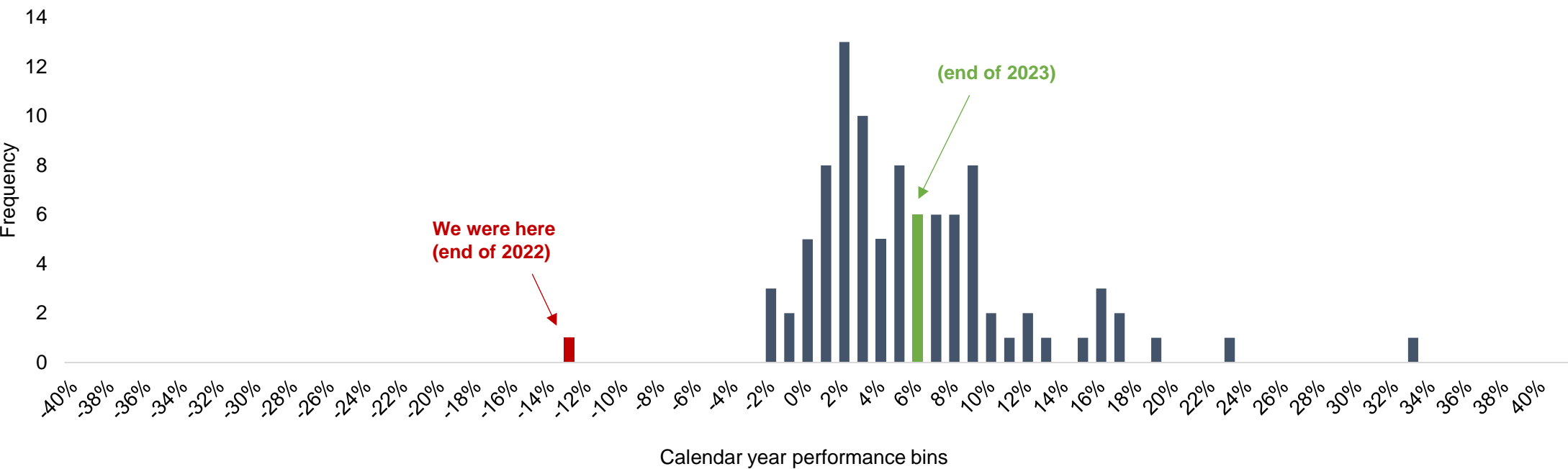
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Historical fixed income performance highlights 2022's outlier status

Distribution of annual bond performance (1928-2023)



Notes: Chart shows the cumulative performance from January through December each calendar year going back to 1928. Data for 2023 performance is through December 21, 2023.

Sources: Vanguard Investment Advisory Research Center analysis. Bonds: IA SBBI U.S. Intermediate-Term Government Bond Index through 1972; Bloomberg U.S. Government/Credit Intermediate-Term Index from 1973 through 1975; Bloomberg U.S. Aggregate Bond Index thereafter.

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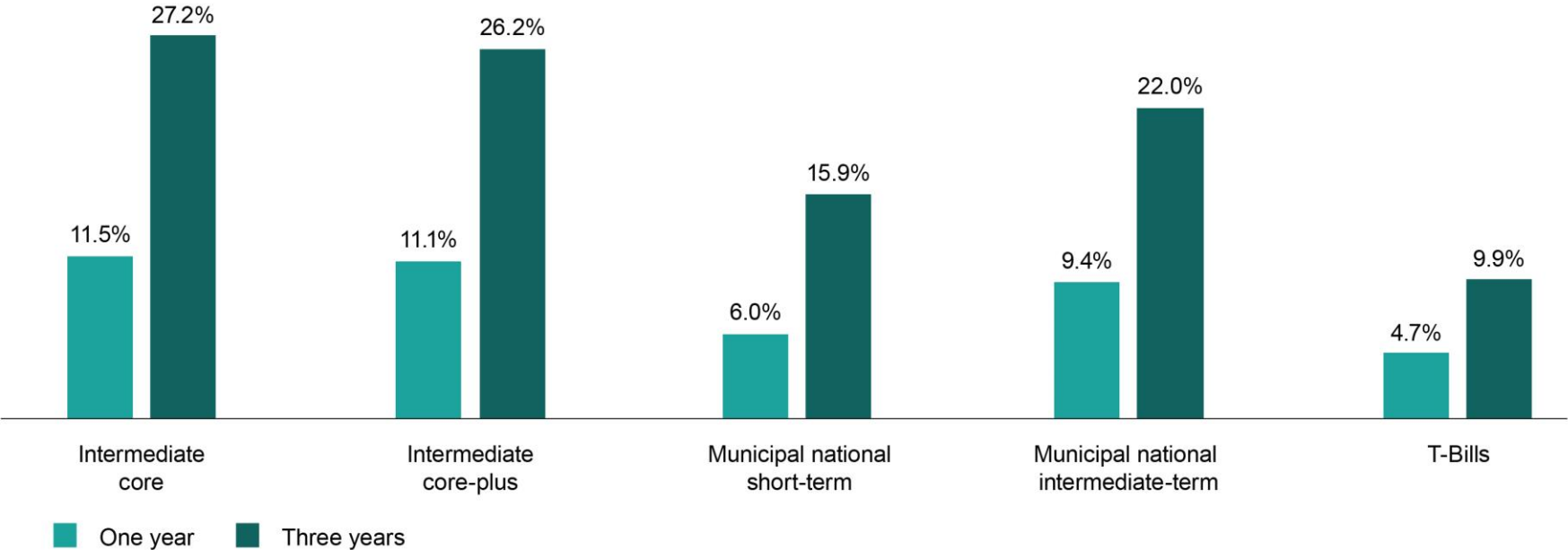
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Historical performance shows that investment-grade bonds have performed well after the Federal Reserve has stopped raising rates

Total cumulative return one and three years after last rate hike

(Last four cycles, on average; categories represented by indexes noted below.)

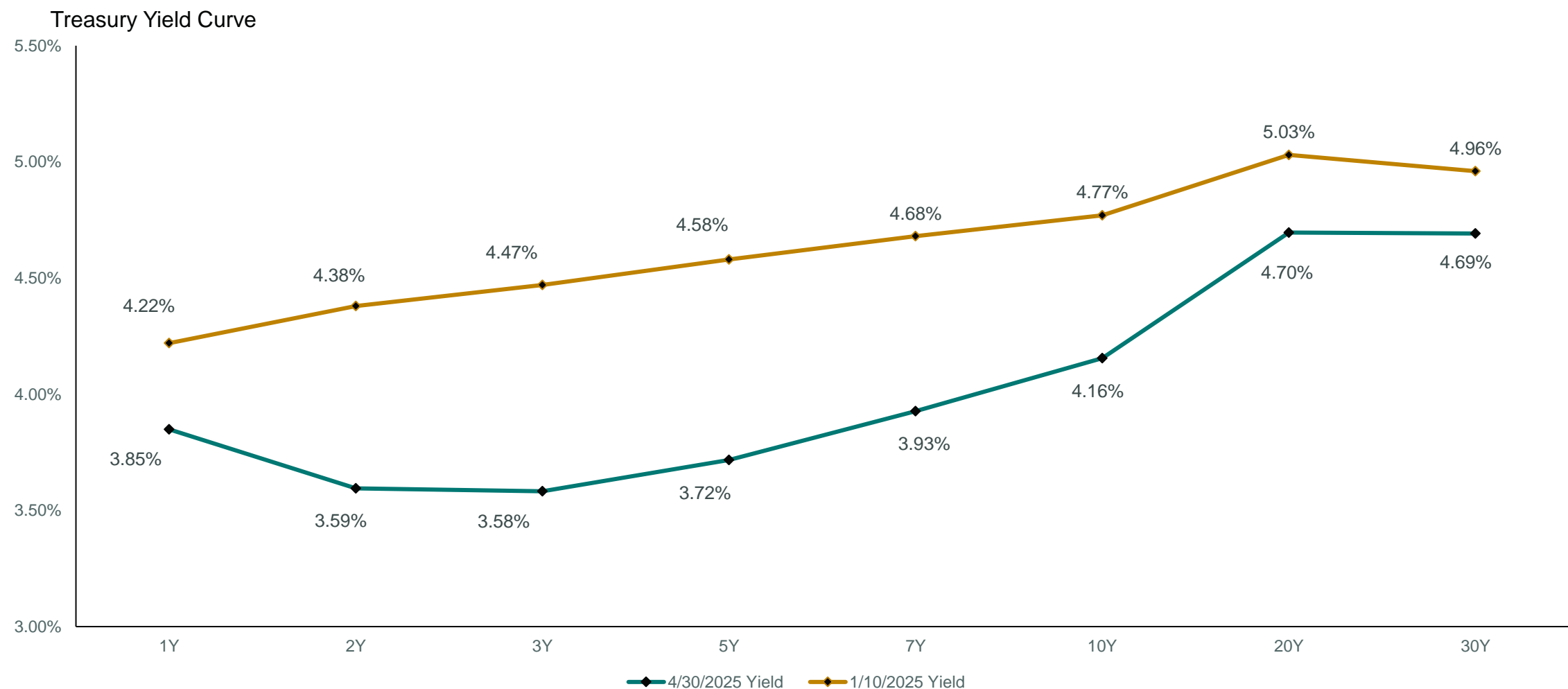


Notes: The one-year returns after rate hikes are complete, averaging the periods of February 1, 1995, to February 1, 1996; May 16, 2000, to May 16, 2001; June 29, 2006, to June 29, 2007; and December 20, 2018, to December 20, 2019. The three-year returns after rate hikes are complete, averaging the periods of February 1, 1995, to February 1, 1998; May 16, 2000, to May 16, 2003; June 29, 2006, to June 29, 2009; and December 20, 2018, to December 20, 2021.

Sources: Bloomberg data via FactSet. Intermediate core represented by Bloomberg U.S. Aggregate Bond Index. Intermediate core-plus represented by Bloomberg U.S. Universal Bond Index. Municipal national short-term represented by Bloomberg Municipal Short (1–5 Year) Index. Municipal national intermediate-term represented by Bloomberg Municipal Bond Index. T-Bills represented by Bloomberg U.S. Treasury 1–3 Month Index.

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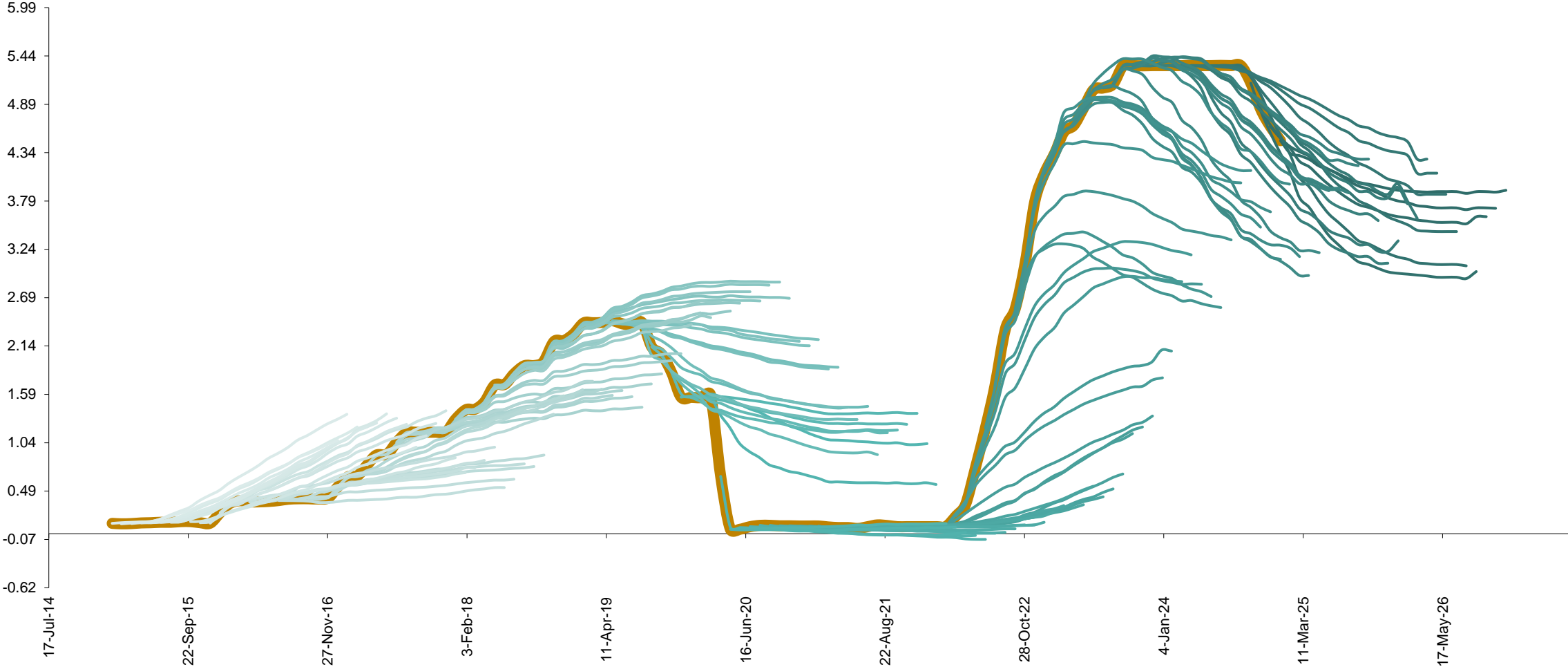
Treasury yields have fallen across the curve since its peak in January



Source: FactSet as of dates noted
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Predicting future rate changes has proven to be challenging

Rolling forward curve of FED FUND 30DAY JAN25



Notes: Monthly data are from January 31, 2015 to December 31, 2024. The federal funds effective rate is annualized. Green lines represent the forward rates, which are based on futures contracts with tenor up to 2 years. Gold Line denotes Effective Federal Funds Rate.

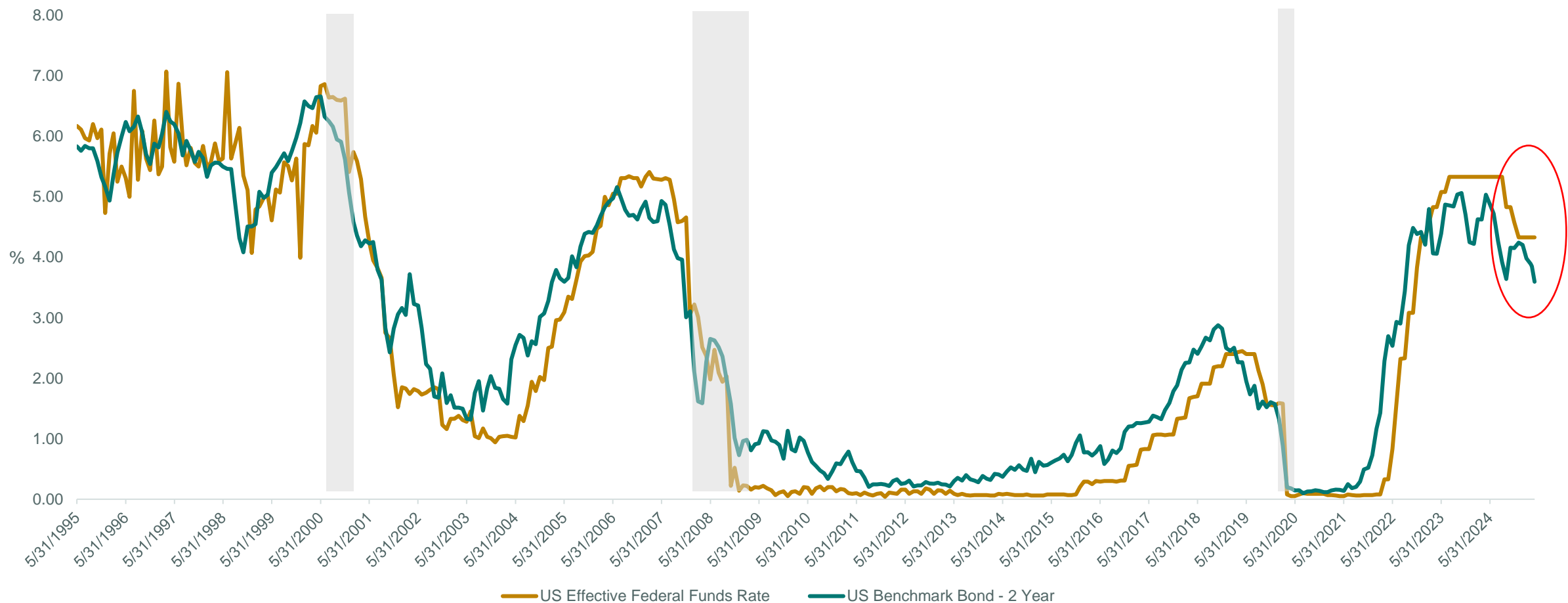
Source: Bloomberg

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Federal Funds rate reduced to 4.25-4.50%, Fixed income market anticipates more cuts in 2025.

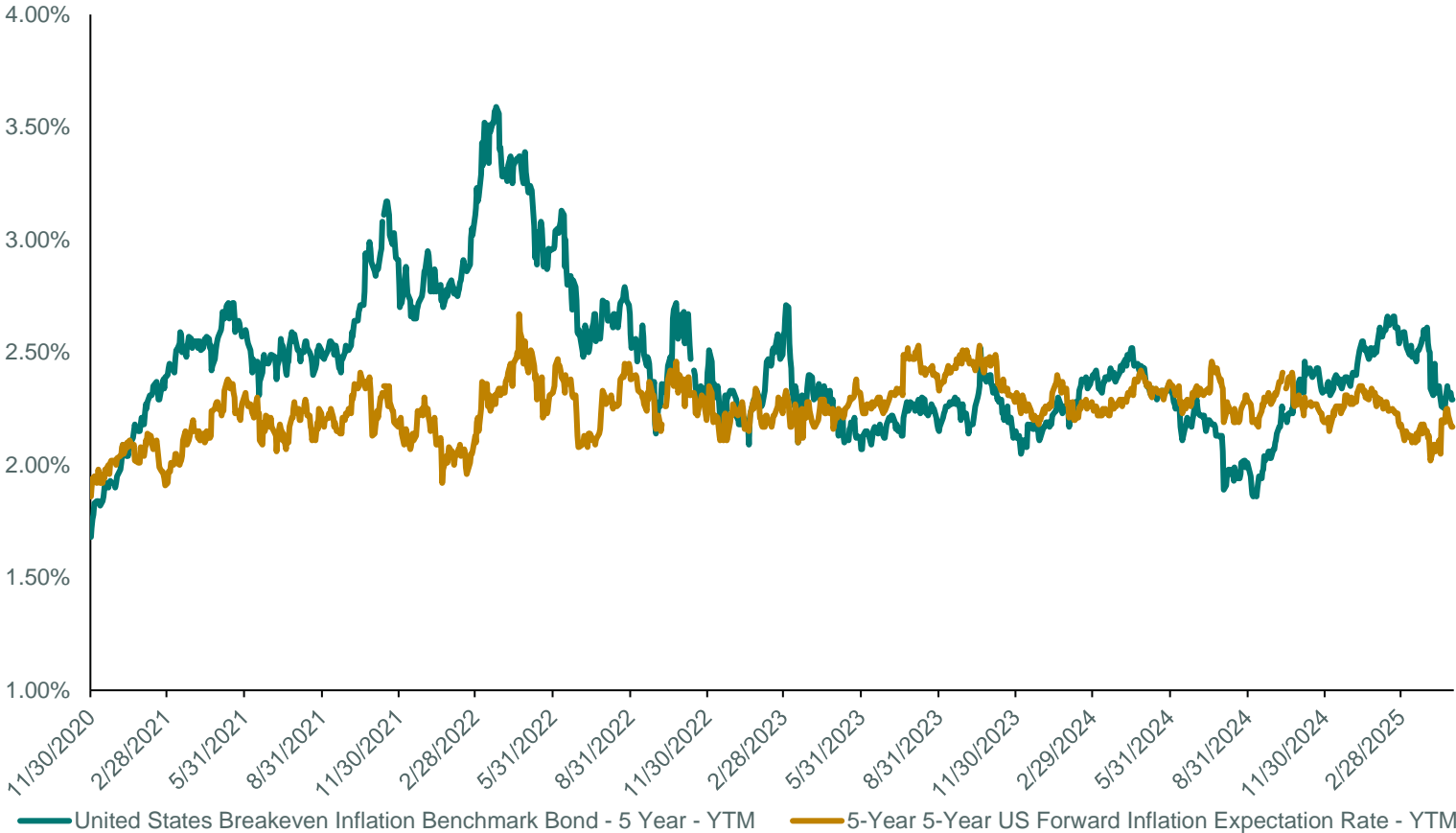
Rising rate periods over the past 30 Years



Source: FactSet, as of 04/30/2025. Grey sections delineate recessions.
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Future inflation expectations on the short end increased meaningfully but have since fallen .

Breakeven Inflation Over Time

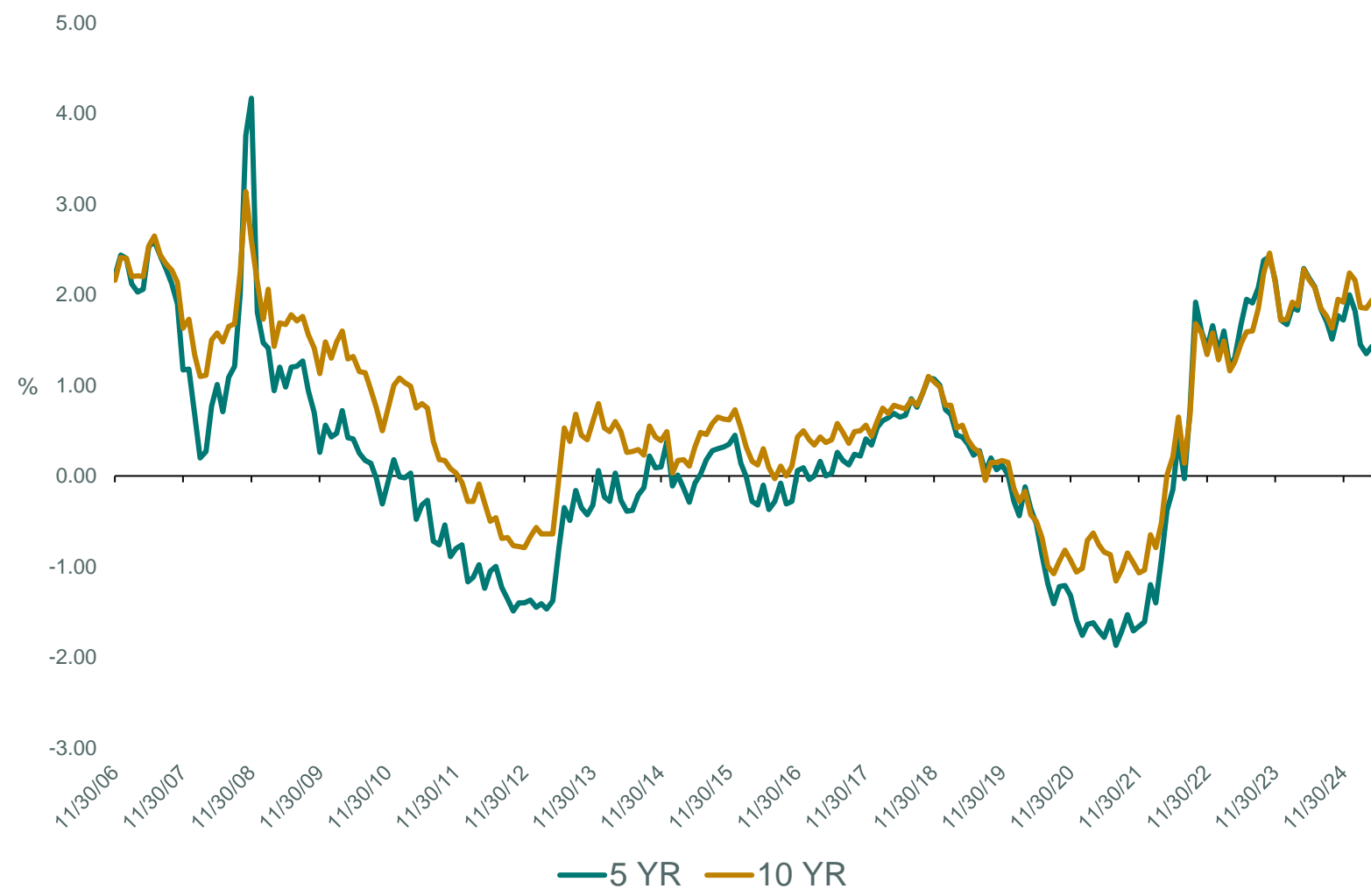


Breakeven Inflation YTD Change			
	9/10/2024	4/30/2025	Change
5 Year	1.86	2.29	0.43
5 Year, 5 Year	2.18	2.17	-0.01

Source: FactSet, as of April 30, 2025. See important information.
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Real yields going forward projected to be higher than recent history

Real Yields Over Time

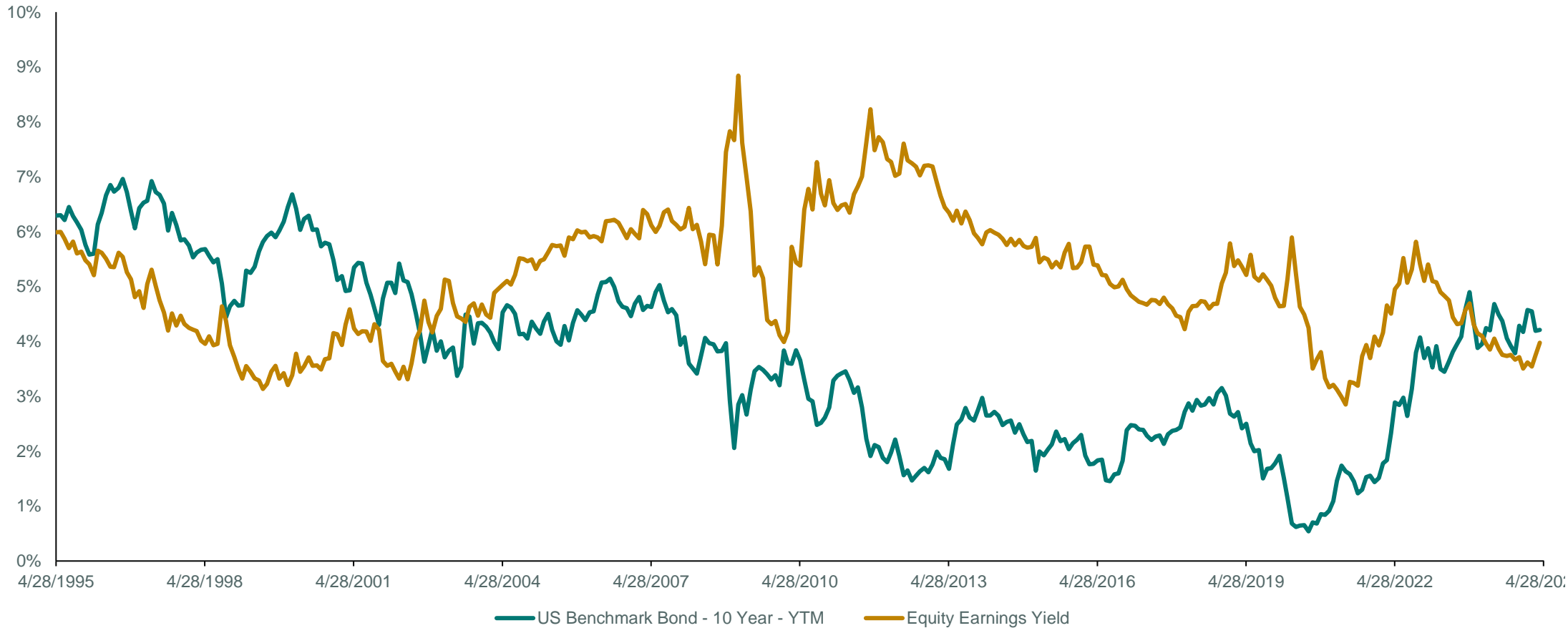


Real Yields YTD Change			
	12/31/2024	4/30/2025	Change
5 Year	2.00	1.43	-0.57
10 Year	2.24	1.94	-0.30

Source: US Treasury, as of April 30, 2025.
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The 10-Year Treasury Yields Surpass Equity Earnings Yields.

S&P 500 Earnings Yield vs 10 Year Treasury Yield



Source: FactSet, as of 04/30/2025.

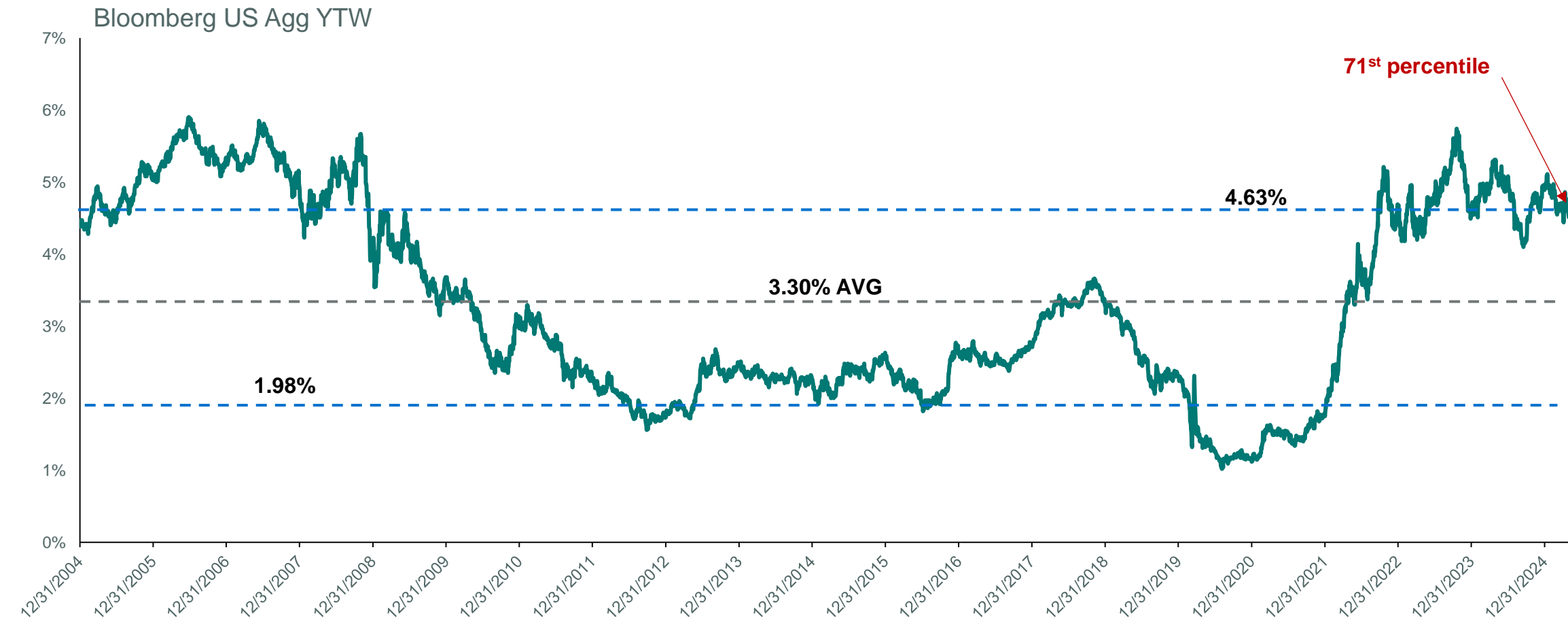
Notes: Equity Earnings Yield is represented by dividing the S&P 500 LTM EPS by the S&P 500 "price".

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Fixed income market is presenting valuation opportunities much higher than recent history



Source: FactSet as of 12/31/2004 – 4/30/2025.

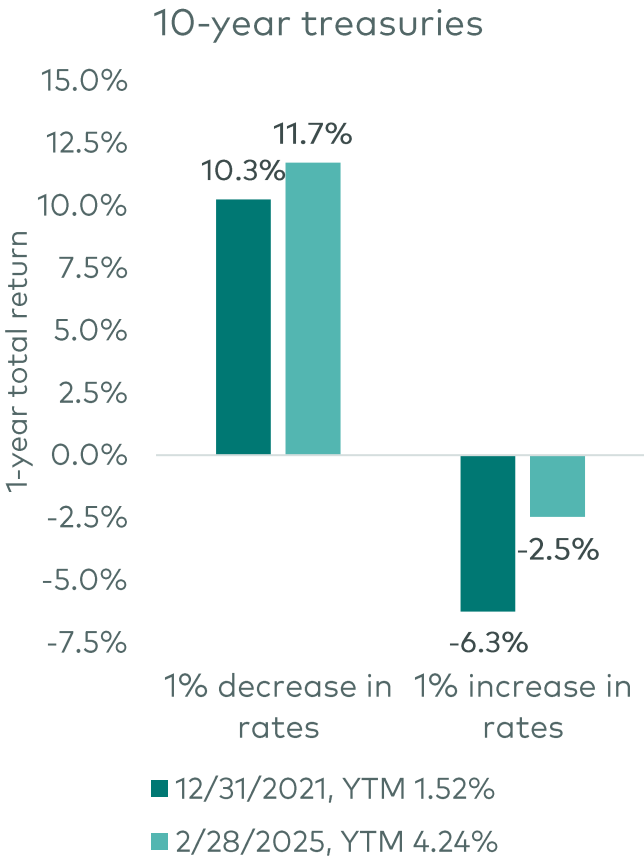
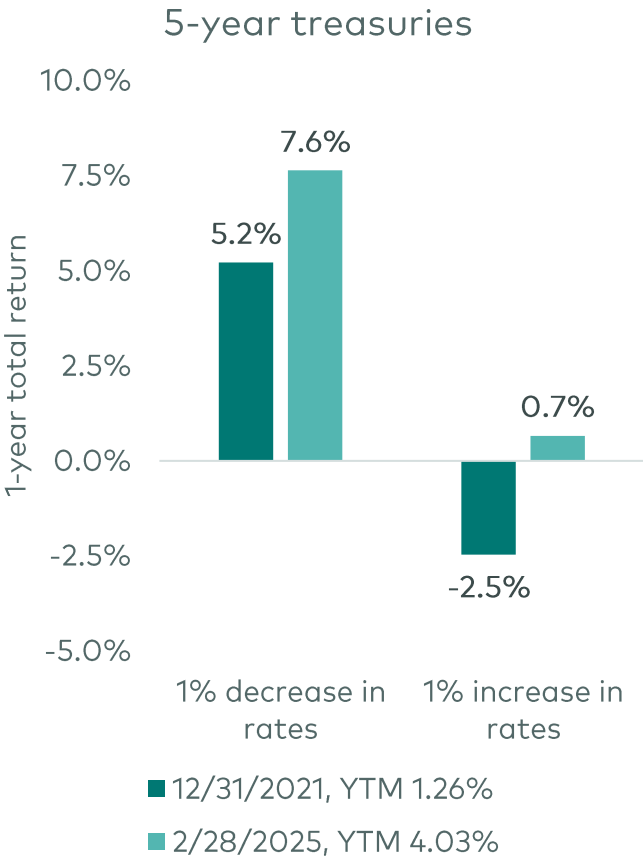
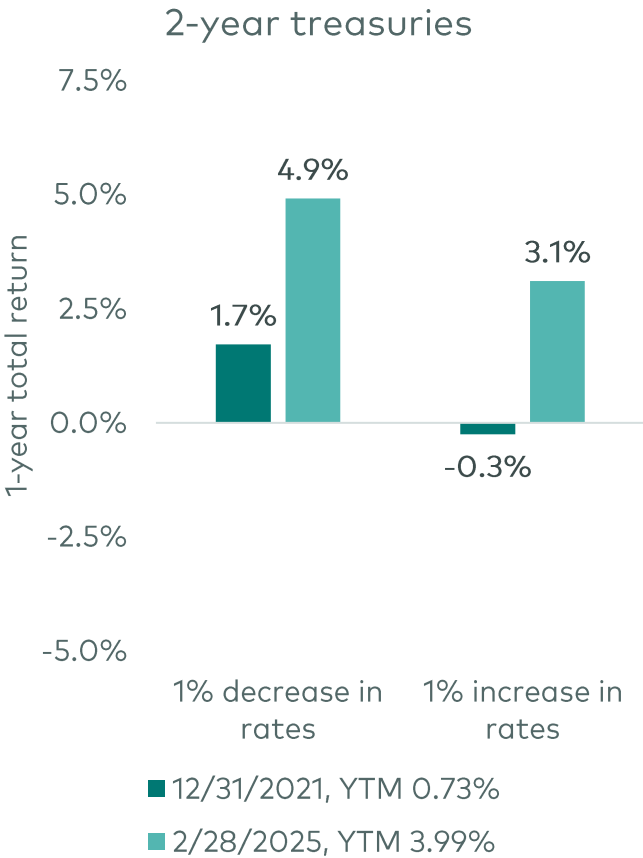
Notes: The chart displays daily yield to worst figures over time on the Bloomberg U.S. Aggregate Index. The gray line denotes the average yield over the stated period. Blue lines indicate one standard deviation above and below the mean.

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Current yields on 2, 5 & 10 year treasuries now provide a buffer to the impact of increases in rates and more ballast if rates drop (+/- 1% rate change)

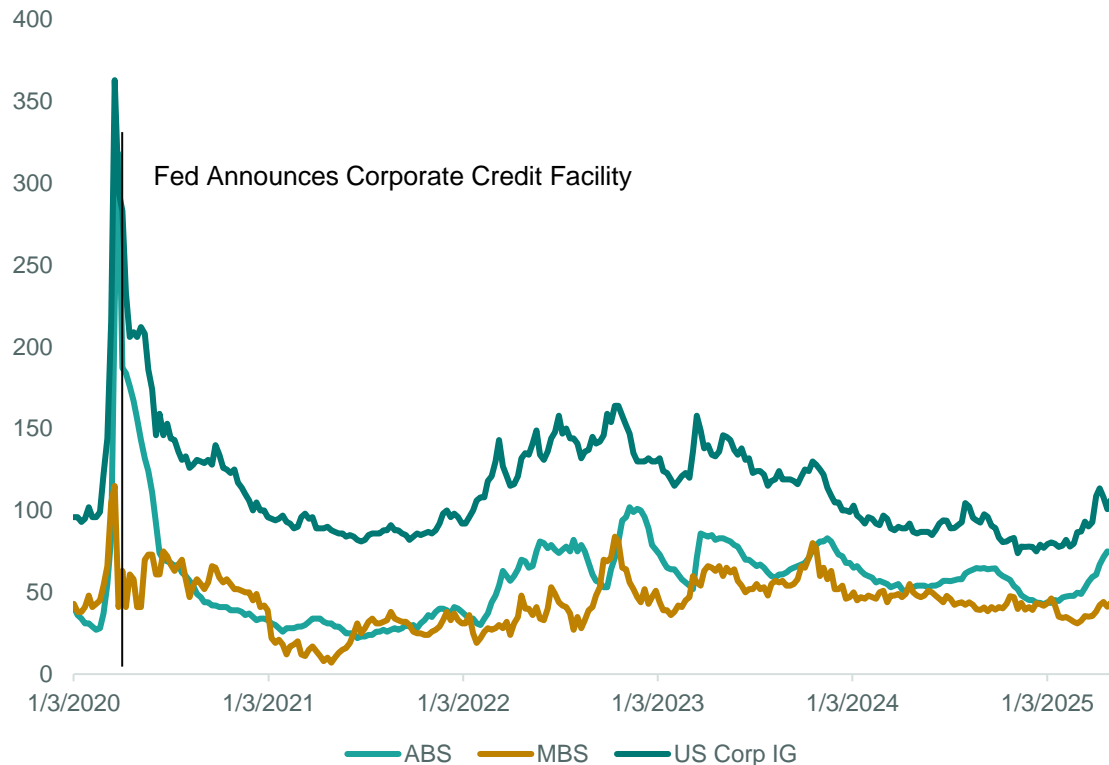


Notes: Modified duration calculated using 2-year constant maturity yields as of December 31, 2021 and February 28th 2025. Changes in rates assumed to impact the price of the bonds immediately and assumes that the change in rates is the same across the entire yield curve
Sources: Vanguard Investment Advisory Research Center calculations using data from Morningstar Direct and St. Louis FRED database
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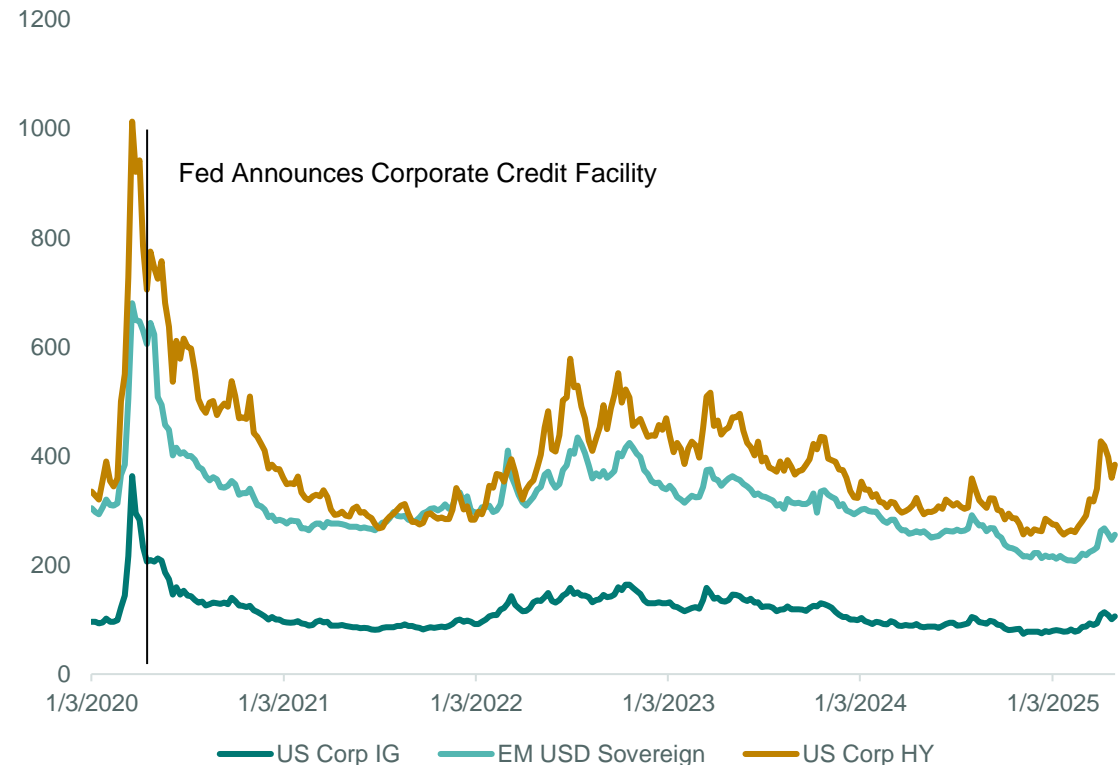
Fixed Income Sectors

Credit spreads meaningfully ticked up last month

Higher Quality Spreads (OAS)



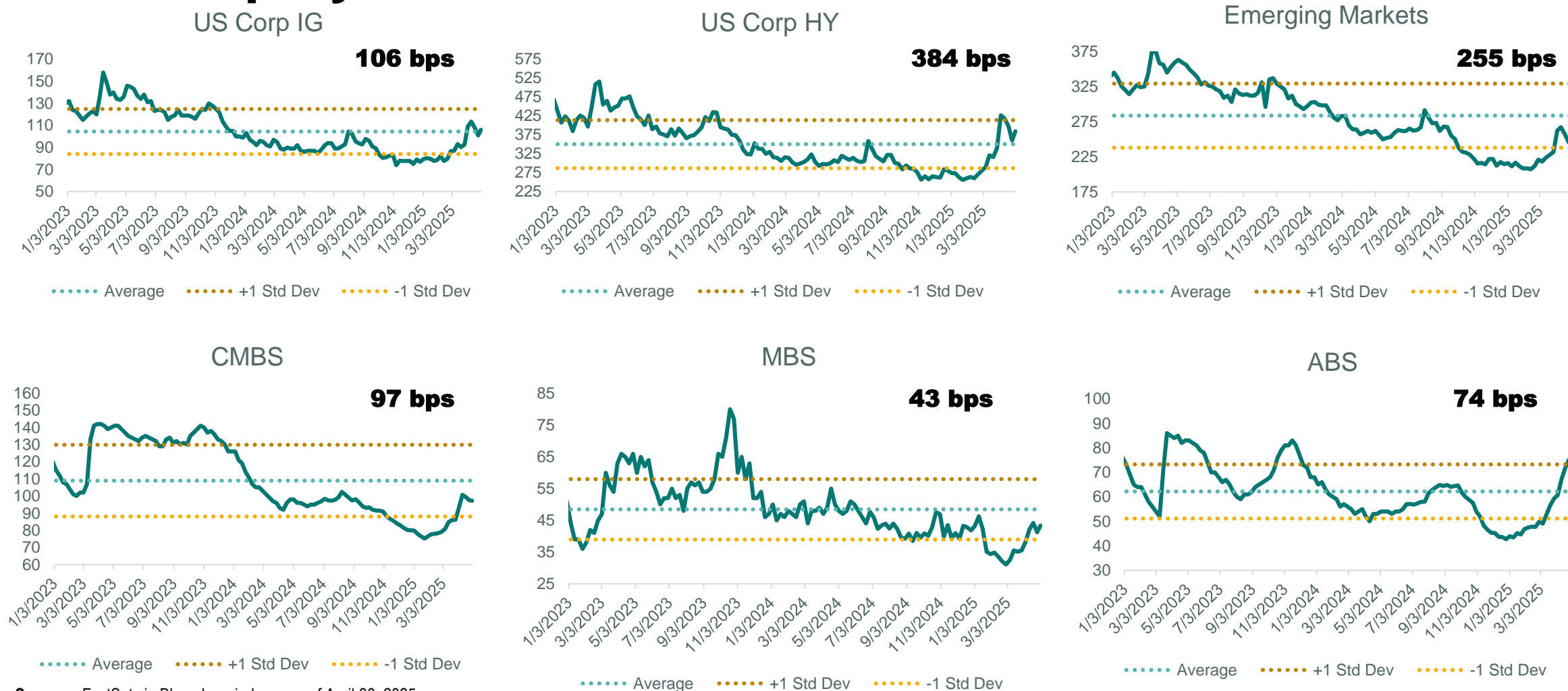
Lower Quality Spreads (OAS)



- Bond markets shuddered in early March 2020, and a sudden loss of liquidity took hold first among the highest-quality, typically easiest-to-trade bonds as investors sought the even safer haven of cash
- However, spreads are now near pre-pandemic levels across the sector and credit quality spectrum

Source: FactSet as of April 30, 2025. See important information.
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Credit spreads have been unequally impacted with the recent equity sell off



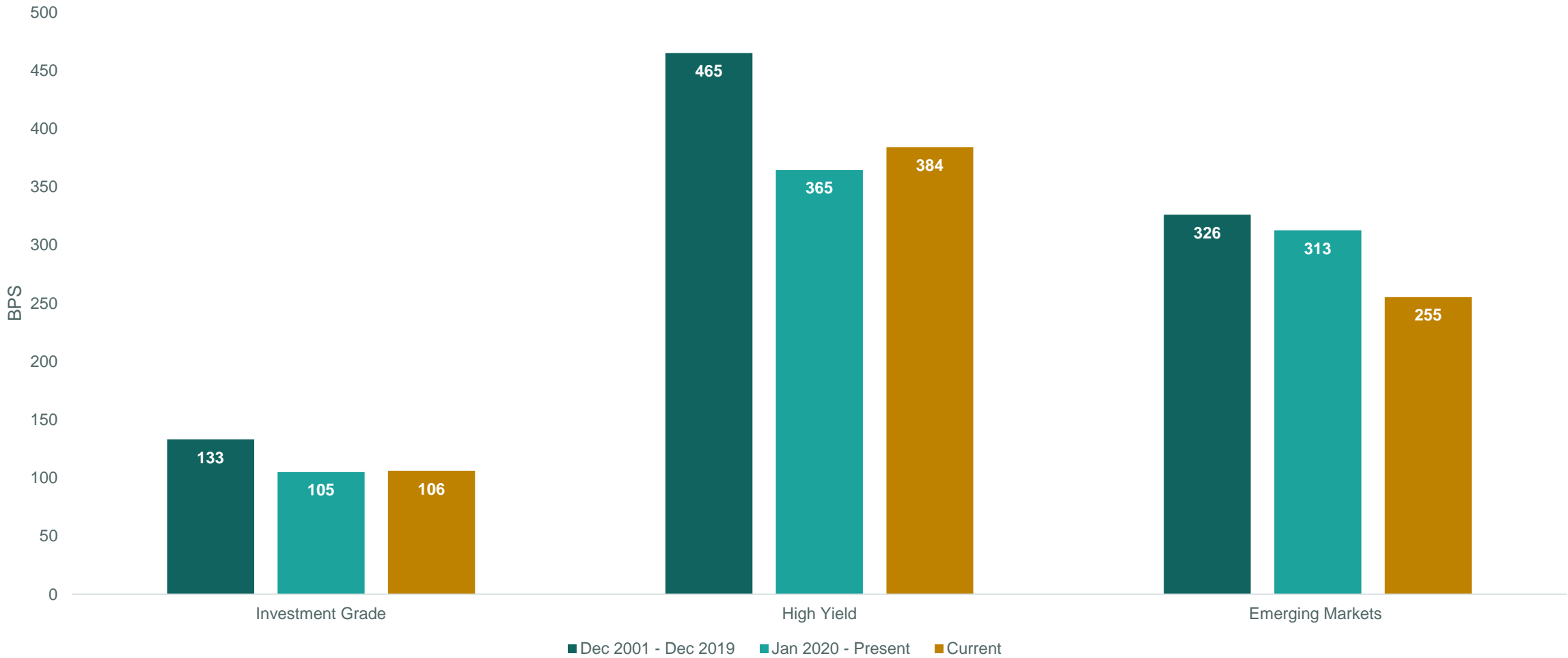
Sources: FactSet via Bloomberg indexes as of April 30, 2025.

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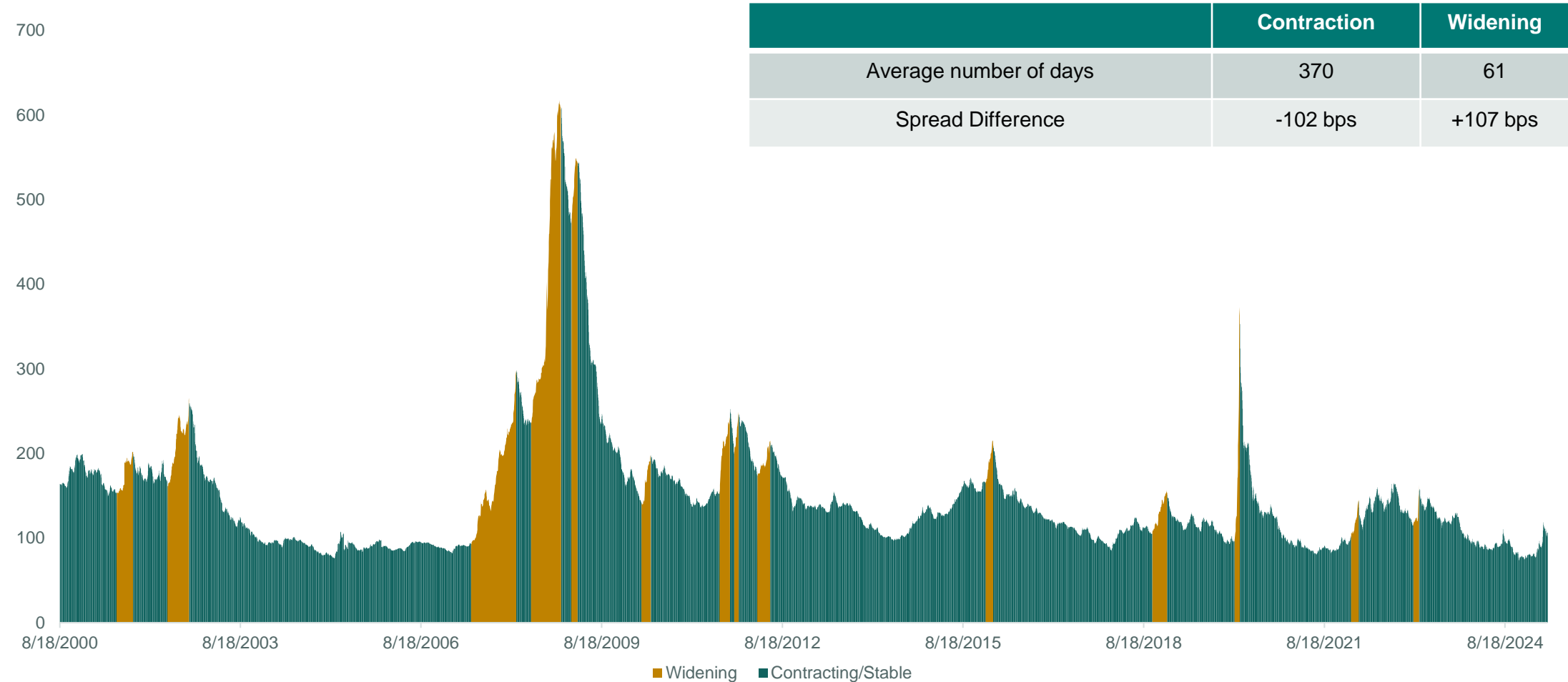
Credit spreads are moving back towards historical averages

Median Option Adjusted Spreads (OAS)



Source: FactSet calculated monthly. Medians as of 12/2001-4/30/2025. Otherwise, dates noted above.
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Dynamics of Option-Adjusted Spreads: Rapid Widening, Gradual Stabilization



Source: FactSet, as of April 2025.

Notes: Spread widening event is characterized by a movement of 39 basis points (bps) within a period of 30 days or less. The period concludes either at the peak spread or if the spread decreases by 39 bps within 30 days or less.

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Corporate bond yields are attractive relative to history but strong demand has helped stabilize spread levels

Yields up, spreads flat



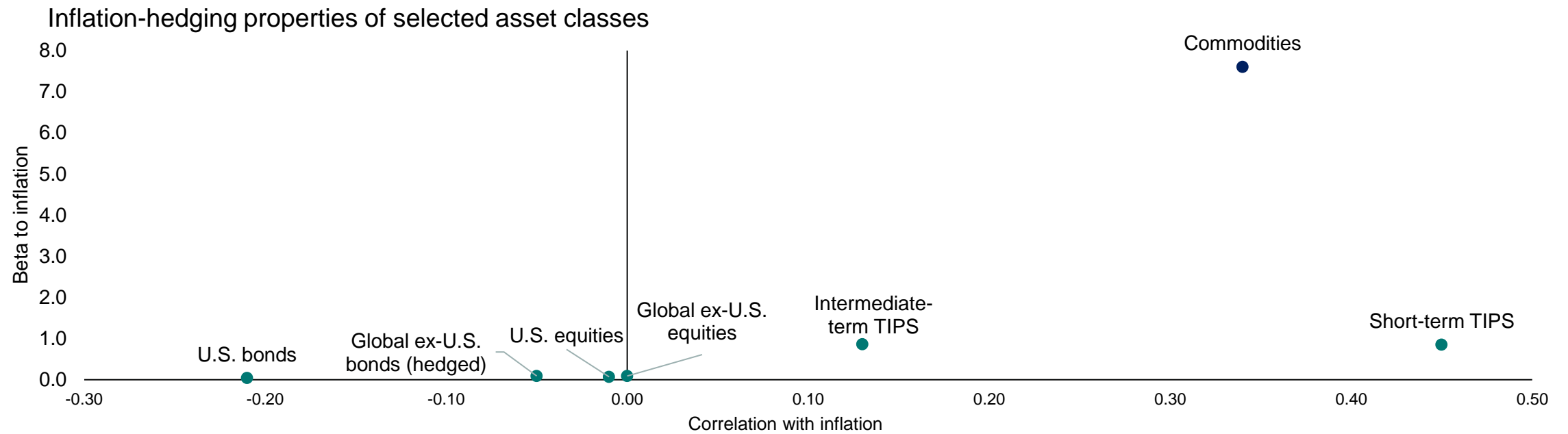
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Source: FactSet, Bloomberg U.S. Corporate Investment Grade Index, as of April 30, 2025.

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Commodities are an overlooked way to diversify against inflation risk



	U.S. bonds	U.S. equities	Global ex-U.S. bonds (hedged)	Global ex-U.S. equities	Short-term TIPS	Intermediate-term TIPS	Commodities
Correlation with inflation	-0.21	-0.01	-0.05	0.00	0.45	0.13	0.34
Beta to inflation	0.04	0.07	0.09	0.09	0.85	0.86	7.60

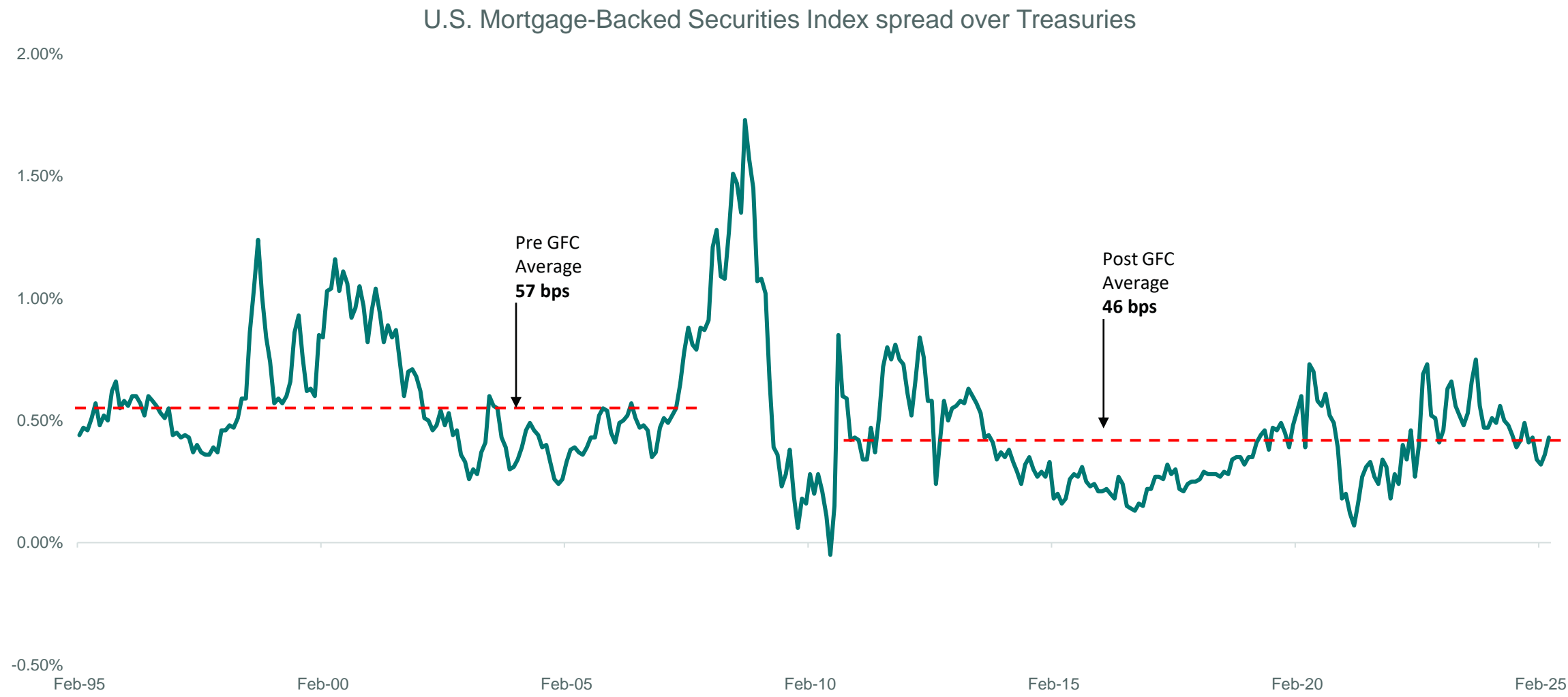
Notes: Correlation with inflation was calculated across the median return from the VCMM distribution of each asset class and inflation within equilibrium market conditions. Inflation beta was calculated as the slope of each asset class and inflation across all 10,000 paths cross-sectionally to year 30 to best represent equilibrium market conditions. See important information slides for further details on asset classes.

Source: Vanguard.

IMPORTANT: The projections and other information generated by the VCMM regarding the likelihood of various investment outcomes are hypothetical in nature, do not reflect actual investment results, and are not guarantees of future results. Distribution of return outcomes from VCMM are derived from 10,000 simulations for each modeled asset class. Simulations as of June 30, 2022. Results from the model may vary with each use and over time. For more information, please see the Important information slide.

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Evolving landscape for MBS puts fair value closer to pre-GFC levels



Source: Bloomberg, as of April 30, 2025.
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Higher quality high-yield has shown a better risk-return profile over the past nearly 30 years

Historical Performance of High-Yield Corporate (Nearly 30 years: 12/31/1996-04/30/2025)

<u>Credit Rating</u>	<u>Annualized Return</u>	<u>Annualized Standard Deviation</u>	<u>Ratio</u>	<u>Current YTW</u>
BB Corporates	6.59	7.32	0.90	6.55%
B Corporates	5.61	8.83	0.63	8.08%
CCC and below Corporates	6.67	13.87	0.48	13.79%

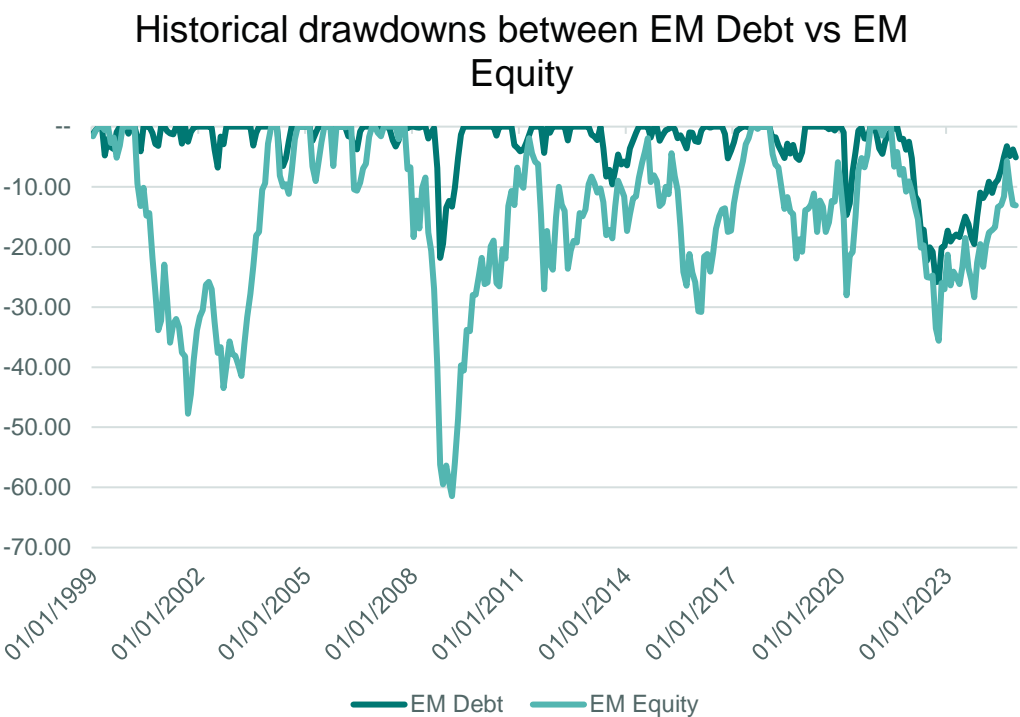
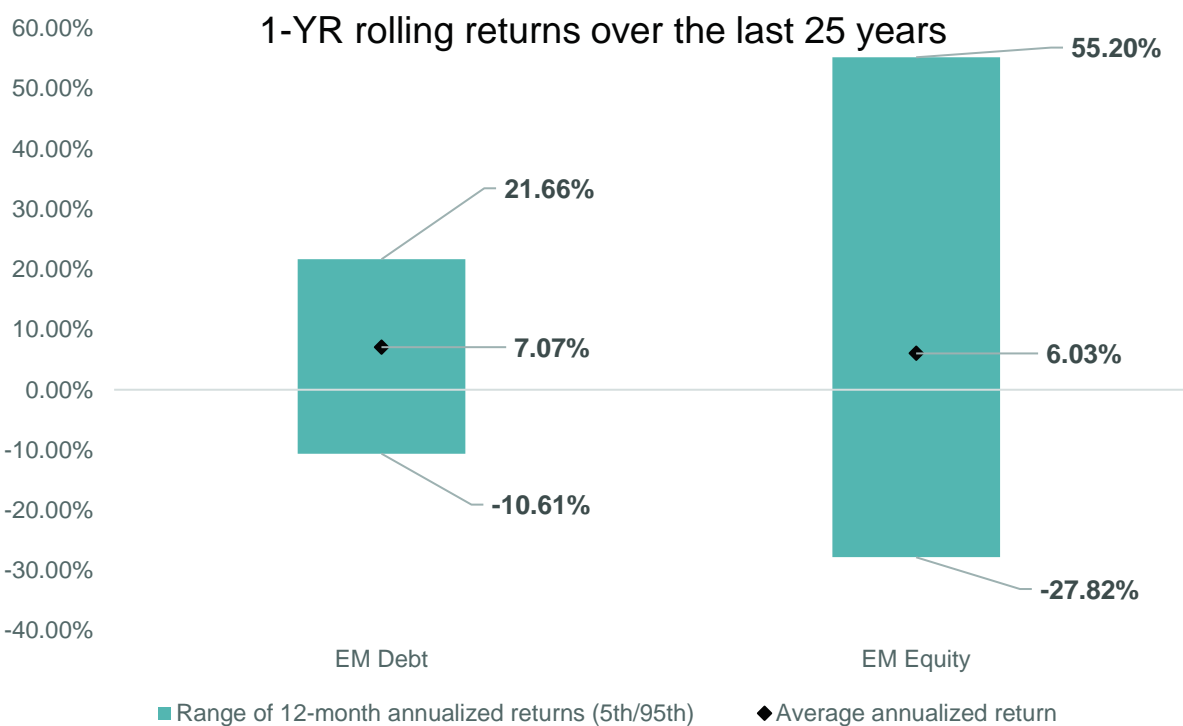
- Lessons learned over the past major credit cycles and research by Wellington and Vanguard have led to a belief that high yield markets miscalculate default risk: compensation increases in a linear fashion while default risk increases exponentially.

Source: ICE BofA ML indices, as of April 30, 2025. See important information. **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.**

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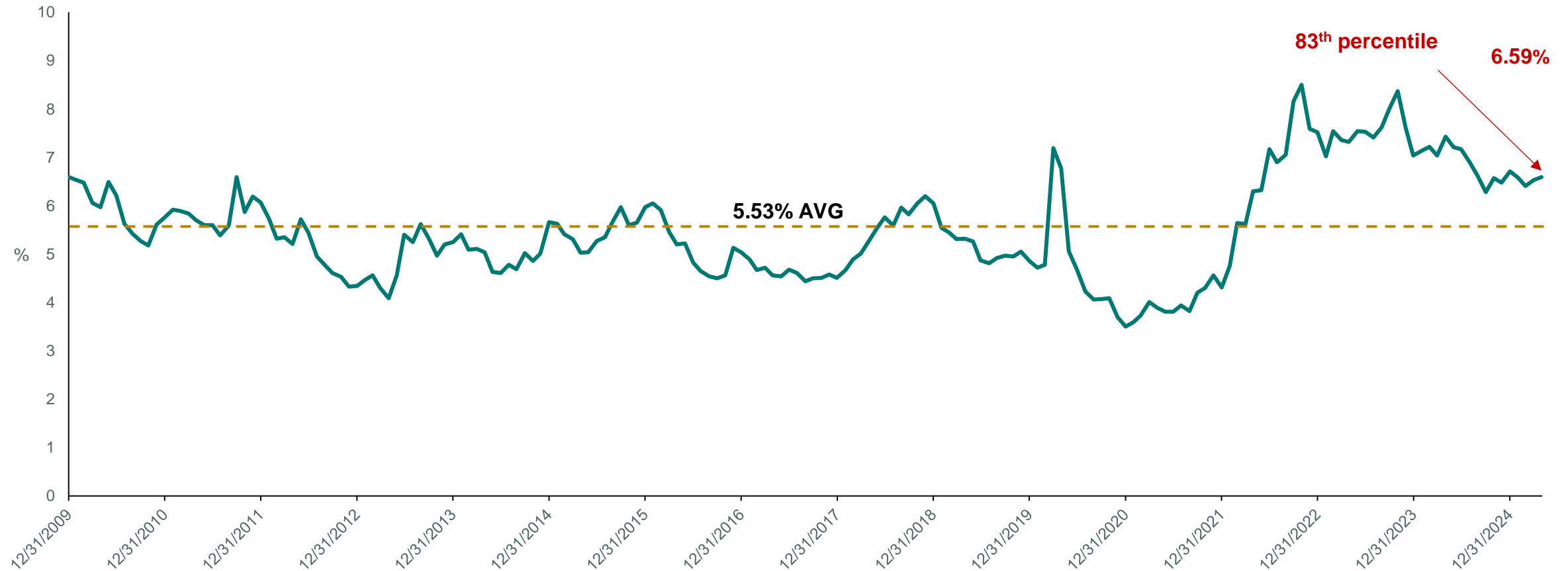
Historically EM bonds have shown a reasonable risk-reward profile relative to EM equities



Data reflects 25-year period ending on December 31, 2024, of rolling 12-month annualized returns.
Source: JPMorgan EMBI Global Diversified Composite for EM debt; MSCI Emerging Markets Index for EM stock using FactSet data.

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Yields across emerging markets are at their highest sustained levels since the global financial crises



Source: FactSet, as of 12/31/2009 – 4/30/2025.

Notes: The chart displays daily yield to worst figures over time on the EM USD Aggregate Index. The gold line denotes the average yield over the stated period.

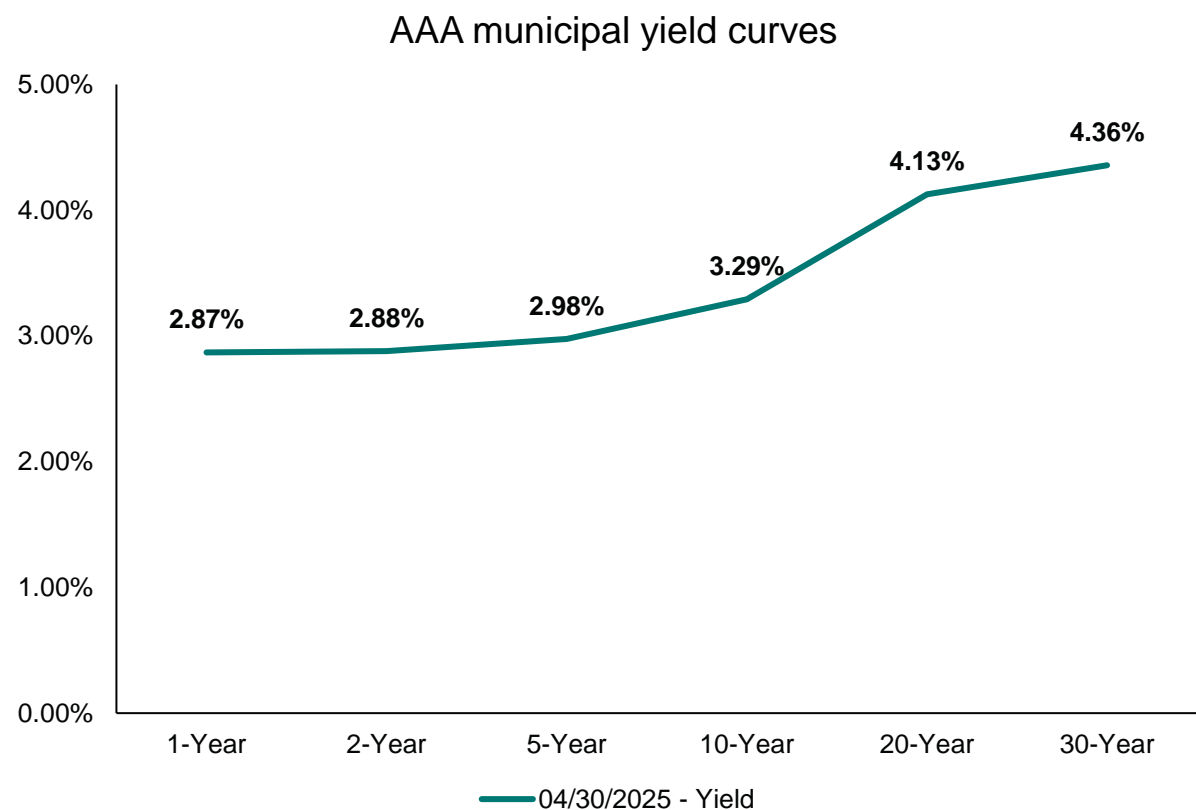
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Municipals

Long end of the curve is upward sloping, while short and intermediate rates remain low relative to their Treasury counterparts

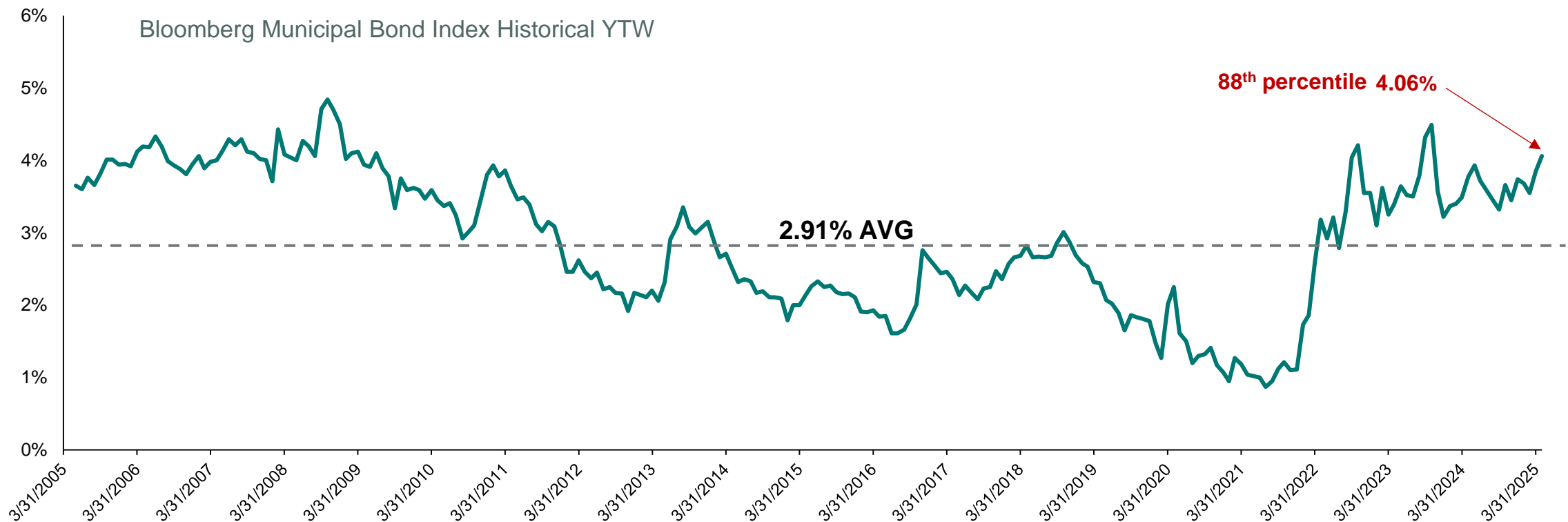


Municipal/Treasury Ratio				
Date	2 Year	5 Year	10 Year	30 Year
12/29/2023	59%	58%	58%	84%
12/31/2024	66%	66%	68%	81%
4/30/2025	81%	82%	81%	95%
10 Year Median	80%	79%	88%	100%

Source: Bloomberg and US Treasury as of dates noted.
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Muni yields have remained above historical averages

Yield Percentiles Over The Past 20 Years					
Muni	AAA	AA	A	BBB	HY
88.20%	87.70%	83.70%	82.30%	70.90%	45.30%



Source: Bloomberg and Vanguard calculations. As of 1/31/2005-4/30/2025.

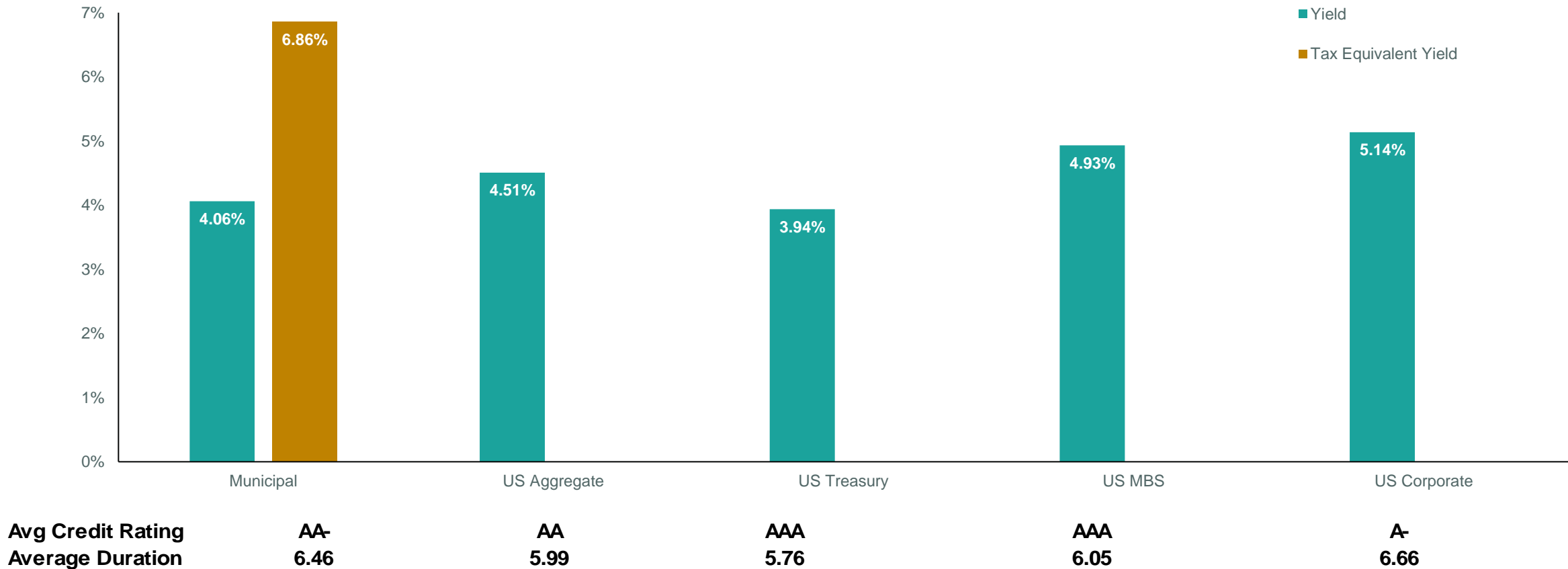
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Tax-equivalent yields for municipal bonds remain attractive for high income earners

Yield to Worst by Market Segment



Source: Bloomberg Indices, using yield-to-worst data as of April 30, 2025.

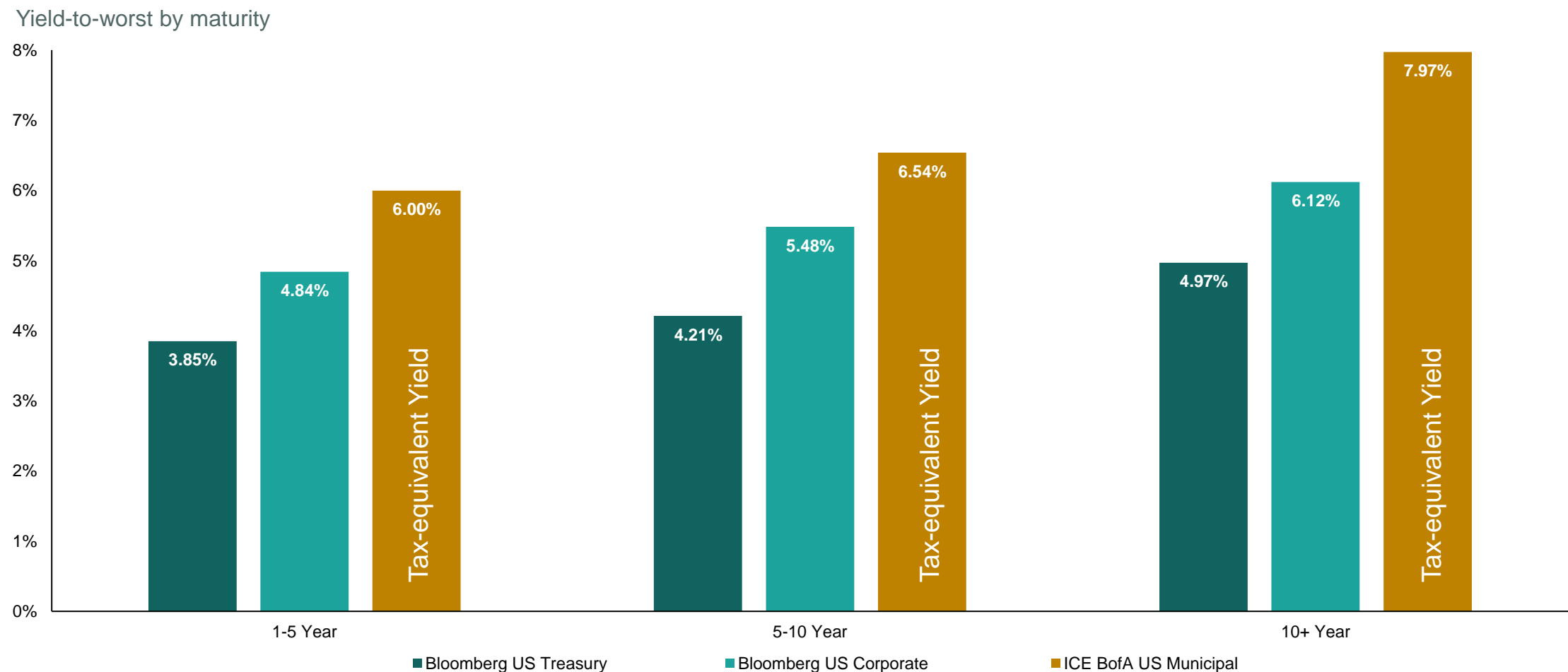
Note: Tax-equivalent yield is calculated using a 40.8% tax bracket, which includes a 37.0% top federal marginal tax rate and a 3.8% net investment income tax to fund Medicare.

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While tax-adjusted yields are broadly similar to corporates, long-term munis continue to show relative value

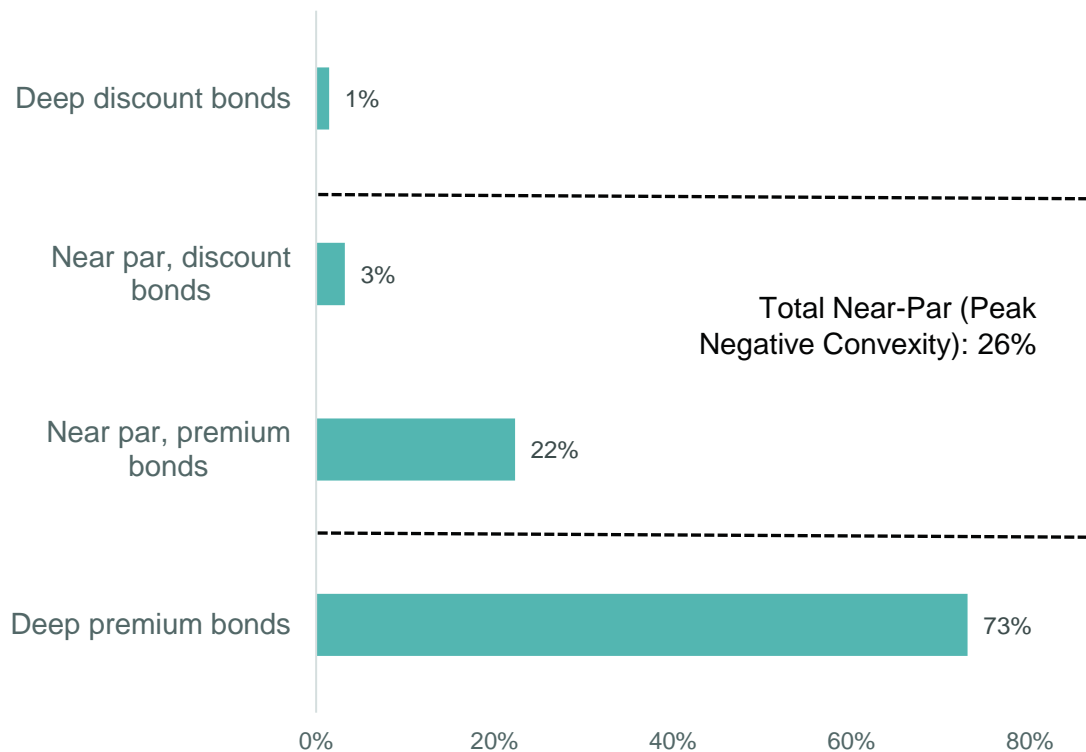


Source: Bloomberg, FactSet, and ICE BofA, using yield to worst data as of April 30 2025.
Note: Tax-equivalent yield is calculated using a 40.8% tax bracket, which includes a 37.0% top federal marginal tax rate and a 3.8% net investment income tax to fund Medicare
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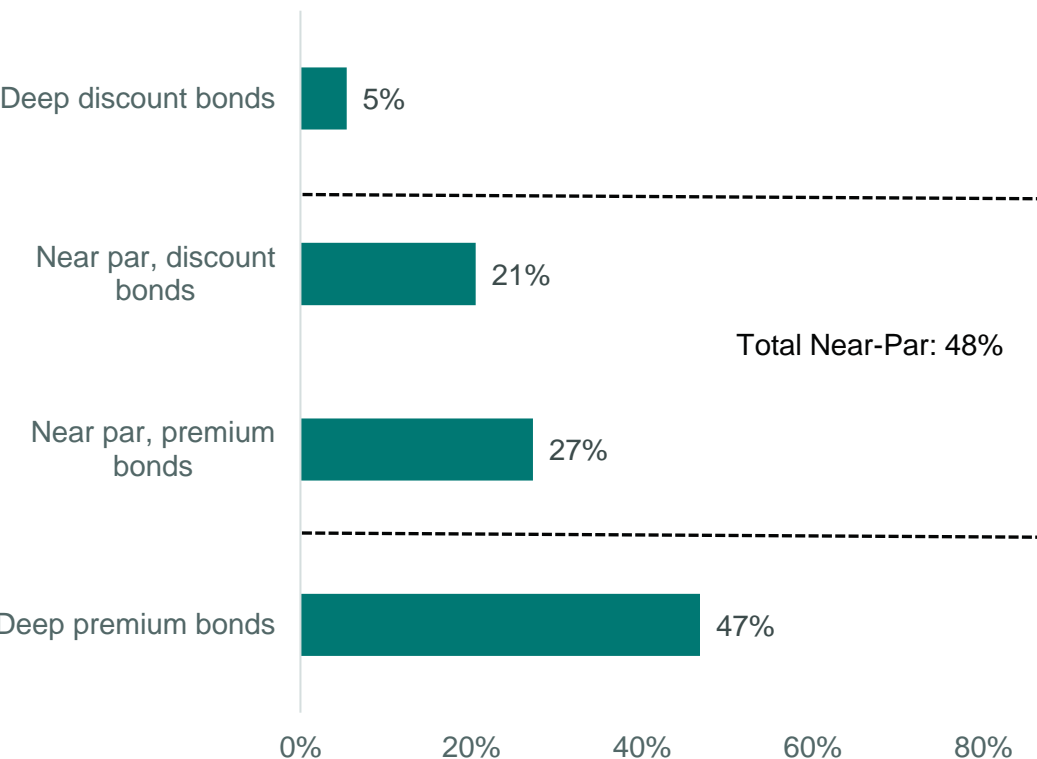


The structure of the market has provided opportunities to derive alpha through optimizing convexity relative to the benchmark, with greater opportunities today

December 31, 2011: % of municipal callable bonds by price category



December 31, 2024: % of municipal callable bonds by price category

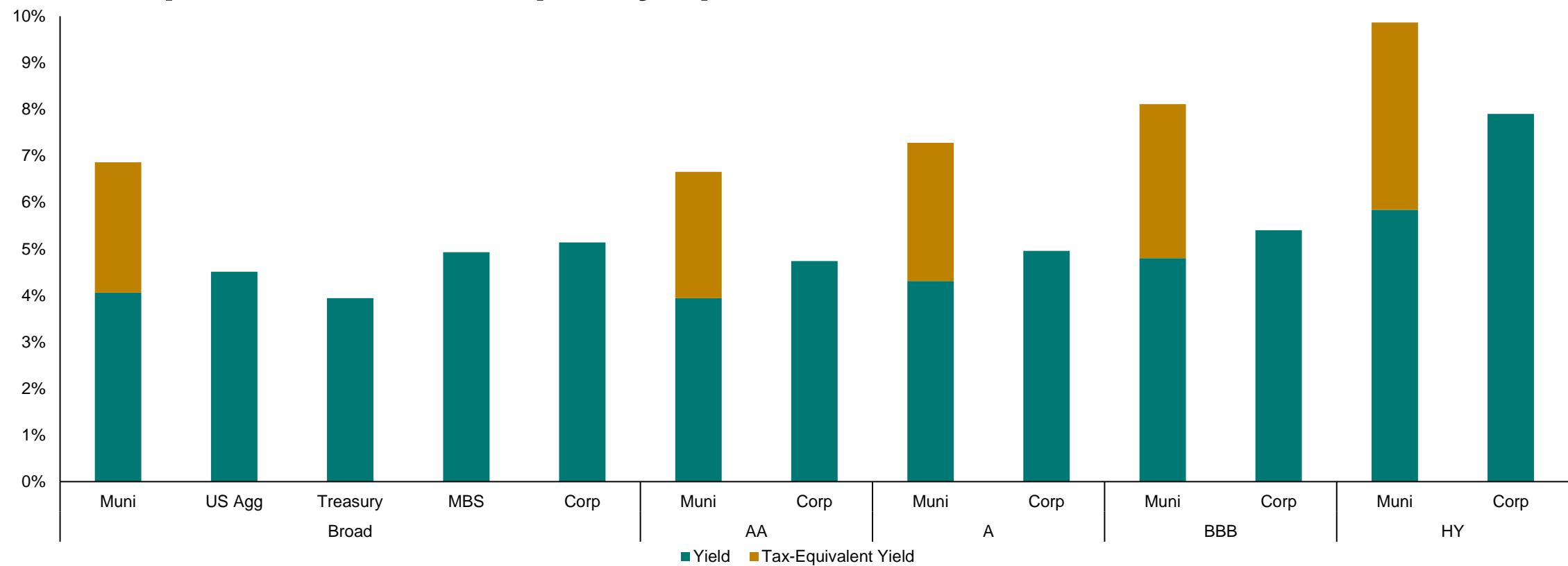


Source: Bloomberg as of December 31, 2024, focusing on callable municipal bonds in the Bloomberg Municipal Bond Index. Deep discount or premium bonds are those with yields 100bps lower or higher, respectively, than their coupon rates. Near par bonds are those with yields within 100 bps of their coupons..

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On an after-tax basis muni yields are more attractive than their taxable counterparts across the quality spectrum

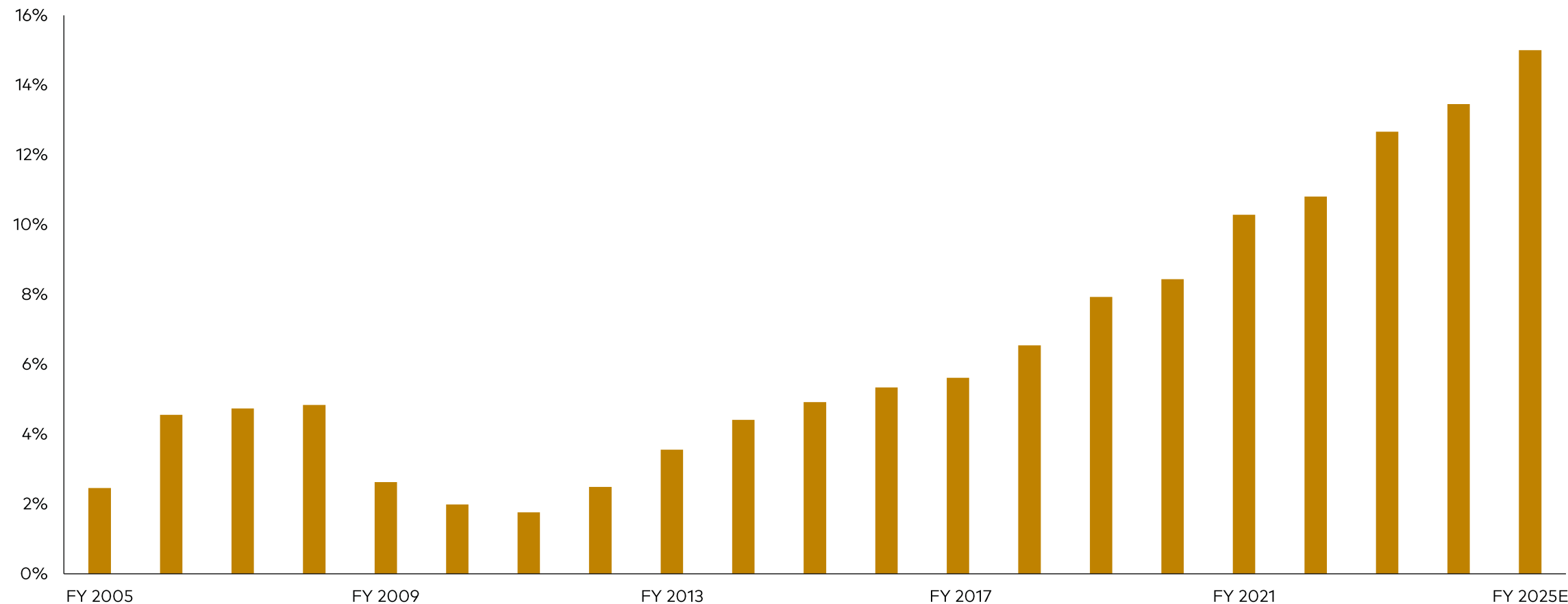


Historical Default Rates (Moody's 1970-2022)	Default Rate
Global Corporate – Investment Grade	2.23%
US Municipal – All Rated	0.15%

Source: Bloomberg Indices, using yield-to-worst data as of April 30, 2025.
 Note: Tax-equivalent yield is calculated using a 40.8% tax bracket, which includes a 37.0% top federal marginal tax rate and a 3.8% net investment income tax to fund Medicare.
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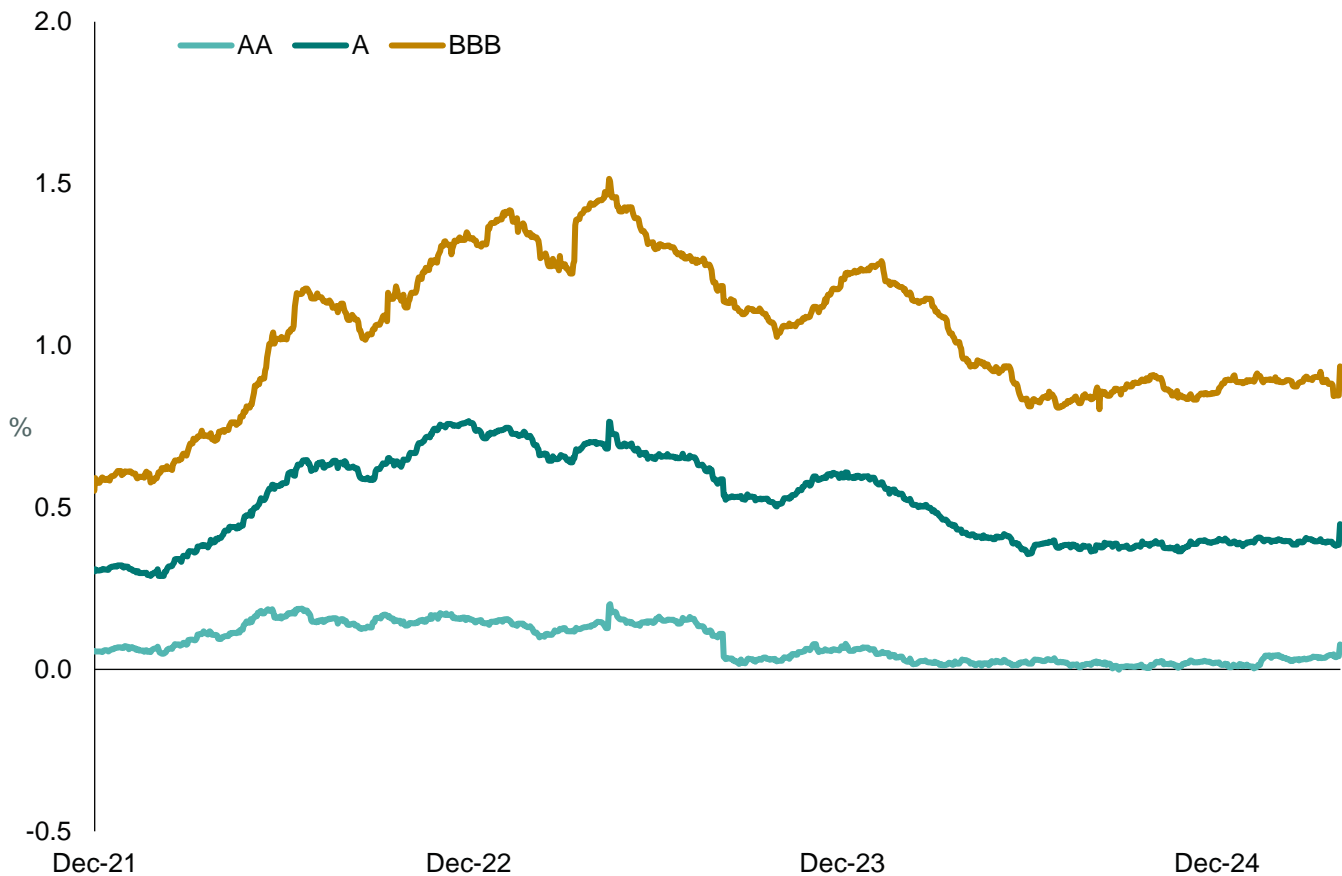
Municipal fundamentals

States' rainy day funds (% of general fund expenditures)



The NASBO (National Association of State Budget Officers) states' rainy day funds as a percentage of general fund expenditures measure the proportion of a state's budget set aside in reserve funds, also known as budget stabilization funds. These funds act as financial safety nets, allowing states to cover budget shortfalls during economic downturns or other unexpected fiscal challenges. Source: NASBO as of February 2025. Note: FY 2025 is estimated, median figures shown.

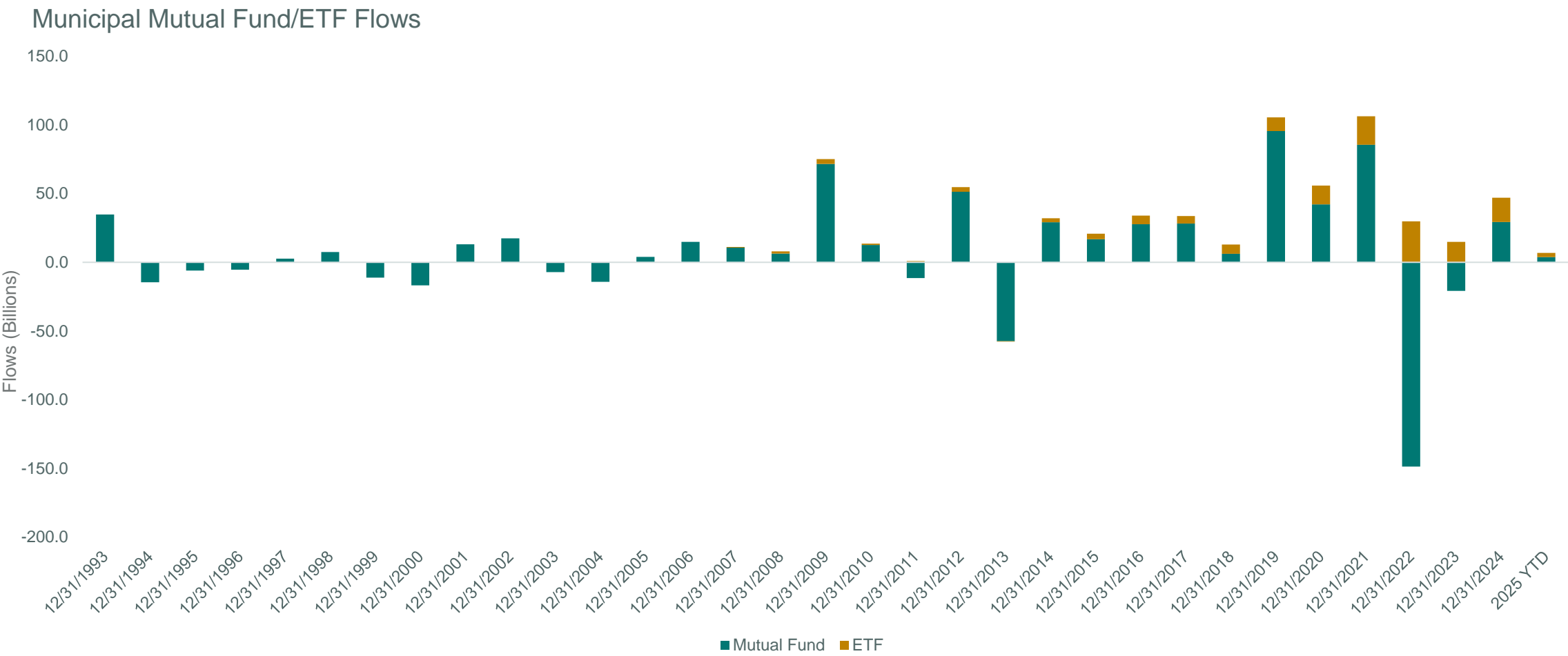
Despite strong fundamentals, investment grade spreads widened during the rate hike cycle and settled below historical averages



Spreads Relative to AAA			
Date	AA	A	BBB
12/29/2023	0.06%	0.59%	1.25%
12/31/2024	0.01%	0.39%	0.89%
4/30/2025	0.08%	0.45%	0.94%
20 Year Median as of 4/30/2025	0.15%	0.67%	1.36%

Source: Bloomberg as of April 30, 2025.
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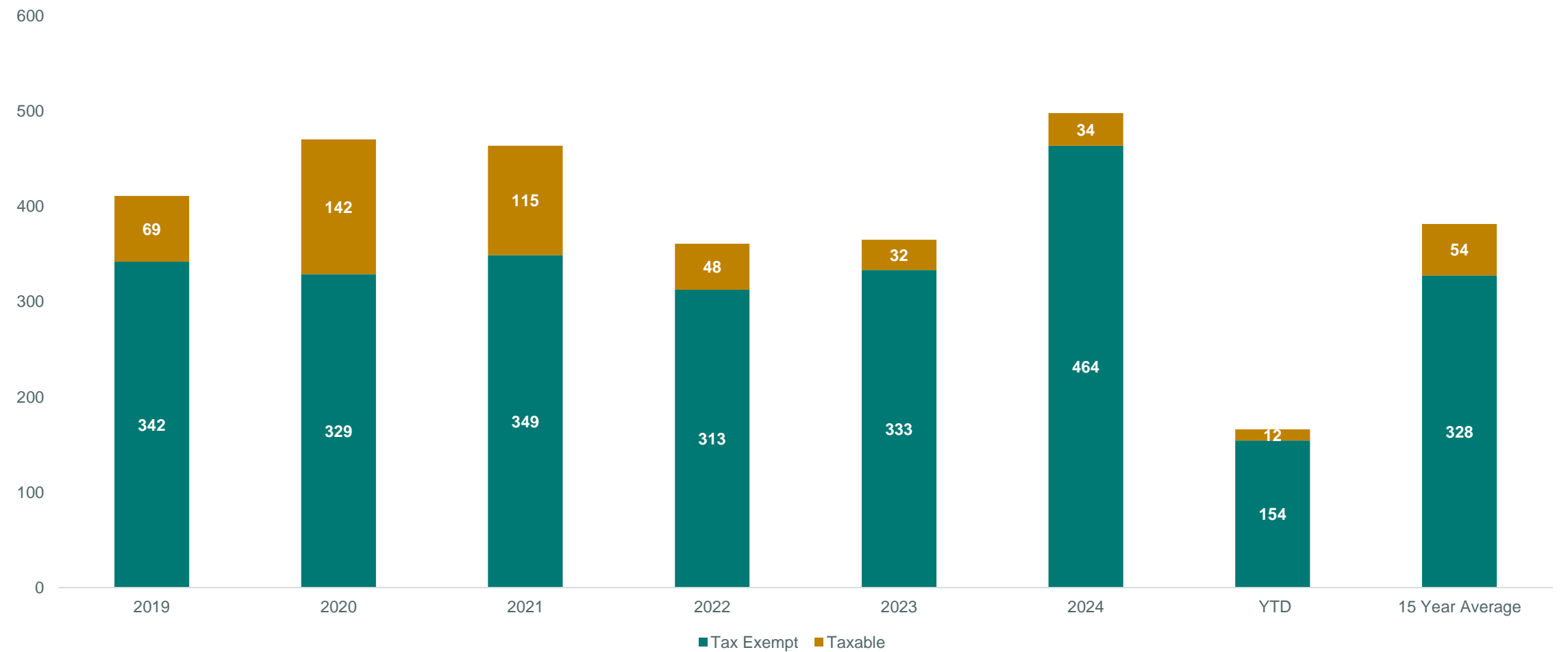
Muni bond flows have been positive throughout 2024, recovering from significant outflows in 2022 and negative trends in 2023



Source: Morningstar Net-Flow monthly from 12/31/1993-3/31/2025.
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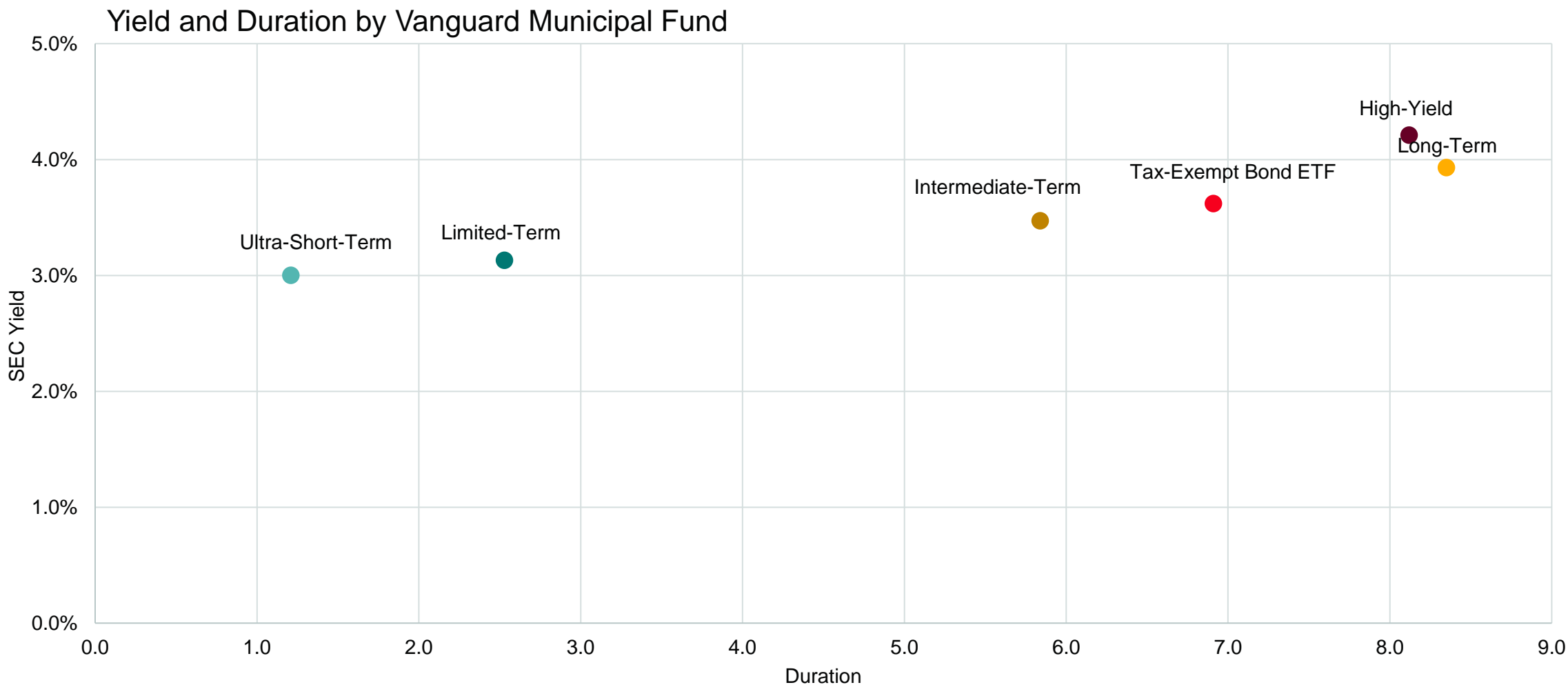
Recent supply trends moderated in 2022-2023 but ticked up in 2024

Annual municipal bond issuance (\$B)



Source: Bloomberg as of April 30, 2025.
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Municipal duration is being compensated with additional yield



The performance data shown represent past performance, which is not a guarantee of future results. Investment returns and principal value will fluctuate, so investors' shares, when sold, may be worth more or less than their original cost. Current performance may be lower or higher than the performance data cited. For performance data current to the most recent month-end, visit our website at www.vanguard.com/performance. There may be other material differences between products that must be considered prior to investing.

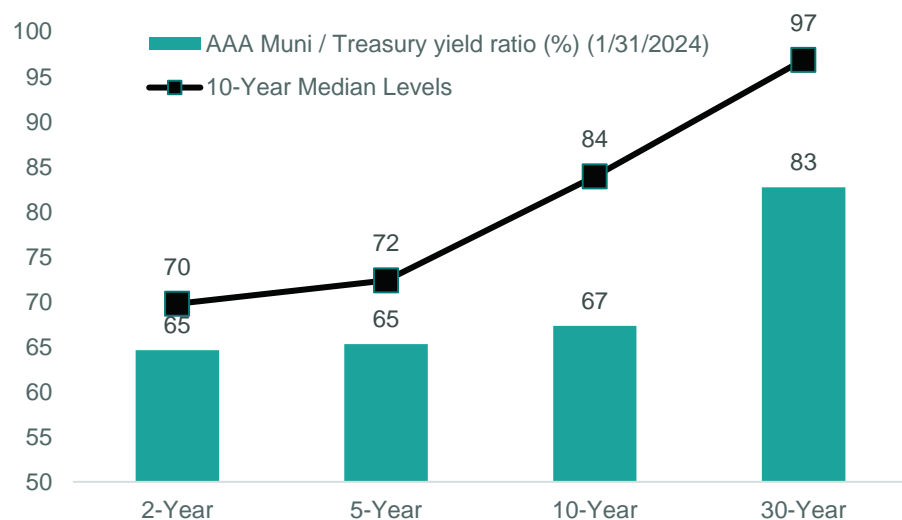
Source: Vanguard as of 4/30/2025
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With higher-rated muni valuations historically compressed, mutual funds are offering compelling yields

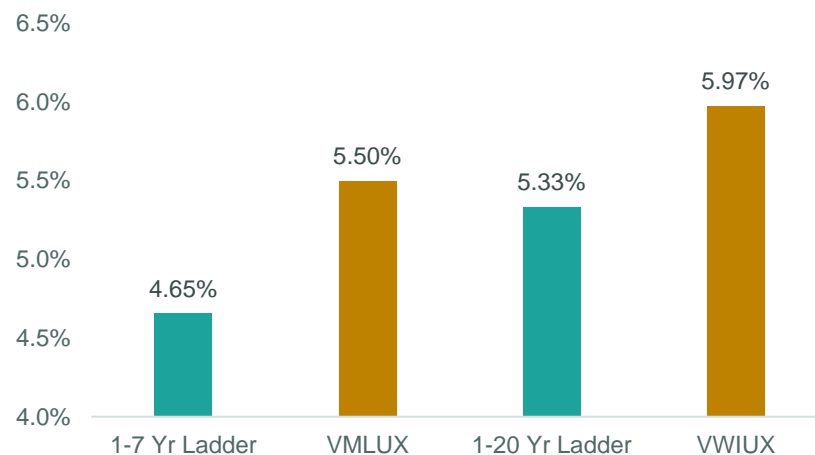
SMA's typically purchase higher-rated bonds, where valuations are now very rich to long-term averages

SMA's/ladders typically purchase higher-rated bonds, where valuations are now very rich to long-term averages



Thus, tax-equivalent yields for our funds appear higher than those of SMA's, given large yield differences

Thus, yields (shown in tax-equivalent basis) for our funds appear higher than those of SMA's/ladders

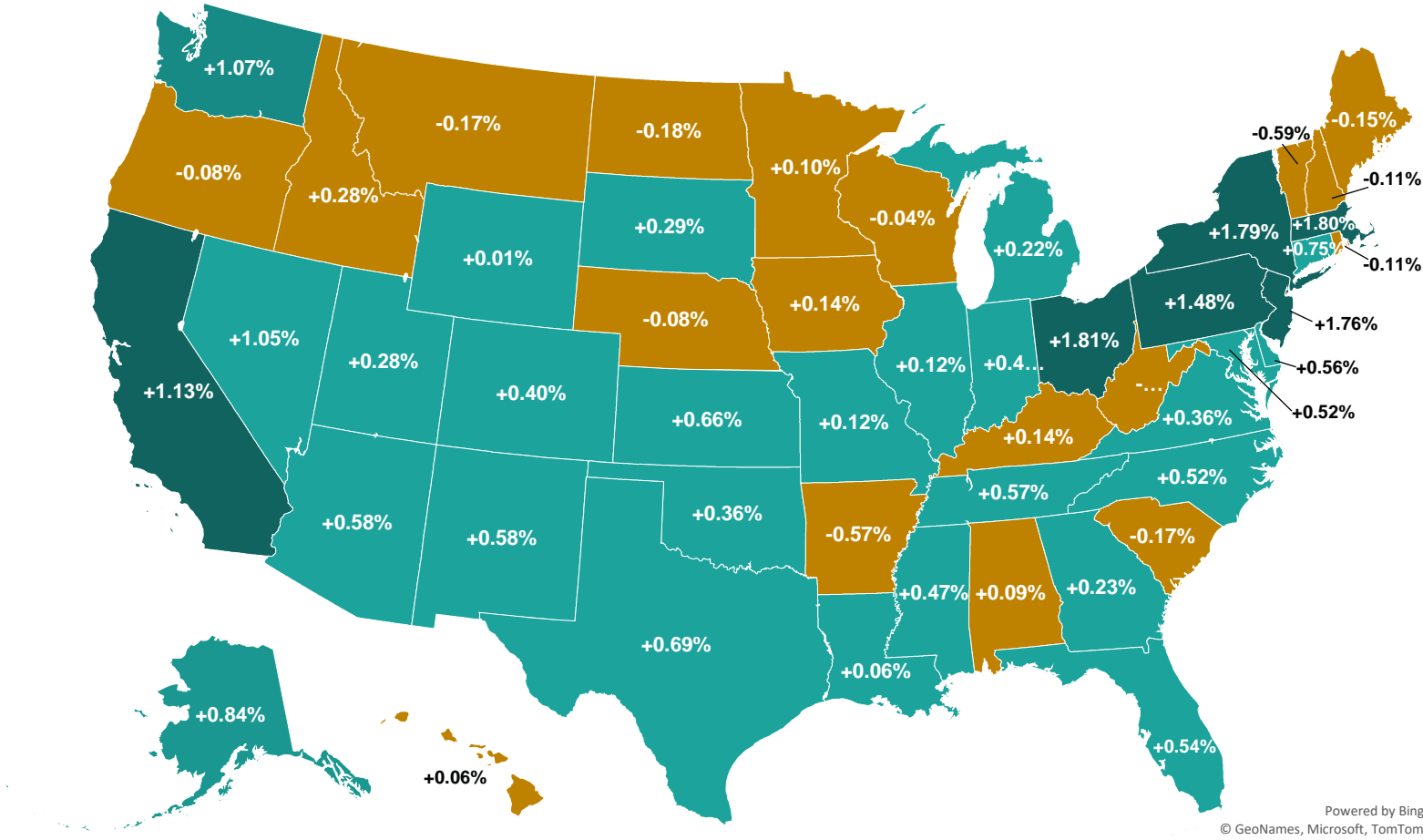


Notes: Data for the left chart is compiled from Bloomberg AAA municipal/Treasury yield ratios using daily observations for the 20 years ended January 31, 2025. In the right chart which shows tax-equivalent yield, ladder yields were constructed using Bloomberg BVAL yield curves, using quality weights of 25% AAAs, 65% AAs, and 10% As, and weighting each year-to-maturity equally from 1 to 7 and 1 to 20 years, accordingly, as of January 31, 2025. Ten basis points of theoretical fees are applied to the ladder yields.

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Our municipal bond funds can offer greater yields in the majority of states, particularly those with higher state taxes

Estimated tax-equivalent yields in Vanguard funds relative to separate accounts by state (in %)



- Vanguard state-specific funds available
- National fund outyielding SMA
- Low issuance/lower rated

The performance data shown represent past performance, which is not a guarantee of future results. Investment returns and principal value will fluctuate, so investors' shares, when sold, may be worth more or less than their original cost. Current performance may be lower or higher than the performance data cited. For performance data current to the most recent month-end, visit our website at www.vanguard.com/performance. The performance of an index is not an exact representation of any particular investment, as you cannot invest directly in an index.

Source: Vanguard, Bloomberg, and Bloomberg indexes, as of September 30, 2024.

Notes: This visual displays the difference between Vanguard modeled SMA yields and those of applicable Vanguard funds. CA, PA, NJ, NY, MA, and OH SMA yields are being compared to those of state-specific funds from Vanguard. All other states are compared against the Vanguard Intermediate-Term Tax-Exempt Fund Admiral Shares™. SMA ladder yields were constructed using Bloomberg BVAL yield curves, using quality weightings of 25% AAA, 65% AA, and 10% A, weighting each year-to-maturity equally from 1 to 20 years. The SMA ladder yield is adjusted for each state using the percentage difference between the Bloomberg national index yield and that of the applicable Bloomberg state index yield. Ten basis points of theoretical fees are applied to the ladder yields. All yields are compared on a tax-equivalent basis for a proper comparison. The top federal tax bracket of 40.8%, which includes a 37.0% top federal marginal tax rate and a 3.8% net investment income tax to fund Medicare, and the top state tax rate are assumed to convert to a tax-equivalent basis. The Vanguard Intermediate-Term Tax-Exempt Fund was only adjusted for the federal tax rate and did not benefit from any state tax adjustments.

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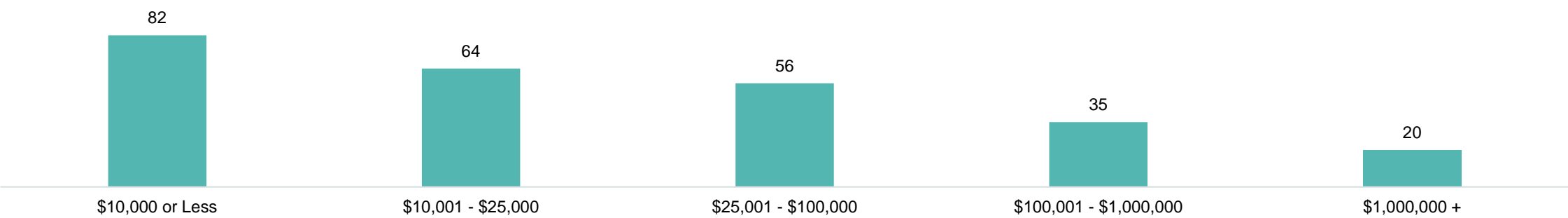
Allocation considerations

Bond funds offer increased diversification, return opportunities, and lower transaction costs, while individual bonds give enhanced control

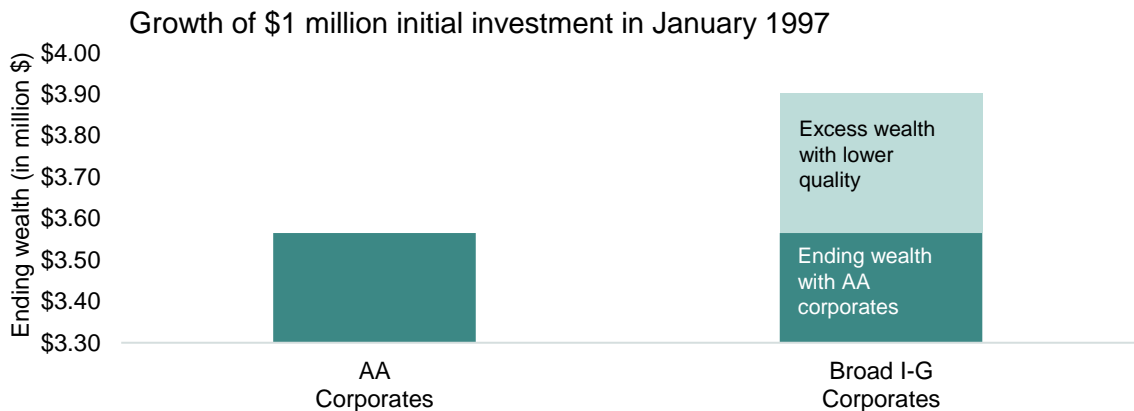
Benefits of choosing either a bond fund or individual bond		
	Bond funds	Individual bonds
Increased control		✓
Increased diversification	✓	
Increased return opportunities	✓	
Lower transaction costs	✓	

Transaction costs are inversely related to transaction size

Average spread (in bps) customers paid by transaction size
January 2019 through April 2021



Diversification can mean higher returns for similar levels of risk



Notes: Growth of \$1 Million figure assumes a hypothetical initial \$1 million investment on January 1, 1997, and held until April 30, 2022. AA corporates as represented by ICE BofA 5–10 Year AA US Corporate Index; and broad I-G corporates as represented by ICE BofA 5–10 Year US Corporate Index. Sources: Vanguard analysis of Morningstar data, as of April 2022.

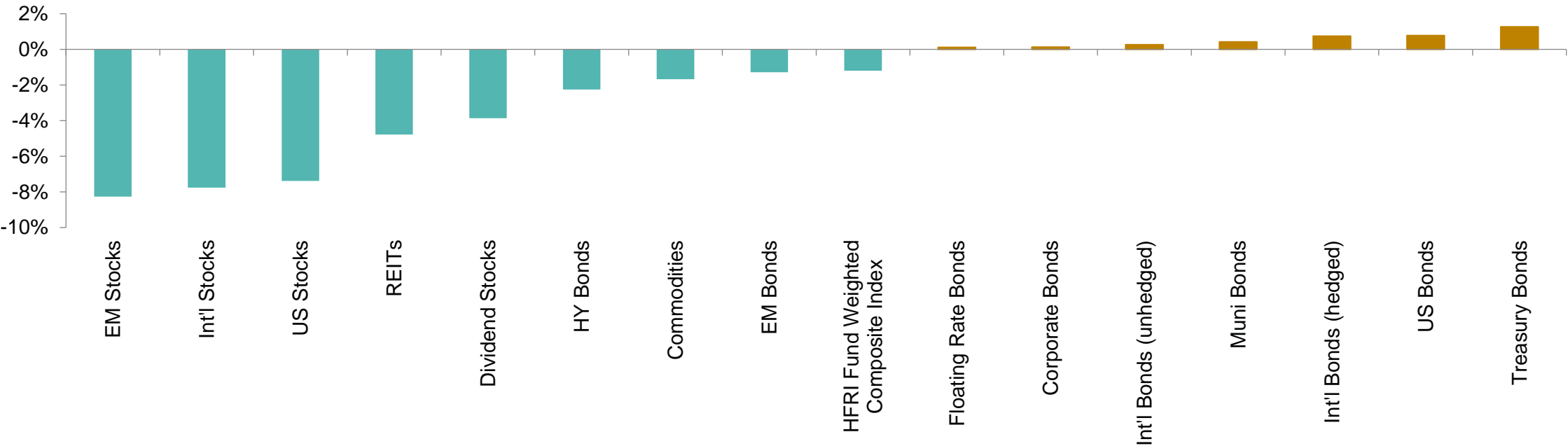
The transaction cost figure shows the average effective spread for municipal bond transactions of various sizes from January 2019 to April 2021. Effective spread is a measure of customer transaction costs and is computed daily for each bond as the difference between the volume-weighted average dealer-to-customer buy and sell price and is then averaged across bonds using equal weighting. Sources: MSRB data and Vanguard Investment Advisory Research Center analysis.

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.

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Bonds provide ballast during equity bear markets

Median monthly asset class returns during bottom-decile U.S. equity months (1988-2024)



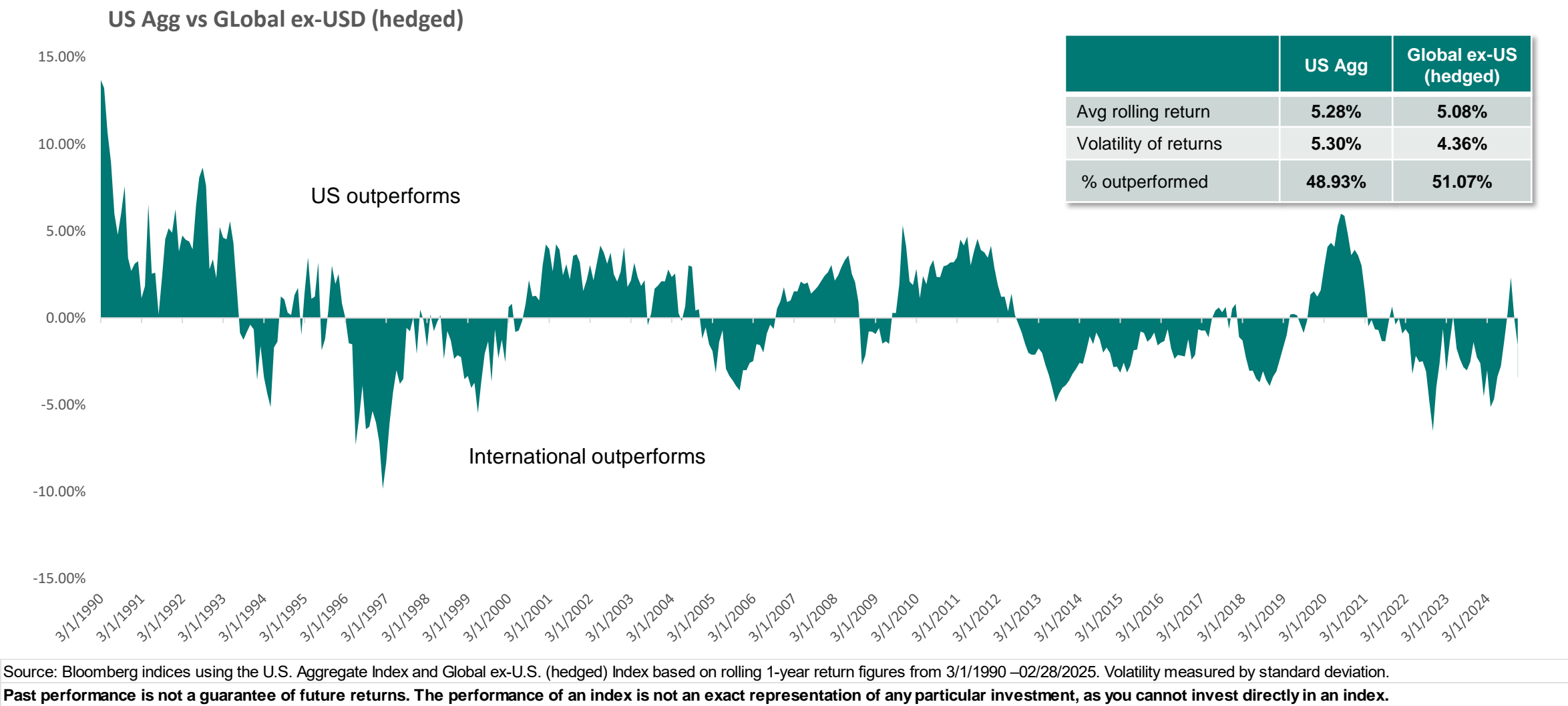
Notes: Emerging-market equities are represented by the MSCI Emerging Markets Index; global ex-U.S. equities by the MSCI AC World ex-USA Index; U.S. equities by the Dow Jones U.S. Total Stock Market Index; U.S. REITs by the FTSE/NAREIT Real Estate Index; U.S. dividend equities by the Dow Jones U.S. Select Dividend Index; U.S. high-yield bonds by the Bloomberg U.S. Corporate High Yield Bond Index; commodities by the Bloomberg Commodity Index; emerging-market bonds by the Bloomberg EM USD Sovereign Index; floating rate bonds by the Credit Suisse Leveraged Loan Index; U.S. corporate bonds by the Bloomberg U.S. Corporate Index; global ex-U.S. bonds by the Bloomberg Global Aggregate ex-USD Bond Index; U.S. bonds by the Bloomberg U.S. Aggregate Bond Index; U.S. municipal bonds by the Bloomberg Municipal Bond Index; U.S. Treasury bonds by the Bloomberg U.S. Treasury Bond Index. All data begin in January 1988, other than the Dow Jones U.S. Select Dividend Index, which begins in January 1992; the Bloomberg Commodity Index, which begins in February 1991, the Bloomberg U.S. Corporate High Yield Bond Index, which begins in February 1988; the HFRI Fund Weighted Composite Index, which begins in January 1990; the Bloomberg EM USD Sovereign Index, which begins in January 1990; and the Bloomberg Global Aggregate ex-USD Bond Index, which begins in January 1990 (unhedged) and February 1990 (hedged).

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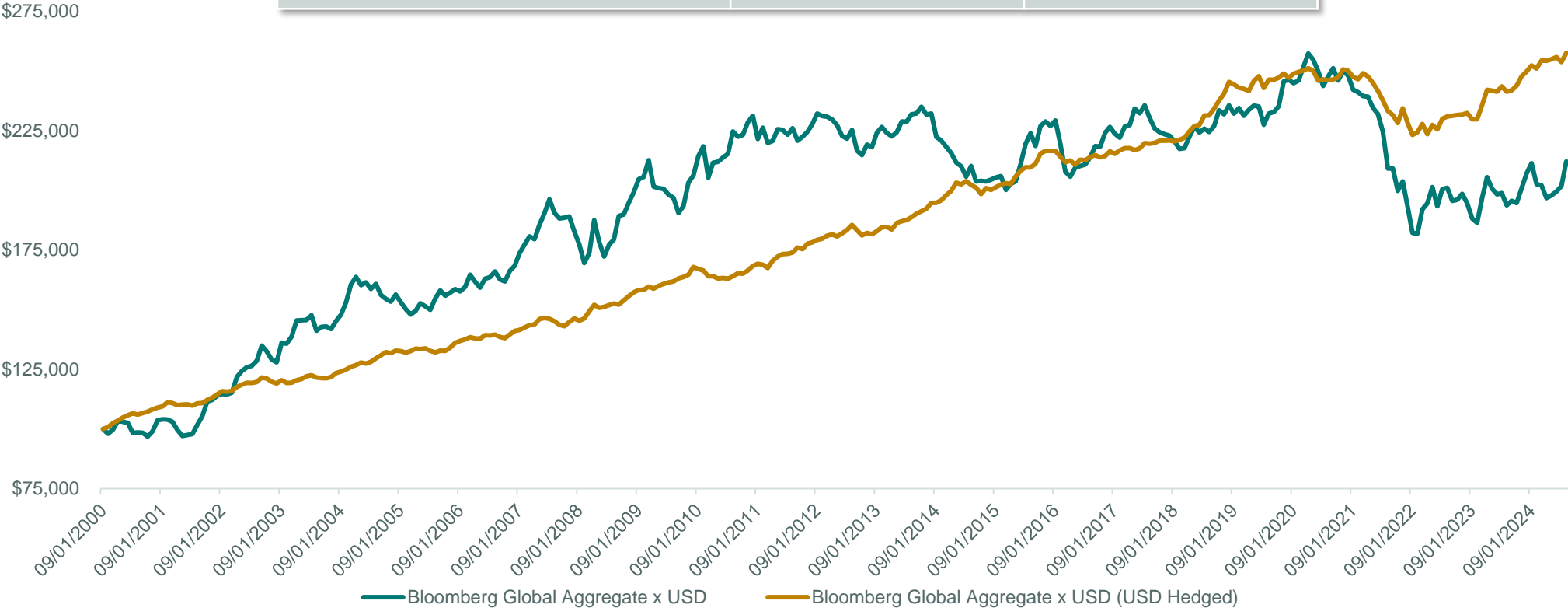


International fixed income provides unique diversification opportunities



Hedging your international bonds has proven to reduce volatility while still providing consistent return potential

	Unhedged	Hedged
Volatility of returns	7.89%	3.18%

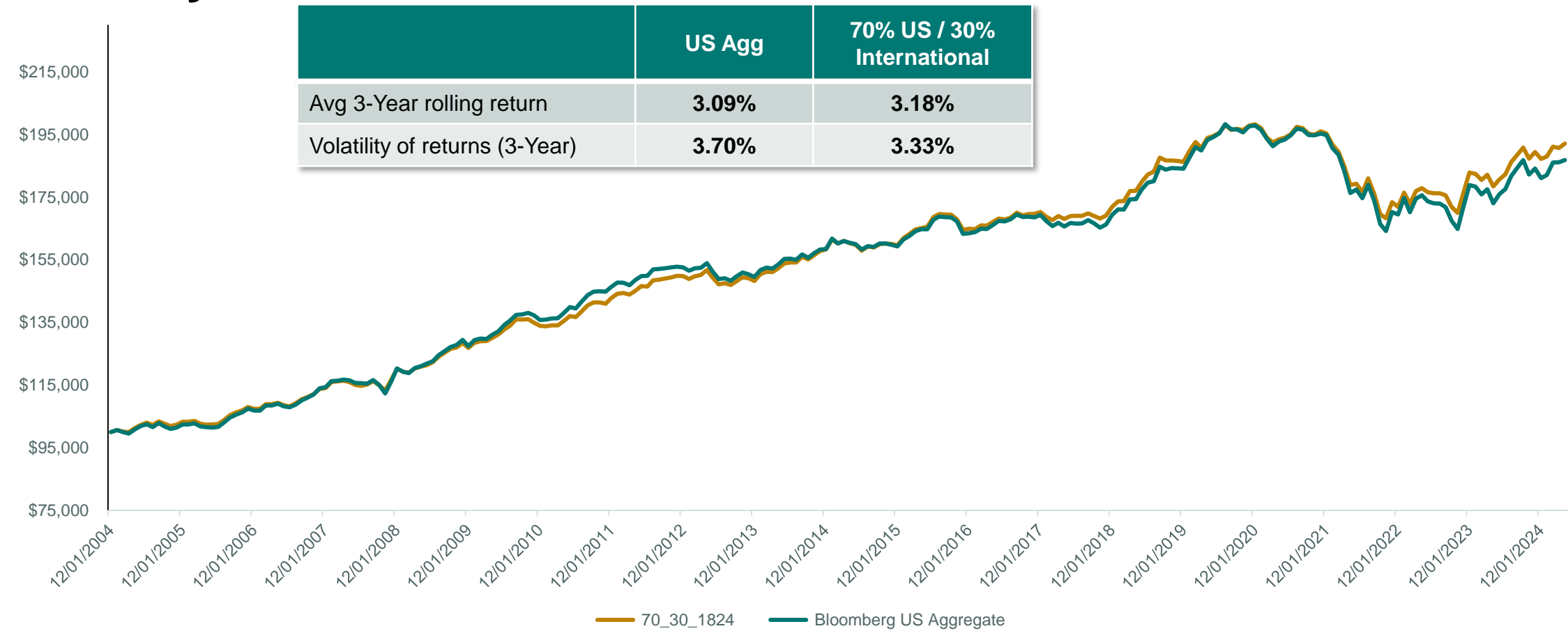


Source: Bloomberg indices using the U.S. Aggregate Index and Global ex-U.S. (hedged) from 9/30/2000 –4/30/2025. Volatility measured by standard deviation.
Past performance is not a guarantee of future returns. The performance of an index is not an exact representation of any particular investment, as you cannot invest directly in an index.

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Diversifying your fixed income sleeve with international exposure has shown product similar returns with reduced volatility



Source: Bloomberg indices using the U.S. Aggregate Index and Global ex-U.S. (hedged) from 12/31/2004 –4/30/2025. Volatility measured by standard deviation.
Past performance is not a 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.

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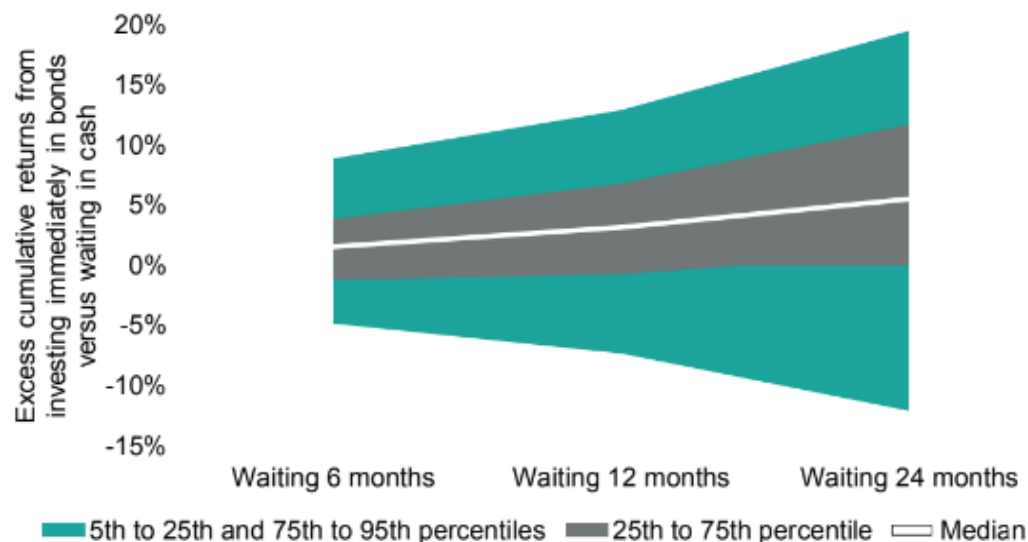


Lump-sum range of excess return versus other methods

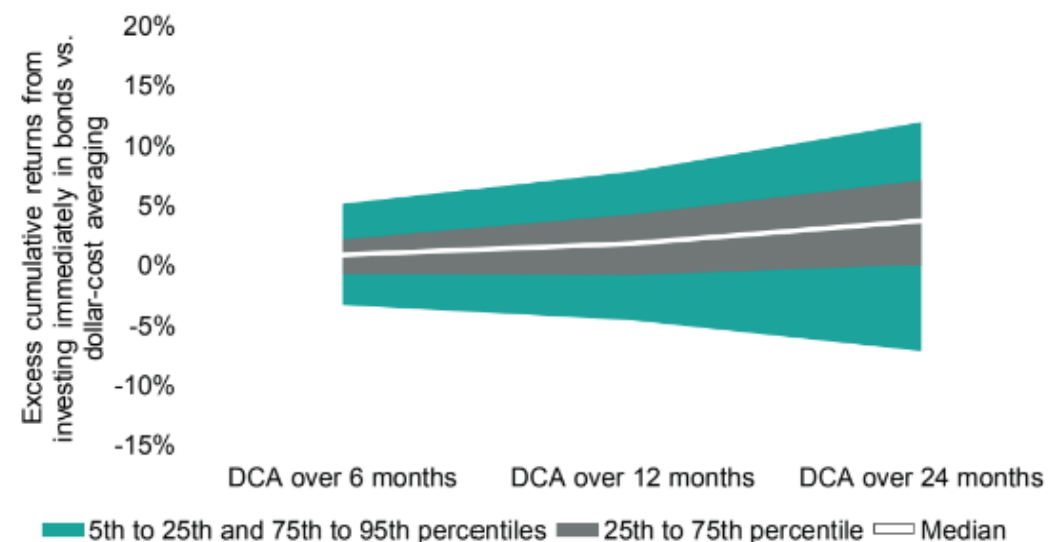
Historically, immediately investing a lump sum in U.S. bonds outperformed either waiting a significant time in cash or dollar-cost averaging

Range of excess return from investing immediately vs. waiting to invest or dollar-cost averaging (1970–2022)

Waiting to invest



Dollar-cost averaging



Source: Vanguard Investment Advisory Research Center analysis using data from Bloomberg.

Notes: Dollar-cost averaging assumes an equal dollar investment in U.S. bonds every three months, including the beginning of the time period. Investments, when made, are in U.S. aggregate bonds, with cash not invested earning 90-day Treasury rate of interest. Performance is measured as total wealth 24 months after initial investment. A spliced index history was used for all analyses: From 1/1/1970 to 12/31/1972: IA SBBI US IT Govt TR USD; from 1/1/1973 to 12/31/1975: Bloomberg U.S. Govt/Credit Intermediate TR USD; from 1/1/1976 to 6/30/2009: Bloomberg U.S. Agg Bond TR USD; from 7/1/2009 to 12/31/2022: Bloomberg U.S. Agg Float Adj TR USD.

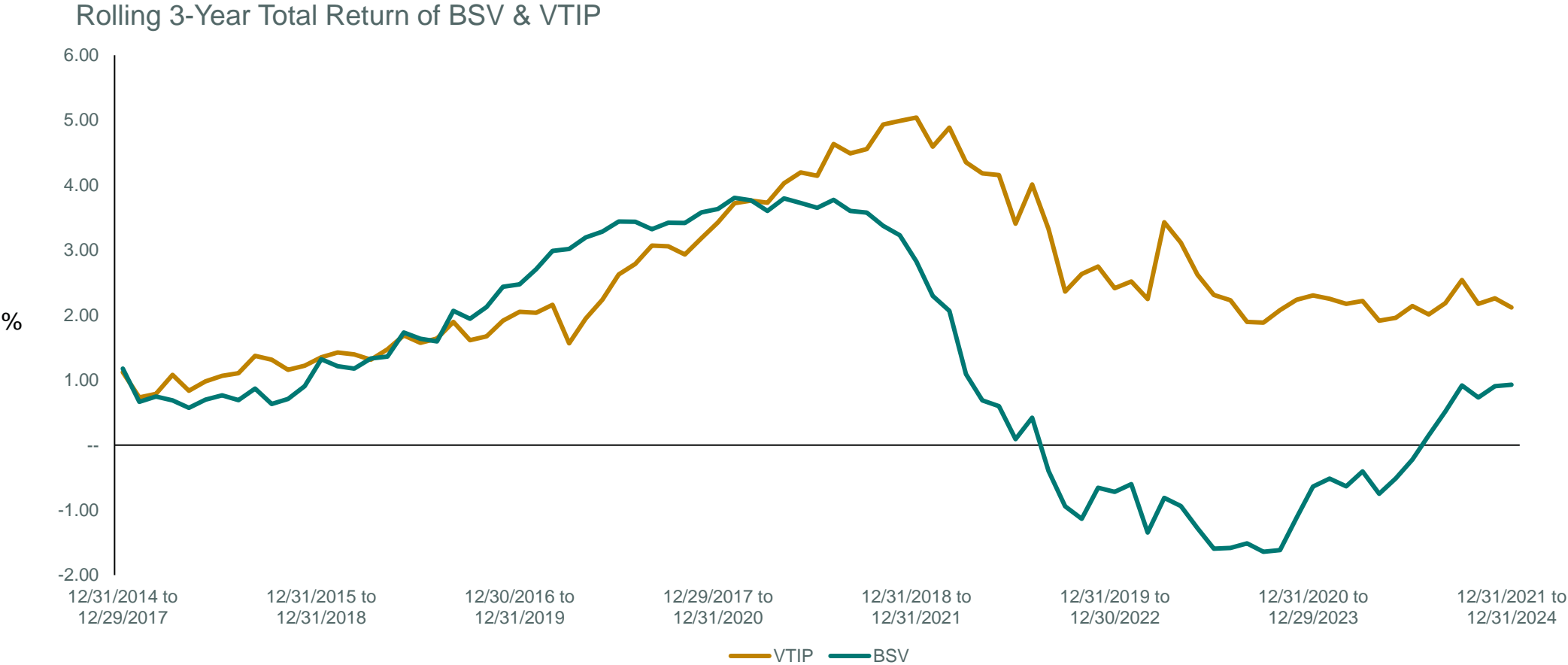
Dollar-cost averaging does not guarantee that your investments will make a profit, nor does it protect you against losses when stock or bond prices are falling.

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

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During the last inflation surge, short-term TIPS provided stability for investors' portfolios compared to a similar duration short-term bond fund.

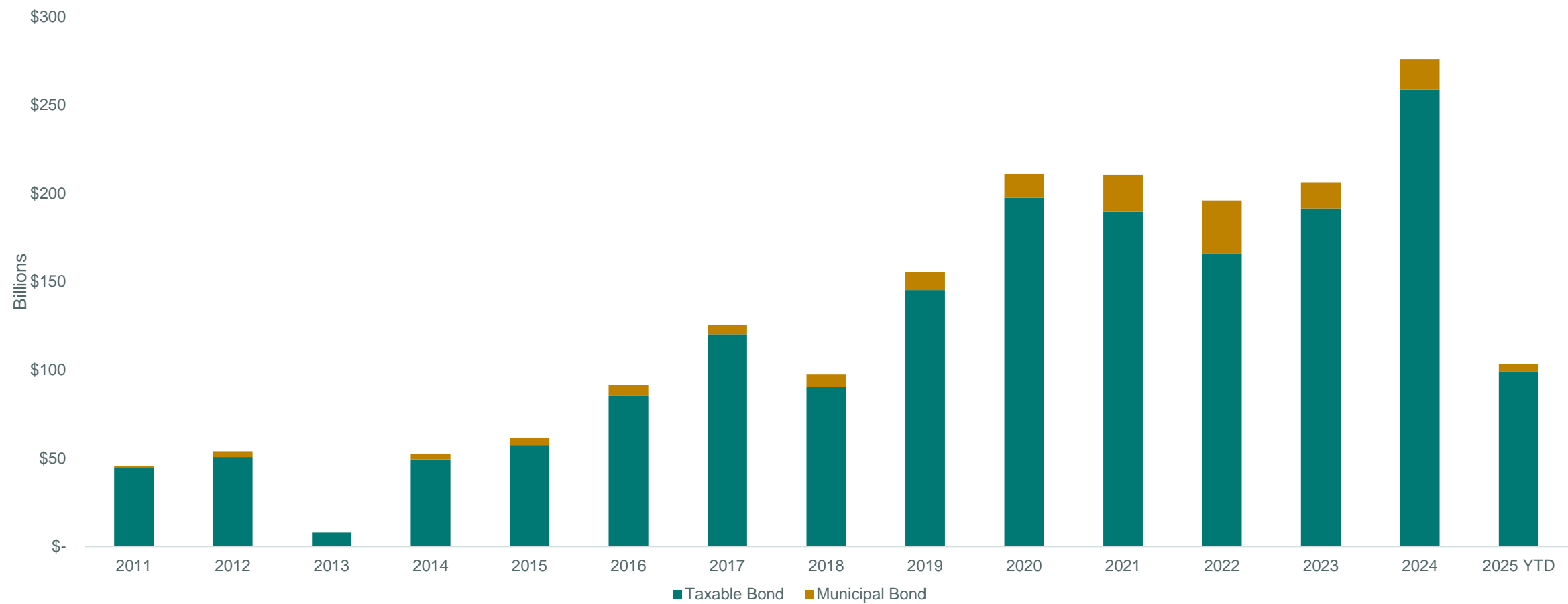


Source: FactSet from December 31, 2014 to December 31, 2024
See important information. **Past performance is no guarantee of future returns. The performance of an index is not an exact representation of any particular investment, as you cannot invest directly in an index.**
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ETFs are slowly becoming a preferred vehicle for advisors in the fixed income space

Yearly Flows to Fixed Income ETFs



Source: Vanguard analysis of Morningstar data. Data as of April 30, 2025.
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Appendix

Standardized performance data

FUND/BENCHMARK		EXPENSE RATIO	SEC Yield	Tax Equivalent Yield*	Year-To-Date	1 Year	3 YEAR	5 YEAR	10 YEAR	SINCE INCEPTION	INCEPTION
Vanguard OH Long-Term Tax-Exempt Fund	VOHIX	0.13%	4.26%	7.20%	-1.43%	2.48%	2.09%	1.18%	2.44%	5.01%	6/18/1990
Bloomberg OH Municipal Index		as of 12/31/2024			-0.84%	1.92%	1.94%	0.90%	2.03%		
+/- Benchmark					-0.59%	0.56%	0.15%	0.28%	0.41%		
Vanguard MA Tax-Exempt Fund	VMATX	0.13%	4.11%	6.94%	-1.61%	1.77%	2.27%	1.15%	2.22%	3.72%	12/9/1998
Bloomberg MA Municipal Index		as of 12/31/2024			-1.28%	1.43%	1.91%	0.64%	1.85%		
+/- Benchmark					-0.33%	0.35%	0.36%	0.51%	0.37%		
Vanguard NJ Long-Term Tax-Exempt Fund Admiral	VNJUX	0.09%	4.10%	6.93%	-1.48%	2.18%	2.70%	2.34%	2.93%	4.02%	5/14/2001
Bloomberg NJ Municipal Index		as of 12/31/2024			-0.94%	1.92%	2.90%	2.61%	2.97%		
+/- Benchmark					-0.54%	0.27%	-0.20%	-0.26%	-0.03%		
Vanguard Limited-Term Tax-Exempt Fund Admiral	VMLUX	0.09%	3.49%	5.90%	0.74%	3.58%	2.98%	1.86%	1.73%	2.46%	2/12/2001
Bloomberg 1-5 Year Municipal Index		as of 12/31/2024			-1.03%	1.66%	2.21%	1.17%	2.10%		
+/- Benchmark					1.76%	1.92%	0.77%	0.69%	-0.37%		
Vanguard Intermediate-Term Tax-Exempt Fund Admiral Shares (VWIUX)	VWIUX	0.09%	3.86%	6.52%	-0.41%	2.37%	2.70%	1.60%	2.17%	3.48%	2/12/2001
Bloomberg 1-15 Year Municipal Index		as of 12/31/2024			-0.23%	1.99%	2.44%	1.28%	1.97%		
+/- Benchmark					-0.17%	0.38%	0.26%	0.33%	0.20%		
Vanguard NY Long-Term Tax-Exempt Fund Admiral	VNYUX	0.09%	4.11%	6.94%	-1.52%	2.00%	2.67%	1.55%	2.37%	3.83%	5/14/2001
Bloomberg NY Municipal Index		as of 12/31/2024			-1.22%	1.57%	2.37%	1.24%	1.99%		
+/- Benchmark					-0.30%	0.43%	0.31%	0.31%	0.38%		

The performance data shown represent past performance, which is not a guarantee of future results. Investment returns and principal value will fluctuate, so investors' shares, when sold, may be worth more or less than their original cost. Current performance may be lower or higher than the performance data cited. For performance data current to the most recent month-end, visit our website at www.vanguard.com/performance.
Note: Tax-equivalent yield is calculated using a 40.8% tax bracket, which includes a 37.0% top federal marginal tax rate and a 3.8% net investment income tax to fund Medicare utilizing SEC yields.
Source: Vanguard and Morningstar, as of April 30, 2025.



Standardized performance data

FUND/BENCHMARK		EXPENSE RATIO	SEC Yield	Tax Equilivant Yield*	Year-To-Date	1 Year	3 YEAR	5 YEAR	10 YEAR	SINCE INCEPTION	INCEPTION
Vanguard PA Long-Term Tax-Exempt Fund Admiral	VPALX	0.09%	4.24%	7.16%	-1.42%	1.97%	2.27%	1.45%	2.58%	3.94%	5/14/2001
Bloomberg PA Municipal Index					as of 12/31/2024	-0.92%	1.66%	2.21%	1.29%	2.32%	
+/- Benchmark						-0.50%	0.31%	0.07%	0.16%	0.27%	
Vanguard CA Intermediate-Term Tax-Exempt Fund Admiral	VCADX	0.09%	3.74%	6.32%	-0.49%	2.34%	2.86%	1.44%	2.12%	3.33%	11/12/2001
Bloomberg Municipal CA Intermediate Index					as of 12/31/2024	-0.41%	1.65%	2.38%	0.84%	1.73%	
+/- Benchmark						-0.08%	0.70%	0.48%	0.59%	0.39%	
Vanguard S&P 500 ETF	VFIAX	0.09%	1.31%		-4.94%	12.05%	12.13%	15.57%	12.28%	7.95%	11/12/2001
S&P 500 TR USD					as of 12/31/2024	-4.92%	12.10%	12.17%	15.61%	12.32%	
+/- Benchmark						-0.01%	-0.05%	-0.05%	-0.04%	-0.04%	
Vanguard Total Bond Market Index Admiral	VBTLX	0.09%	4.46%		3.20%	7.94%	1.99%	-0.67%	1.52%	3.30%	11/12/2001
Bloomberg US Agg Float Adj Index					as of 12/31/2024	3.16%	7.94%	2.00%	-0.64%	1.58%	
+/- Benchmark						0.04%	0.00%	-0.02%	-0.03%	-0.06%	
Vanguard High-Yield Tax-Exempt Admiral	VWALX	0.09%	4.57%	7.72%	-1.43%	2.46%	2.73%	2.48%	2.93%	4.12%	11/12/2001
Bloomberg Municipal Index					as of 12/31/2024	-1.03%	1.66%	2.21%	1.17%	2.10%	
+/- Benchmark						-0.40%	0.80%	0.53%	1.31%	0.83%	
Vanguard Tax-Exempt Bond Index Admiral	VTEAX	0.09%	3.89%	6.57%	-1.24%	1.64%	2.12%	1.13%		2.02%	11/12/2001
S&P National AMT Free Muni Index					as of 12/31/2024	-1.21%	1.64%	2.18%	1.20%		
+/- Benchmark						-0.03%	-0.01%	-0.06%	-0.07%		

The performance data shown represent past performance, which is not a guarantee of future results. Investment returns and principal value will fluctuate, so investors' shares, when sold, may be worth more or less than their original cost. Current performance may be lower or higher than the performance data cited. For performance data current to the most recent month-end, visit our website at www.vanguard.com/performance.
Note: Tax-equivalent yield is calculated using a 40.8% tax bracket, which includes a 37.0% top federal marginal tax rate and a 3.8% net investment income tax to fund Medicare utilizing SEC yields.
Source: Vanguard and Morningstar, as of April 30, 2025.



Important information: Bloomberg Indexes

Bloomberg Global Aggregate ex-USD Float Adjusted RIC Capped Index (USD Hedged) is a market-cap weighted index measuring investment grade fixed rate bonds outside of the US.

Bloomberg US Aggregate Float Adjusted Index is a market-cap weighted index measuring investment grade US dollar-denominated, fixed-rate taxable bonds.

Bloomberg Agg US Government Index is a market-cap weighted index representing investment-grade US government bonds.

Bloomberg Agg US MBS Index is a market-cap weighted index representing investment-grade US MBS bonds.

Bloomberg Agg US ABS Index is a market-cap weighted index representing investment-grade US ABS bonds.

Bloomberg Agg US CMBS Index is a market-cap weighted index representing investment-grade US CMBS bonds.

Bloomberg Municipal Bond Index is a market-cap weighted index representing the USD-denominated tax exempt bond market.

Bloomberg US Agg Corporate Index is a market-cap weighted index representing the investment grade, US-dollar denominated, fixed-rate, taxable corporate bond market.

Bloomberg US Agg Corporate High-Yield Index is a market-cap weighted index representing USD-denominated, high yield, fixed rate corporate bond market. Securities are classified as high yield if the middle rating of Moody's, Fitch and S&P is Ba1/BB+/BB+ or below.

Bloomberg EM USD Agg Index is a market-cap weighted index that measures the performance of USD denominated emerging markets debt.

Bloomberg Global Emerging Markets (USD) Index is a market-cap weighted index that measures the performance of USD-denominated debt from sovereign, quasi-sovereign, and corporate EM issuers.

Bloomberg US Corporate Investment Grade is a market-cap weighted index representing the investment grade, US-dollar denominated, fixed-rate, taxable corporate bond market.

Bloomberg US High Yield – Corporate is a market-cap weighted index representing USD-denominated, high yield, fixed rate corporate bond market. Securities must be rated high-yield (Ba1/BB+ or lower, by at least two of the following ratings agencies: Moody's, Fitch and S&P. If there are two ratings, the lower rating is used, and if there is only one, the rating must be high yield).

Bloomberg Emerging Markets USD Sovereign is a hard currency index representing the USD denominated debt from sovereign, quasi-sovereign, and corporate emerging markets issuers. Country classification is based on World Bank income groups and International Monetary Fund country classifications, and includes both investment-grade and high-yield debt.

Important information

IMPORTANT: The projections or other information generated by the Vanguard Capital Markets Model® (VCMM) regarding the likelihood of various investment outcomes are hypothetical in nature, do not reflect actual investment results, and are not guarantees of future results. VCMM® results will vary with each use and over time.

The VCMM projections are based on a statistical analysis of historical data. Future returns may behave differently from the historical patterns captured in the VCMM. More importantly, the VCMM may be underestimating extreme negative scenarios unobserved in the historical period on which the model estimation is based.

The Vanguard Capital Markets Model is a proprietary financial simulation tool developed and maintained by Vanguard's primary investment research and advice teams. The model forecasts distributions of future returns for a wide array of broad asset classes. Those asset classes include U.S. and international equity markets, several maturities of the U.S. Treasury and corporate fixed income markets, international fixed income markets, U.S. money markets, commodities, and certain alternative investment strategies. The theoretical and empirical foundation for the Vanguard Capital Markets Model is that the returns of various asset classes reflect the compensation investors require for bearing different types of systematic risk (beta). At the core of the model are estimates of the dynamic statistical relationship between risk factors and asset returns, obtained from statistical analysis based on available monthly financial and economic data from as early as 1960. Using a system of estimated equations, the model then applies a Monte Carlo simulation method to project the estimated interrelationships among risk factors and asset classes as well as uncertainty and randomness over time. The model generates a large set of simulated outcomes for each asset class over several time horizons. Forecasts are obtained by computing measures of central tendency in these simulations. Results produced by the tool will vary with each use and over time.

Indexes for VCMM Simulations

The long-term returns of our hypothetical portfolios are based on data for the appropriate market indexes through December 31, 2024. We chose these benchmarks to provide the most complete history possible, and we apportioned the global allocations to align with Vanguard's guidance in constructing diversified portfolios. Asset classes and their representative forecast indexes are as follows:

- **U.S. equities:** MSCI US Broad Market Index.
- **Global ex-U.S. equities:** MSCI All Country World ex USA Index.
- **U.S. REITs:** FTSE/NAREIT US Real Estate Index.
- **U.S. cash:** U.S. 3-Month Treasury—constant maturity.
- **U.S. Treasury bonds:** Bloomberg U.S. Treasury Index.
- **U.S. short-term Treasury bonds:** Bloomberg U.S. 1–5 Year Treasury Bond Index.
- **U.S. long-term Treasury bonds:** Bloomberg U.S. Long Treasury Bond Index.
- **U.S. credit bonds:** Bloomberg U.S. Credit Bond Index.
- **U.S. short-term credit bonds:** Bloomberg U.S. 1–3 Year Credit Bond Index.
- **U.S. high-yield corporate bonds:** Bloomberg U.S. High Yield Corporate Bond Index.
- **U.S. bonds:** Bloomberg U.S. Aggregate Bond Index.
- **Global ex-U.S. bonds:** Bloomberg Global Aggregate ex-USD Index.
- **U.S. TIPS:** Bloomberg U.S. Treasury Inflation Protected Securities Index.
- **U.S. short-term TIPS:** Bloomberg U.S. 1–5 Year Treasury Inflation Protected Securities Index.
- **Emerging-market sovereign bonds:** Bloomberg Emerging Markets USD Aggregate Bond Index.
- **Commodities:** Bloomberg Commodity Index.
- **Mortgage-backed securities (MBS):** Bloomberg U.S. Mortgage Backed Securities Index.

All equity indexes below are weighted by market capitalization:

- **Small-cap equities:** Stocks with a market cap in the lowest two-thirds of the Russell 3000 Index.
- **Large-cap equities:** Stocks with a market cap in the highest one-third of the Russell 1000 Index.
- **Growth equities:** Stocks with a price/book ratio in the highest one-third of the Russell 1000 Index.
- **Value equities:** Stocks with a price/book ratio in the lowest one-third of the Russell 1000 Index.

Important information (continued)

For more information about Vanguard funds or ETF Shares, contact your financial advisor to obtain a prospectus or, if available, a summary prospectus. Investment objectives, risks, charges, expenses, and other important information are contained in the prospectus; read and consider it carefully before investing.

Vanguard ETF Shares are not redeemable with the issuing Fund other than in very large aggregations worth millions of dollars. Instead, investors must buy and sell Vanguard ETF Shares in the secondary market and hold those shares in a brokerage account. In doing so, the investor may incur brokerage commissions and may pay more than net asset value when buying and receive less than net asset value when selling.

All investing is subject to risk, which may result in loss of principal. Be aware that fluctuations in the financial markets and other factors may cause declines in the value of your account. There is no guarantee that any particular asset allocation or mix of funds will meet your investment objectives or provide you with a given level of income. Prices of mid- and small-cap stocks often fluctuate more than those of large-company stocks. Investments in stocks or bonds issued by non-U.S. companies are subject to risks including country/regional risk and currency risk. These risks are especially high in emerging markets. Funds that concentrate on a relatively narrow market sector face the risk of higher share-price volatility. It is possible that tax-managed funds will not meet their objective of being tax-efficient. Because company stock funds concentrate on a single stock, they are considered riskier than diversified stock funds.

Investments in bond funds are subject to the risk that an issuer will fail to make payments on time, and that bond prices will decline because of rising interest rates or negative perceptions of an issuer's ability to make payments. High-yield bonds generally have medium- and lower-range credit-quality ratings and are therefore subject to a higher level of credit risk than bonds with higher credit-quality ratings. 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. Diversification does not ensure a profit or protect against a loss.

The Factor Funds are subject to investment style risk, which is the chance that returns from the types of stocks in which a Factor Fund invests will trail returns from U.S. stock markets. The Factor Funds are also subject to manager risk, which is the chance that poor security selection will cause a Factor Fund to underperform its relevant benchmark or other funds with a similar investment objective, and sector risk, which is the chance that significant problems will affect a particular sector in which a Factor Fund invests, or that returns from that sector will trail returns from the overall stock market.

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