CHIEF INVESTMENT OFFICE

Investment Insights

Understanding and Managing Fixed Income in a Rising Rate Environment

May 2022

All data, projections and opinions are as of the date of this report and subject to change.

AUTHORED BY:

Chief Investment Office Fixed Income Team

Data as of 05/2/2022 and subject to change.

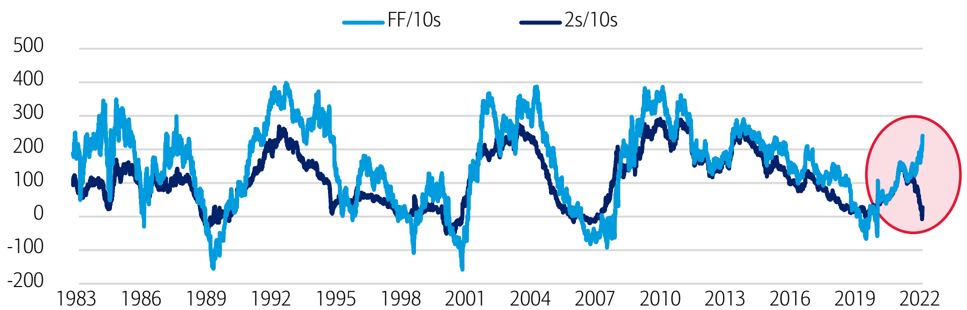
U.S. interest rates reached historic lows during the pandemic—at one point the 10-year Treasury was .50%, while the 30-year Treasury was 1%. As the economy normalized, interest rates have risen with inflation and the price drops in Fixed Income have become equally historic. In this piece, we discuss the drivers of the recent price drawdowns, potential clues as we look to the future, and what investors should understand and consider throughout the current environment.

The Federal Reserve's (Fed) Delayed Reaction

The federal government's policy response to the pandemic led to a level of monetary-financed deficit spending unseen since World War II. This led, in turn, to U.S. inflation not witnessed in over four decades. The Fed was slow to understand and react to this new regime. Initially, the Fed diagnosed inflation as being "transitory." That myth has clearly been dispelled; we are in our 13th month of higher than 2% inflation, with the consumer price index (CPI) currently 8.5%.

The Fed's delayed reaction has led to unusual yield curve moves. The Fed has only started raising interest rates, so the fed funds (FF) to 10-year yield curve has steepened dramatically—fed funds have only increased a little, while 10-year Treasury yields have increased significantly—which indicates that current monetary policy is still extremely accommodative. This contrasts with the 2-year to 10-year yield curve; it has actually flattened consistently since last year, highlighting that policy should become much more restrictive in the next two years when the expected fed funds rate hikes finally materialize. The gap between those two yield curves highlights approximately how much "catching up" the Fed has to do over the next two years.

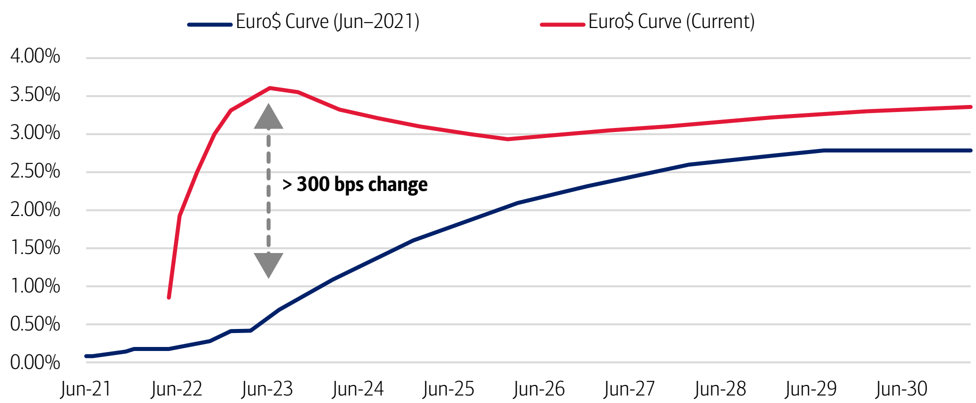
Exhibit 1: The Fed Has Not Been This Far Behind The Curve In Modern Era Fueling High Single Digit Inflation.



Sources: Chief Investment Office; Bloomberg. Data as of April 11, 2022.

The Fed's misdiagnosis of inflation exacerbated the recent rise in yields. As recently as last year, the Fed projected no rate hikes in the following 12 months. Fast forward to now, and 10 rate hikes are expected through the beginning of next year, including several 50 basis points (bps) hikes. This abrupt about-face caused short rates to rise dramatically, as the market prices in much higher fed funds rates in the near future. This also accelerated the sell-off in long rates: longer-dated bond yields are based least partially on the expected path for short term rates over the term of those bonds.

Exhibit 2: The Fed Has Changed Its Expected Policy Dramatically, From Last Year, In One Of The Largest Pivots In Modern-day Fed History.

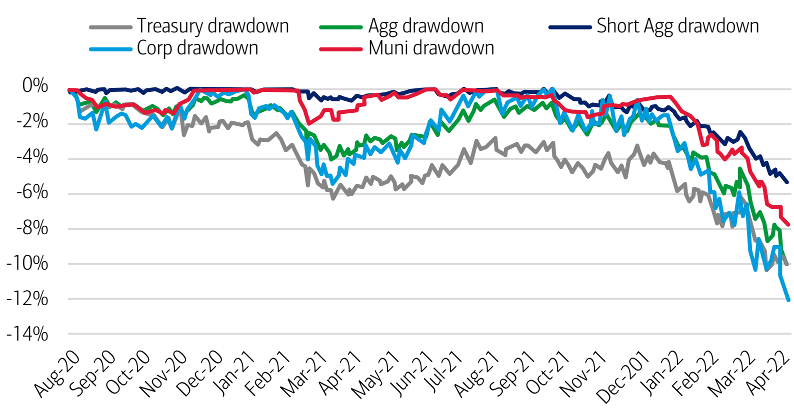


Source: Bloomberg as of April 27, 2022. The Eurodollar futures curve reflects market expectations for future short-term US$ interbank interest rates. It is one of the deepest and most liquid short-term interest rate derivative markets, is highly influenced by decisions by the Federal Reserve, and is therefore an important market gauge of the outlook for monetary policy and the fed funds rate.

The Effect on Fixed Income

The Fed's complete re-appraisal of correct policy in less than a year—combined with historically low rates—has caused massive Fixed Income drawdowns. These are extremely large by historical standards, especially on the short end. Shorter-dated bonds are generally less price sensitive to interest rates moves, given that they repay principal much sooner than longer-dated bonds, but they are not totally insensitive to rate moves: a 200 bps+ yield move on almost any bond sector will likely lead to significant prices declines.

Exhibit 3: Fixed Income Drawdowns.



	Current Drawdown	Worst Drawdown		Data Since
		Amount	Date	
Treasury	-12.4%	Current	Current	Jan-73
Corporates	-13.4%	-19.3%	Feb-80	Jan-73
Municipals	-8.7%	-22.4%	Aug-81	Jan-80
Aggregate	-11.1%	-12.7%	Feb-80	Jan-76
Short Aggregate	-5.6%	Current	Current	Jan-00

Source: Bloomberg Bond Indices. Data as of April 20, 2022. **It is not possible to invest directly in an index. Past performance is no guarantee for future results. See Asset Class Proxies and Index Definitions at the end of this report.**

The Significance of Bond Price Drawdowns Due To Higher Rates

The Chief Investment Office (CIO) suggests that the majority of Fixed Income allocations in multi-asset class portfolios be in high-quality bonds such as Treasurys, Agency

Mortgage-Backed Securities, and Investment-grade Corporate and Municipals. Properly diversified, these assets exhibit little-to-no credit losses. When held to term, broadly diversified portfolios of high-quality bonds help deliver total returns similar to the yield at which they were acquired regardless of interest rate moves. This generally applies to portfolios of individual bonds, ladders or pooled vehicles. (Active manager[1] risk in pooled vehicles may lead to larger variations, positive or negative; but that is manager risk, not vehicle risk.)

Within the holding period, though, market prices can move dramatically in response to rate moves. As rates rise, Fixed Income total returns are likely to be lower than starting yields: Price drops detract from coupon income. However, absent credit losses, rising rates only affect the present value of a portfolio, not its ultimate principal value. Price moves caused by rate fluctuations are temporary for the long-term investor with the willingness and ability to hold bonds through their average life (or average duration of a fund). Long-term returns correlate to acquisition yields for high-quality Fixed Income. Rate moves change the random walk of those returns, but do not dramatically alter their ultimate destination, from our perspective. The only way to turn a temporary impairment of capital into a permanent one is to sell a portfolio and move to a significantly lower-return alternative (for example, cash.) As bonds get closer to maturity, the "pull to par"—the price moving closer to par as the maturity nears—has a strong affect (again, absent any default or credit losses.

This same idea applies to pooled vehicles, such as mutual funds (MFs) or exchange-traded funds (ETFs). Pooled vehicles own bonds across the yield curve, and may receive principal payments regularly, and experience the "pull to par" themselves. If not, the same principle applies in a different way. Assume a fund invested only in five-year bonds, a general rate rise caused the price of all bonds in the portfolio to drop, and the manager sold a certain bond. The manager would likely reinvest in another bond presumably also at a similarly discounted price now. If instead the manager bought a new-issue bond at a higher dollar price, the coupon on the new bond would presumably be higher (rates have increased). The CIO therefore does not have a preference for either individual bonds, ladders, or pooled vehicles (ETF/MFs) relative to an interest rate environment or rate hike cycle. Each alternative has pros and cons, but each does a good job of providing Fixed Income exposure when managed properly. The duration of the vehicle—not the vehicle itself—will likely be more of a key driver of returns.

Current Signs from the Market

The current environment is historically unusual. Inflation has never been this high while rates were this low; there is still significant interest rate risk in bond portfolios. Nevertheless, the moves in Fixed Income are not all bad news for investors. First, the ability to reinvest cash flows at higher yields is a welcome outcome for savers penalized by years of financial repression. The other alternative—rates staying perpetually low and market values remaining near par—should not be preferable to most investors versus experiencing some market value losses now combined with the ability to earn higher yields on redeployed cash in the interim, from our perspective. Second, those market value declines on high quality bonds are not permanent impairments of capital for investors with the ability and willingness to hold to term. Total returns on high quality bond portfolios will trend back to their acquisition yield, as bonds are "pulled to par" closer to maturity. Market value losses never affect principal at maturity but only present values of that principal. Finally, while the future is far from certain, it is possible that a good portion of market value losses are behind us. The market expects the fed funds rate at the end of this hiking cycle to be in the low 3% range, longer-dated yield curves are already flattening, and 10-year Treasurys have moved from 0.5% to close to 3% already. Unless the 10-year rises to 5.5% quickly—a level not seen in 20 years, completely out of context with low yields globally—then the vast majority of

[1] Active management seeks to outperform benchmarks through active investment decisions such as asset allocation and investment selection.

market value losses may have already occurred, in our opinion. Furthermore, a rate rise in to the low-to-mid 3% range would be consistent with both history and the market's expectation, if correct, of a fed funds rate at the end of this cycle of low 3%. The obvious risk to this view is if the current expected policy—both rate hikes and quantitative tightening—is not enough to slow inflation, and the terminal fed funds rate is much larger than currently anticipated.

Exhibit 4: 10-year Rates Have Generally Moved Less Than Fed Funds (FF) Rates Through An Interest Rate Hike Cycle.

	Fed Funds Rate		10-year Yield at		Rate hike cycle changes		
Date	**Start**	**End**	**1st Hike**	**Last Hike**	**FF**	**10-year**	**FF/10s**
Feb-94	3.00%	6.00%	5.87%	7.66%	+300 bps	+179 bps	-121 bps
Jun-99	4.75%	6.50%	5.78%	6.42%	+175 bps	+64 bps	-111 bps
Jun-04	1.00%	5.25%	4.58%	5.20%	+425 bps	+61 bps	-364 bps
Dec-15	0.125%	2.375%	2.30%	2.76%	+225 bps	+46 bps	-179 bps
				Average	**+281 bps**	**+88 bps**	**-194 bps**
Mar-22	0.125%	N/A	2.19%	N/A	N/A	N/A	N/A

Source: Bloomberg as of April 27, 2022.

Asset Class Views and Portfolio Considerations

Given the extreme moves in Fixed Income, especially on short-dated rates, we think the ability to extend out the yield curve from cash looks attractive, in our opinion. The yield curve from 1-month Treasury-bills to 2-year Treasurys is currently over 230 bps, and it has not been this high since the early 1990s. Short-dated corporates earn over 3.5% yields for 2.7-year duration and municipals bonds over 2.5% for 2.3-year durations; both are a lot more compelling from a risk-to-return perspective. We still favor being slightly short on duration, overall, relative to the duration of a stated benchmark that is specifically aligned to investment goals.

The municipal market is starting to look more attractive across the curve. Over the last year, 10-year muni-to-Treasury ratios have moved from below 60% to around 95%, while the 10-year Treasury has almost doubled from 1.5% to 3%. Therefore, muni investors are not only benefiting from higher Treasury yields, they are benefiting from cheaper valuations as they achieve a higher percentage of those higher Treasury yields, and we find municipal credit to be generally strong and resilient and not a driver of the recent moves higher in ratios. Corporate spreads have likewise moved up fairly dramatically, from around 80 bps to 130 bps, a much better overall valuation level. While, historically, spreads can move up to around 200 bps or higher in a recession, we do not foresee a recession in 2022. However if spreads do move 70 bps wider to that recessionary levels, that implies another approximately 5.5% price drop at the current duration of the corporate market (and assuming Treasury yields do not change). At current corporate yields (around 4.2%), it would take about 1.3 years of coupon income to overcome a price drop of that magnitude. Since corporates also provide a meaningfully higher percentage of yields than Treasurys, we maintain our prudent overweight but caution investors to expect potentially more downside price volatility in return for those higher yields, and suggest expecting to hold bonds to term (or the equivalent duration/weighted average maturity for any fund or pooled vehicle.)

While Treasury Inflation-Protected Securities (TIPS) may seem alluring, in reality they have already "baked in" significantly higher than anticipated inflation. Inflation would have to exceed even the market's high estimates of inflation for TIPS to outperform Treasurys. Furthermore, TIPS are bonds first and foremost; when real yields rise, their prices drop, even with higher inflation. We are therefore neutral on TIPS tactically currently on valuations, but always suggest that investors who want additional inflation protection maintain some modest, strategic allocation to TIPS within a Treasury portfolio in all environments.

The high yield market also looks more attractive as yields approach 7%, almost double the lows the 2021, and finally offers reasonable compensation for higher credit risk, and one of the few asset classes that offers close-to-positive real yields (that is, yields adjusted for likely inflation). We remain underweight in an overall multi-asset class portfolio, however, as we are still overweight Equities, and yields could move closer to 10% or higher in a recession. However, for investors with longer timeframes who are looking to add macro risk, this is a better recent entry point, in our opinion, and if a recession does not occur in the near term the additional income received until then will somewhat cushion the eventual price drawdown. In particular, owning high yield in tax-advantaged accounts may be beneficial given that higher tax rates can greatly reduce after-tax income; on the flip side, any future price drawdowns in high yield would likely not be available to be tax-loss harvested if in tax-sheltered accounts. Within high yield, leveraged loans have outperformed high yield bonds massively; as of April 27, loans are actually up 0.2% year-to-date while bonds are down -7.7%, for almost 8% of loan-to-bond outperformance. This is historically unusual outperformance, and we have changed our preference from loans in a high yield allocation to equally favoring both bonds and loans, as we believe this amount of outperformance is unsustainable and bonds yield significantly more than loans as the curve has steepened between loan and bond yields. We caution, as always, that investors should not consider using leveraged loans as a short-term investment or cash surrogate, and not chase near-term relative performance. Leveraged loans, while short duration, have tremendous credit risk and may see significant price drops (possibly 10%+) in a recession.

Conclusion and Considerations

In summary, we suggest that investors do not overreact to the current environment and continue to use Fixed Income appropriately, for their situation. Importantly, do not ask bonds to do what they can't do: namely, provide good defense from rising rates and inflation. Inflation exposure in particular is better achieved through personal Real Estate, Equities, Commodities and Real Assets. Trying to "inflation proof" or "rising rate proof" a Fixed Income portfolio would make an overall multi-asset class portfolio much riskier in our opinion, not less, as it would increase overall exposure to macroeconomic risk. Fixed Income is there to provide reliable yield, diversification over longer time periods through that steady cash flow, and, importantly, help shield from a worse-than-expected economic environment. Maintaining an up-in-quality bias, using higher yields as opportunities to redeploy cash, being pragmatic about market value declines, and tilting away from rate risk with lower duration but not abandoning Fixed Income remains the prudent course.

Asset Class Proxies and Index Definitions

Securities indexes assume reinvestment of all distributions and interest payments. Indexes are unmanaged and do not take into account fees or expenses. It is not possible to invest directly in an index. Indexes are all based in U.S. dollars.

Consumer Price Index (CPI) is an index of the variation in prices paid by typical consumers for retail goods and other items.

Treasury/Bloomberg Treasury Index includes government Treasury securities, corporate bonds, mortgage-backed securities (MBS), asset-backed securities (ABS), and munis to simulate the universe of bonds in the market. It tracks bonds that are of investment-grade quality or better.

Corporates/ICE BofA U.S. Corp Master Index tracks the performance of US dollar denominated investment grade corporate debt publicly issued in the US domestic market. Qualifying securities must have an investment grade rating (based on an average of Moody's, S&P and Fitch), at least 18 months to final maturity atthe time of issuance, at least one year remaining term to final maturity as of the rebalancing date, a fixed coupon schedule and a minimum amount outstanding of $250 million .

Municipals/Bloomberg Municipal Index covers the USD-denominated long-term tax exempt bond market.

Aggregate/Bloomberg US Aggregate Bond Index is a broad base, market capitalization-weighted bond market index representing intermediate term investment grade bonds traded in the United States.

Short Aggregate/Bloomberg Short Aggregate Bond Index is used by bond funds as a benchmark to measure their relative performance.

Important Disclosures

Investing involves risk, including the possible loss of principal. Past performance is no guarantee of future results.

Bank of America, Merrill, their affiliates, and advisors do not provide legal, tax, or accounting advice. Clients should consult their legal and/or tax advisors before making any financial decisions.

This information should not be construed as investment advice and is subject to change. It is provided for informational purposes only and is not intended to be either a specific offer by Bank of America, Merrill or any affiliate to sell or provide, or a specific invitation for a consumer to apply for, any particular retail financial product or service that may be available.

The Chief Investment Office (CIO) provides thought leadership on wealth management, investment strategy and global markets; portfolio management solutions; due diligence; and solutions oversight and data analytics. CIO viewpoints are developed for Bank of America Private Bank, a division of Bank of America, N.A., ("Bank of America") and Merrill Lynch, Pierce, Fenner & Smith Incorporated ("MLPF&S" or "Merrill"), a registered broker-dealer, registered investment adviser and a wholly owned subsidiary of BofA Corp.

All recommendations must be considered in the context of an individual investor's goals, time horizon, liquidity needs and risk tolerance. Not all recommendations will be in the best interest of all investors.

Asset allocation, diversification and rebalancing do not ensure a profit or protect against loss in declining markets.

Investments have varying degrees of risk. Some of the risks involved with equity securities include the possibility that the value of the stocks may fluctuate in response to events specific to the companies or markets, as well as economic, political or social events in the U.S. or abroad. Investing in fixed-income securities may involve certain risks, including the credit quality of individual issuers, possible prepayments, market or economic developments and yields and share price fluctuations due to changes in interest rates. When interest rates go up, bond prices typically drop, and vice versa. Income from investing in municipal bonds is generally exempt from Federal and state taxes for residents of the issuing state. While the interest income is tax-exempt, any capital gains distributed are taxable to the investor. Income for some investors may be subject to the Federal Alternative Minimum Tax (AMT). Tax-exempt investing offers current tax-exempt income, but it also involves special risks. Single-state municipal bonds pose additional risks due to limited geographical diversification. Interest income from certain tax-exempt bonds may be subject to certain state and local taxes and, if applicable, the alternative minimum tax. Any capital gains distributed are taxable to the investor. Investments in high-yield bonds (sometimes referred to as "junk bonds") offer the potential for high current income and attractive total return, but involve certain risks. Changes in economic conditions or other circumstances may adversely affect a junk bond issuer's ability to make principal and interest payments. For investments in Asset-backed Securities (ABS) and Mortgage-backed Securities (MBS), generally, when interest rates decline, prepayments accelerate beyond the initial pricing assumptions, which could cause the average life and expected maturity of the securities to shorten. Conversely, when interest rates rise, prepayments slow down beyond the initial pricing assumptions, and could cause the average life and expected maturity of the securities to extend, and the market value to decline. Most senior/leveraged loans are made to corporations with below investment-grade credit ratings and are subject to significant credit, valuation and liquidity risk. The value of the collateral securing a loan may not be sufficient to cover the amount owed, may be found invalid or may be used to pay other outstanding obligations of the borrower under applicable law. There is also the risk that the collateral may be difficult to liquidate, or that a majority of the collateral may be illiquid. Treasury bills are less volatile than longer-term fixed income securities and are guaranteed as to timely payment of principal and interest by the U.S. government. Investments in foreign securities involve special risks, including foreign currency risk and the possibility of substantial volatility due to adverse political, economic or other developments. These risks are magnified for investments made in emerging markets. Investments in a certain industry or sector may pose additional risk due to lack of diversification and sector concentration. There are special risks associated with an investment in commodities, including market price fluctuations, regulatory changes, interest rate changes, credit risk, economic changes and the impact of adverse political or financial factors. Investments in real estate securities can be subject to fluctuations in the value of the underlying properties, the effect of economic conditions on real estate values, changes in interest rates, and risk related to renting properties, such as rental defaults. There are special risks associated with an investment in commodities, including market price fluctuations, regulatory changes, interest rate changes, credit risk, economic changes and the impact of adverse political or financial factor.

Nonfinancial assets, such as closely-held businesses, real estate, fine art, oil, gas and mineral properties, and timber, farm and ranch land, are complex in nature and involve risks including total loss of value. Special risk considerations include natural events (for example, earthquakes or fires), complex tax considerations, and lack of liquidity. Nonfinancial assets are not in the best interest of all investors. Always consult with your independent attorney, tax advisor, investment manager, and insurance agent for final recommendations and before changing or implementing any financial, tax, or estate planning strategy.