Bond Market Update

October 2022

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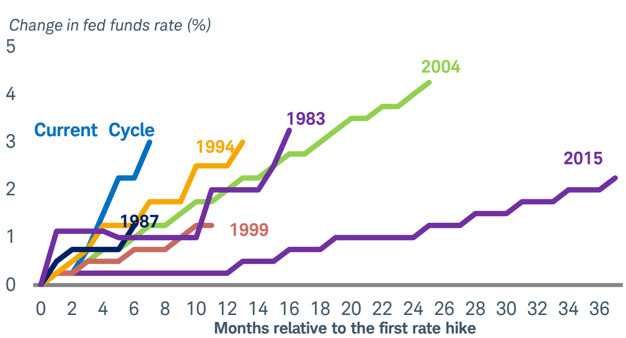
Schwab Center for Financial Research perspective

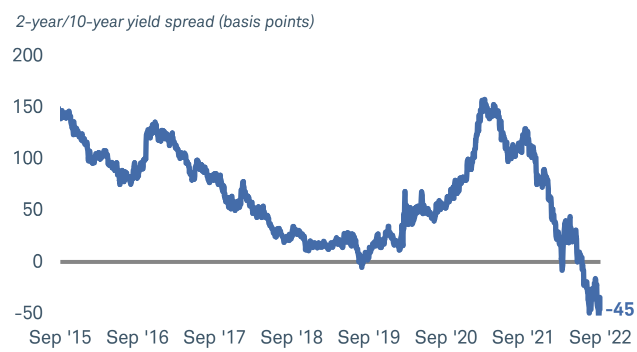
- **The pace of Fed rate hikes is the fastest tightening cycle in modern history,** the key reason why the bond market has declined so much this year. We expect more Fed rate hikes but the pace may moderate due to slowing growth and increasingly unstable global financial conditions.
- **The more the Fed hikes, the more the curve should invert.** Short-term Treasury yields could continue to move up, but upside is likely limited with long-term Treasury yields as tighter monetary policy pulls down both growth and inflation. Inverted yield curves tend to signal that a recession is possible.
- **The dollar has been in a long-term uptrend for a decade.** The surge to new highs in the past six months is a strong signal that investors are looking for high ground in an increasingly turbulent global environment.
- **Inflation expectations are declining** with 5- and 10-year TIPS breakeven rates in the 2.2% area. The gap between the two measures has shrunk lately, suggesting that investors expect inflation in the intermediate-term to keep trending lower. With breakeven rates down and TIPS yields positive, TIPS are beginning to look more attractive.

The pace of Fed rate hikes in this cycle has been rapid



Note: Lines represent the cumulative change in the Fed funds target rate from the start of each rate hike cycle shown.
Source: Bloomberg. Federal Funds Target Rate - Upper Bound (FDTR Index), using monthly data. **Past performance is no guarantee of future results.**

2-year / 10-year yield curve is inverted

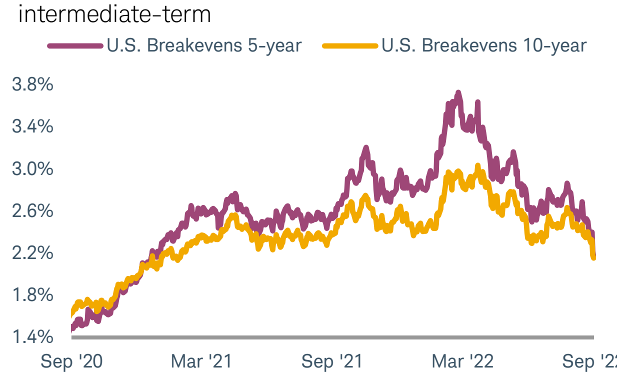


Source: Bloomberg. Market Matrix US Sell 2 Year & Buy 10 Year Bond Yield Spread (USCY2Y10 INDEX). Daily data as of 9/30/2022.

Rise in the dollar could be the "canary in the coal mine"

Source: Bloomberg. Bloomberg Dollar Spot Index (BBDXY Index). Daily data as of 9/30/2022. **Past performance is no guarantee of future results.**

Markets are pricing in lower inflation over the intermediate-term



Source: Bloomberg, using daily data as of 9/30/2022. US Breakevens 5 Year (USGGBE05 Index) and US Breakeven 10 Year (USGGBE10 Index). **Past performance is no guarantee of future results.**

Corporate Bond Market Update

October 2022

Collin Martin, CFA
Director, Fixed Income Strategist
Taxable Asset Classes

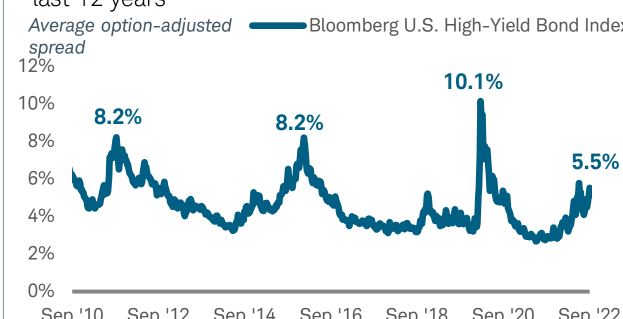
Schwab Center for Financial Research perspective

- **Investment grade corporate bonds appear attractive.** Yields are now at 13-year highs and the corporate bond curve is positively sloped, meaning investors can earn modestly higher yields by extending out the curve. Spreads could drift up if economic growth slows, but we believe the downside relative to Treasuries should be limited.
- **We suggest caution with high-yields bonds,** and there may be better entry points down the road. High-yield spreads—the additional yield that corporate bonds offer above comparable Treasury yields—are still well below previous peaks. As the Fed aggressively tightens monetary policy and economic growth continues to slow, spreads should rise (pulling prices down) as investors demand more compensation for lending to risky issuers.
- **Preferred securities look attractive for long-term investors.** Their high correlation to stocks means additional price declines could be possible, however. We believe that most large financial institutions are in good fundamental shape, supporting our positive view of preferreds compared to our cautious outlook with HY bonds.[1]
- **Bank loan prices could decline as well.** Bank loans have sub-investment grade ratings, and despite their "senior secured" status, their average ratings tend to be lower than the broad high-yield market.

Investment-grade corporate bond yields are at a 13-year high

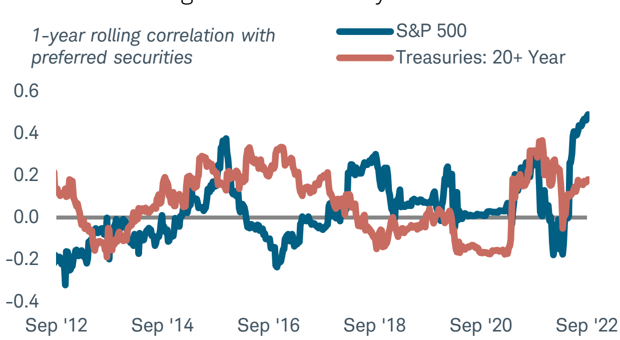
Source: Bloomberg, using weekly data as of 9/30/2022. Bloomberg U.S. Corporate Bond Index (LUACYW Index). **Past performance is no guarantee of future results.**

High-yield spreads are well below previous peaks of the last 12 years



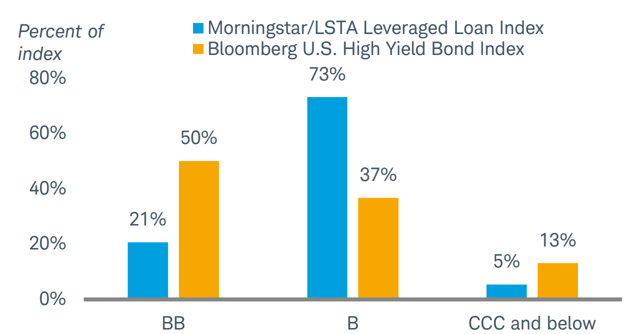
Source: Bloomberg, using weekly data as of 9/30/2022. Bloomberg U.S. Corporate High-Yield Bond Index (Lf98OAS Index) Option-adjusted spreads are quoted as a fixed spread over U.S. Treasury issues. Spreads are used in calculating the relative value of a fixed income security containing an embedded option, such as a borrower's option to prepay a loan. . **Past performance is no guarantee of future results.**

Preferred securities have been more correlated with stocks than long-term bonds lately



Source: Bloomberg, using weekly data as of 9/30/2022. Indexes represented are the ICE BofA Fixed Rate Preferred Securities Index, S&P 500 Index, and the Bloomberg U.S. Treasury 20+ Year Index. Correlation is a statistical measure of how two investments move in relation to each other

Bank loans have lower ratings than high-yield bonds, on average



Sources: Leveraged Commentary and Data (LCD) from PitchBook, a Morningstar company, S&P Global Market Intelligence's CreditPro®, S&P Global Ratings Research, and Bloomberg, as of 7/31/2022.

[1] Financial institutions are the largest issuers of the highly-rated preferred securities market

Municipal Bond Market Update

October 2022

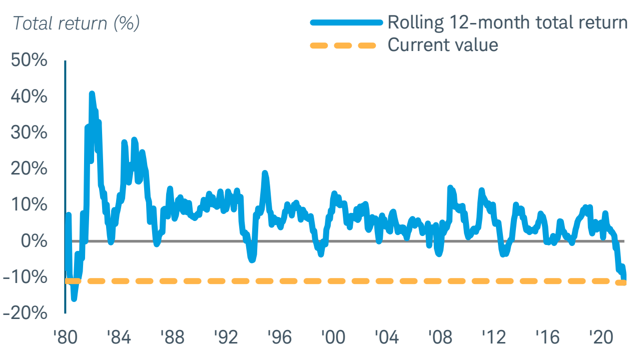
Cooper Howard, CFA

Director, Fixed Income Strategist
Municipal Bonds

Schwab Center for Financial Research perspective

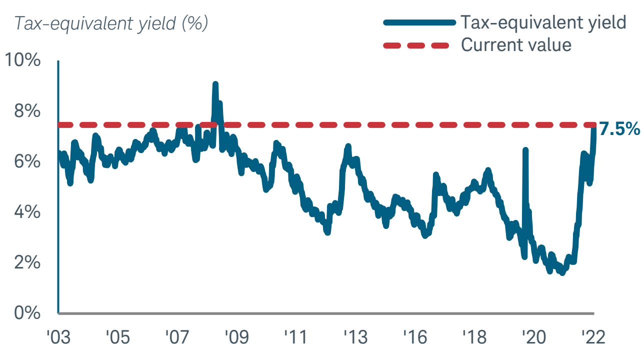
- **This year is an anomaly and likely won't repeat**. Munis are down 11.6% year-to-date[1] which is the worst rolling 12-month total return since the early 1980's. We believe the poor performance is unlikely to repeat because starting yields are better now and rates are unlikely to rise as sharply as they have since the start of the year.
- **Munis are an area of opportunity now.** The sharp selloff has created opportunities that largely haven't existed over the past 15-years. The odds of a recession are growing but credit risk in the muni market is generally strong and likely to hold up even if the economy slows. Munis generally pay interest that is exempt from federal income taxes which can be a benefit to investors in higher tax-brackets.
- **Defaults remain rare.** There have been 35 new defaults, which represents less than 0.1% of the total muni market, this year. Munis have defaulted less frequently than corporate bonds which is a trend that we expect to continue.
- **Munis provide diversification benefits.** The correlation between the S&P 500 and the Bloomberg Municipal Bond Index is near zero – meaning that total returns for munis tend not to move with equities. We believe that municipal bonds can be a complement to a fully diversified portfolio.

Not since the early 1980's have total returns been this bad



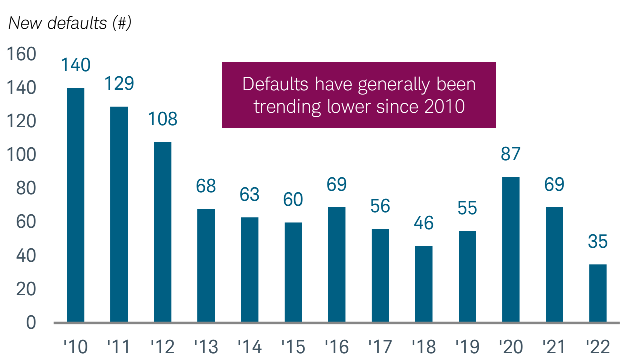
Source: Bloomberg Municipal Bond Index, as of 9/30/22. Rolling 12-moth total return using monthly data. **Past performance is no guarantee of future results.**

The tax-equivalent yield for the broad muni index is over 7% for investors in the top tax bracket



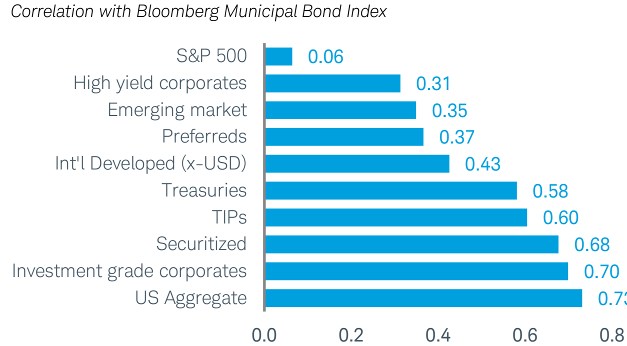
Source: Bloomberg Municipal Bond Index, as of 9/30/22. Assumes a Federal Tax rate of 35% from 2003-2012, 39.6% from 2013-2017, and 37% from 2018-present. Also assumes a 3.8% ACA tax and 5% state tax rate.

We expect that municipal bond defaults should continue to be rare



Source: Municipal Market Analytics, as of 9/27/22

Munis can help smooth portfolio volatility when combined with other investments



Source: Bloomberg. Monthly data from 12/31/97 to 9/30/22. See disclosure page for a definition of correlation.

[1]As represented by the Bloomberg Municipal Bond Index, as of 9/26/22

Fixed Income Market Snapshot

October 2022

Schwab Center for Financial Research strategy

- **Continue to extend duration gradually.** The markets appear to have already discounted the aggressive pace of rate hikes. Short-term Treasury yields may continue rise gradually, but we believe upside is limited with the 10-year Treasury yield currently trading in the 3.75% to 4% range as the markets begin to price in rate cuts down the road. We suggest investors lock in these yields with certainty today.
- **Credit:** Move up in credit quality as corporate fundamentals should continue to deteriorate through the end of the year. We prefer investment grade corporate bonds and preferred securities for those with a more aggressive risk tolerance. With financial conditions tightening and the yield curve continuing to invert, we suggest a more cautious approach with high-yield bonds and bank loans.
- **Munis:** The 5- to 7–year portion of the curve offers the most attractive yields relative to their risks. Relative yields lean rich for shorter-term bonds but are closer to their 5-year average for the intermediate part of the curve. Credit conditions are generally favorable, but we suggest focusing on higher rated issuers.

Total returns

	Year-to-Date	September Returns
US Aggregate	-14.6%	-4.3%
Treasuries	-13.1%	-3.5%
TIPs	-13.6%	-6.6%
Securitized	-13.4%	-4.9%
Municipals	-12.1%	-3.8%
Investment grade corporates	-18.7%	-5.3%
High yield corporates	-15.5%	-4.2%
Bank loans	-4.3%	-2.9%
Preferreds	-14.7%	-3.4%
Int'l Developed (x-USD)	-23.9%	-5.9%
Emerging market	-20.5%	-5.5%

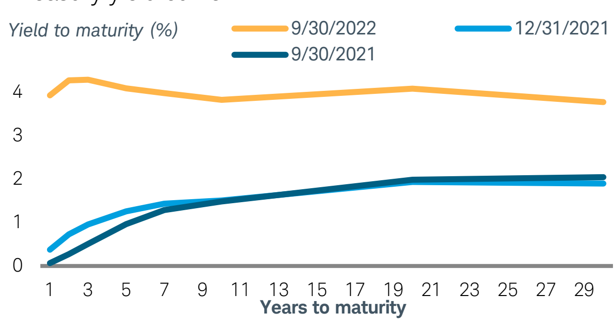
Source: Bloomberg. Returns from 12/31/2021 through 9/30/2022. Returns assume reinvestment of interest and capital gains. See disclosures for indexes used. **Past performance is no guarantee of future results.**

Key metrics

	Current	One-month ago
2-yr. Treasury yield (%)	4.28	3.50
5-yr. Treasury yield (%)	4.09	3.35
10-yr. Treasury yield (%)	3.83	3.20
30-yr. Treasury yield (%)	3.78	3.29
10-yr. TIPS Breakeven (%)	2.15	2.48
2/10 Spread (BPS)	-45.4	-30.4
Dollar Index	1,337.5	1,295.6
5-yr. MOB spread (%)	76.8	69.4
10-yr. MOB spread (%)	85.3	81.5
IG Corporate OAS (BPS)	159	140
HY Corporate OAS (BPS)	523	480

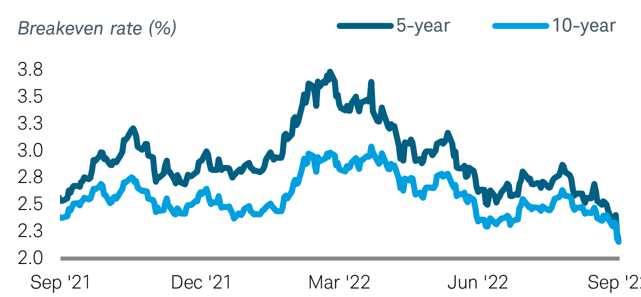
Source: Bloomberg, as of 9/30/2022. **Past performance is no guarantee of future results.**

Treasury yield curve



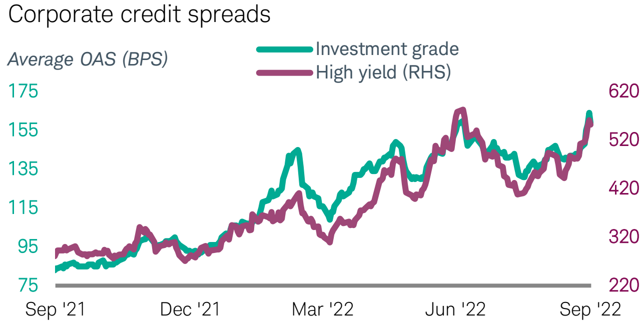
Source: Bloomberg, as of 9/30/2022. **Past performance is no guarantee of future results.**

TIPS breakeven rates



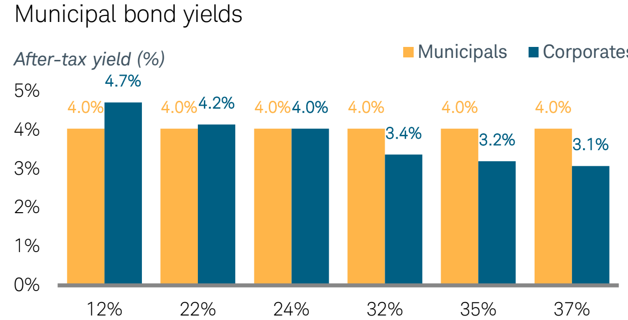
Source: Bloomberg, as of 9/30/2022. U.S. Breakeven 5 Year (USGGBE05 Index) US Breakeven 10 Year (USGGBE10 Index).

Corporate credit spreads



Source: Bloomberg, as of 9/30/2022. Bloomberg U.S. Corporate Bond Index (LUACTRUU) and Bloomberg U.S. Corporate High-Yield Bond Index (LF98TRUU Index). OAS is quoted as a fixed spread, or differential, over U.S. Treasury issues.

Municipal bond yields



Source: Bloomberg Municipal Bond Index and Bloomberg Corporate Bond Index, as of 9/30/2022. Corporates assume an additional 5% state income tax and 3.8% ACA tax for the 32% and above brackets. **Past performance is no guarantee of future results.**

Important Disclosures

All views and opinions in this update are as of September 30, 2022.

The information provided here is for general informational purposes only and should not be considered an individualized recommendation or personalized investment advice. The investment strategies mentioned here may not be suitable for everyone. Each investor needs to review an investment strategy for his or her own particular situation before making any investment decision. Schwab does not provide tax advice. Clients should consult a professional tax advisor for their tax advice needs.

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Investing involves risk including loss of principal.

Fixed income securities are subject to increased loss of principal during periods of rising interest rates. Fixed-income investments are subject to various other risks including changes in credit quality, market valuations, liquidity, prepayments, early redemption, corporate events, tax ramifications and other factors.

High-yield bonds and lower rated securities are subject to greater credit risk, default risk, and liquidity risk.
Tax-exempt bonds are not necessarily suitable for all investors. Information related to a security's tax-exempt status (federal and in-state) is obtained from third parties, and Schwab does not guarantee its accuracy. Tax-exempt income may be subject to the alternative minimum tax. Capital appreciation from bond funds and discounted bonds may be subject to state or local taxes. Capital gains are not exempt from federal income tax.

Treasury Inflation Protected Securities (TIPS) are inflation-linked securities issued by the US Government whose principal value is adjusted periodically in accordance with the rise and fall in the inflation rate. Thus, the dividend amount payable is also impacted by variations in the inflation rate, as it is based upon the principal value of the bond. It may fluctuate up or down. Repayment at maturity is guaranteed by the US Government and may be adjusted for inflation to become the greater of the original face amount at issuance or that face amount plus an adjustment for inflation.

Bank loans are typically below investment-grade credit quality and may be subject to more credit risk, including the risk of nonpayment of principal or interest. Most bank loans are floating rate, with interest rates that are tied to LIBOR or another short-term reference rate, so substantial increases in interest rates may make it more difficult for issuers to service their debt and cause an increase in loan defaults. Bank loans are typically secured by collateral posted by the issuer, or guarantees of its affiliates, the value of which may decline and be insufficient to cover repayment of the loan. Many loans are relatively illiquid or are subject to restrictions on resales, have delayed settlement periods, and may be difficult to value. Bank loans are also subject to maturity extension risk and prepayment risk.

International investments involve additional risks, which include differences in financial accounting standards, currency fluctuations, geopolitical risk, foreign taxes and regulations, and the potential for illiquid markets. Investing in emerging markets may accentuate these risks.

Preferred securities are often callable, meaning the issuing company may redeem the security at a certain price after a certain date. Such call features may affect yield. Preferred securities generally have lower credit ratings and a lower claim to assets than the issuer's individual bonds. Like bonds, prices of preferred securities tend to move inversely with interest rates, so they are subject to increased loss of principal during periods of rising interest rates. Investment value will fluctuate, and preferred securities, when sold before maturity, may be worth more or less than original cost. Preferred securities are subject to various other risks including changes in interest rates and credit quality, default risks, market valuations, liquidity, prepayments, early redemption, deferral risk, corporate events, tax ramifications, and other factors.

This information does not constitute and is not intended to be a substitute for specific individualized tax, legal, or investment planning advice. Where specific advice is necessary or appropriate, Schwab recommends consultation with a qualified tax advisor, CPA, financial planner, or investment manager.

Currencies are speculative, very volatile and are not suitable for all investors.

Municipal-Over-Bonds (MOB) Spread is the ratio between the yield on a municipal bond and a Treasury bond with the same time to maturity.

Basis points (BPS) One basis point (BPS) is equal to one one-hundredth of 1 percent..

Schwab does not recommend the use of technical analysis as a sole means of investment research.

Examples provided are for illustrative purposes only and not intended to be reflective of results you should expect to attain.

Diversification strategies do not ensure a profit and do not protect against losses in declining markets.

The policy analysis provided by the Charles Schwab & Co., Inc., does not constitute and should not be interpreted as an endorsement of any political party.

Correlation is a statistical measure of how two investments have historically moved in relation to each other, and ranges from -1 to +1. A correlation of 1 indicates a perfect positive correlation, while a correlation of -1 indicates a perfect negative correlation. A correlation of zero means the assets are not correlated.

Past performance is no guarantee of future results and the opinions presented cannot be viewed as an indicator of future performance.

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Index Definitions

Indexes are unmanaged, do not incur management fees, costs and expenses, and cannot be invested in directly.

The **Bloomberg U.S. Aggregate Index** (“Core Bonds”) represents securities that are SEC-registered, taxable, and dollar denominated. The index covers the U.S. investment grade fixed rate bond market, with index components for government and corporate securities, mortgage pass-through securities, and asset-backed securities. These major sectors are subdivided into more specific indices that are calculated and reported on a regular basis.

The **ICE BofA Fixed Rate Preferred Securities Index** (“Preferred Securities”) tracks the performance of fixed-rate USD-denominated preferred securities issued in the U.S. domestic market.

The **Bloomberg U.S. Corporate Bond Index** (“IG Corporate Bonds”) covers the U.S. dollar (USD)-denominated investment-grade, fixed-rate, taxable corporate bond market. Securities are included if rated investment-grade (Baa3/BBB-/BBB-) or higher using the middle rating of Moody’s, S&P and Fitch ratings services. This index is part of the Bloomberg Barclays U.S. Aggregate Bond Index (Agg

The **Bloomberg U.S. Treasury Index** (“U.S. Treasury Bonds”) includes public obligations of the U.S. Treasury excluding Treasury Bills and U.S. Treasury TIPS. The index rolls up to the U.S. Aggregate. Securities have $250 million minimum par amount outstanding and at least one year until final maturity.

The **Bloomberg U.S. Corporate High-Yield Bond Index** (“HY Corporate Bonds”) covers the USD-denominated, non-investment grade, fixed-rate, taxable 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.

The **Bloomberg U.S. Municipal Bond Index** (“Municipal Bonds”) is a broad-based benchmark that measures the investment grade, U.S. dollar-denominated, fixed tax-exempt bond market. The index includes state and local general obligation, revenue, insured and pre-refunded bonds. The AAA, AA, A, Baa, 1 Year (1-2), 3 Year (2-4), 5 Year (4-6), 7 Year (6-8), 10 Year (8-12), 15 Year (12- 17), 20 Year (17-22), and Long Bond (22+) are all subindices.

The **Bloomberg Emerging Markets USD Aggregate Bond Index** (“EM USD Bonds”) includes USD-denominated debt from emerging markets in the following regions: Americas, Europe, Middle East, Africa, and Asia.

The **Bloomberg US Mortgage-Backed Securities** Index measures the performance of mortgage pass-through securities guaranteed by the Government National Mortgage Association (Ginnie Mae),the Federal National Mortgage Association (Fannie Mae), and the Federal Home Loan Mortgage Corporation (Freddie Mac). It is constructed by grouping individual mortgage-backed security pools into aggregates or generics based on program, coupon, and vintage. It is a market-value weighted index.

The **Bloomberg Securitized Bond Index** (“Securitized”) represents the securitized section of the Barclays US Aggregate.

The **Bloomberg U.S. Treasury Inflation Protected Securities (TIPS) Index** (“TIPS”) is a market value-weighted index that tracks inflation-protected securities issued by the U.S. Treasury. To prevent the erosion of purchasing power, TIPS are indexed to the non-seasonally adjusted Consumer Price Index for All Urban Consumers, or the CPI-U (CPI).

The **Bloomberg Global Aggregate ex USD Bond Index** (“Int’l Developed Bonds (x-USD”) provides a broad-based measure of the global investment-grade fixed-rate debt markets. The two major components of this index are the Pan-European Aggregate, and the Asian-Pacific Aggregate Indices.

The **Morningstar LSTA US Leveraged Loan Index** is designed to deliver comprehensive, precise coverage of the US leveraged loan market. Underpinned by PitchBook | LCD data, the index brings transparency to the performance, activity, and key characteristics of the market.

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