

Delving into Volatility

Implications for Fixed Income Investing: Calibration, MBS Valuation and Portfolio Risk

November 2018

While there are myriad ways to define volatility, measure it, calibrate it and mitigate it, volatility is, at the very least, something investors should be fairly compensated for. Janus Henderson Fixed Income believes it is crucial for investors and asset managers to be on the same page, not only in terms of return expectations, but also in terms of parameters for the volatility of those returns. To manage to those expectations, asset managers must have the tools in place to distinguish short-term blips in market volatility from the indicators of a more systemic event. Further, an appreciation of how asset spreads change along with volatility is essential to better manage portfolio risk in line with investor expectations. In the pages that follow, we discuss the team's recent delve into volatility and our resulting observations.

Identifying Trends

A simple but, in our view, the most relevant definition of volatility is the standard deviation of financial returns over time. However, we have explored multiple indicators to determine which provide the most valuable insight in terms of highlighting market stress and revealing volatility trends.

The two most followed measures of volatility – the Chicago Board Options Exchange Volatility Index® (VIX®) and the Merrill Lynch Option Volatility Estimate (MOVE) Index – use options for construction. The VIX uses equity options, and the MOVE uses U.S. Treasury options. We would argue, however, that implied volatility in the construct of Black-Scholes options pricing is more of a self-fulfilling outcome. For instance, when uncertainty rises and asset prices fluctuate, options traders increase options bid/ask spreads, forcing options prices higher and implied volatility to increase. Nevertheless, the VIX and the MOVE are prevalent and frequently cited, providing investors with useful calibration tools.



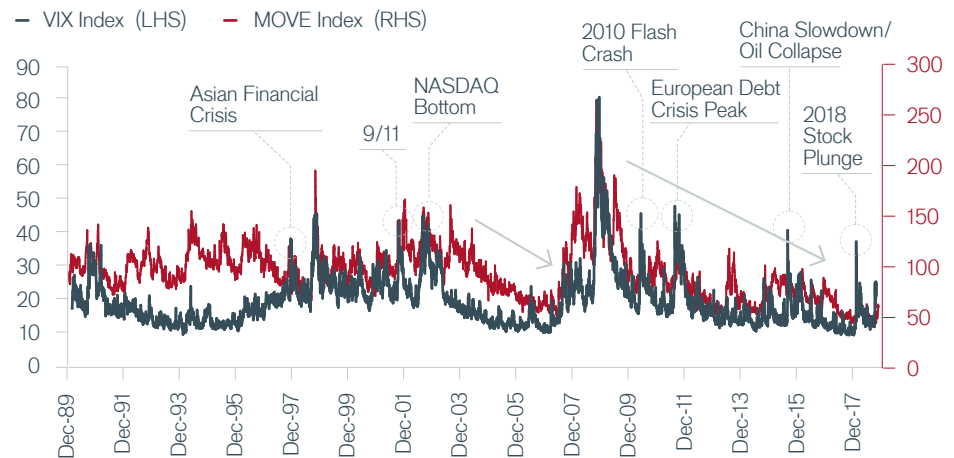
John Kerschner, CFA
Head of U.S. Securitized
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Key Takeaways

- ▶ While a volatility cycle is difficult to define, there has been a noticeable downward trend in volatility due in large part to increased transparency in monetary policy.
 - ▶ Given that interest rate volatility significantly impacts the value of mortgage-backed securities (MBS), we would expect MBS to perform well as the Federal Reserve hikes and average volatility continues to decline.
 - ▶ In our view, understanding the impact of volatility on asset prices, and therefore portfolio returns, better positions an asset manager to manage risk overall.
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Exhibit 1: The VIX and The MOVE

While volatility does not exhibit real cyclicality, it has trended lower over time



Source: Bloomberg, as of 10/31/18

From Exhibit 1's analysis of the VIX and the MOVE, three observations stand out:

1. Volatility is mean reverting. Simply put, exogenous events cause volatility to spike, but it typically retreats to more "normal" levels in short order. Uncertainty generates volatility, and as time progresses, uncertainty tends to dissipate, causing volatility to retreat.
2. Defined cyclical volatility trends are difficult to discern. Unlike asset spread volatility, which tends to correlate with the business cycle, options volatility does not exhibit real cyclicality.
3. Volatility has trended lower over time. Gained efficiencies in market pricing techniques, the rise of program trading and increased clarity in central bank intentions are just a few of the factors that have influenced this downward trend.

A Better Measure

While the VIX brings the aforementioned trends to light, we would argue its usefulness as an indicator of pending stress for spread assets is limited. The often knee-jerk reaction to events in equity markets coupled with the fairly rapid mean reversion tend to present more noise than signal for fixed income investors. Additionally, unlike the business cycle, volatility does not demonstrate a clear beginning, middle and end. Given that there is no cyclicality to volatility and its spikes are driven by exogenous events, we believe it is critical to monitor macro indicators for signs of more systemic events.

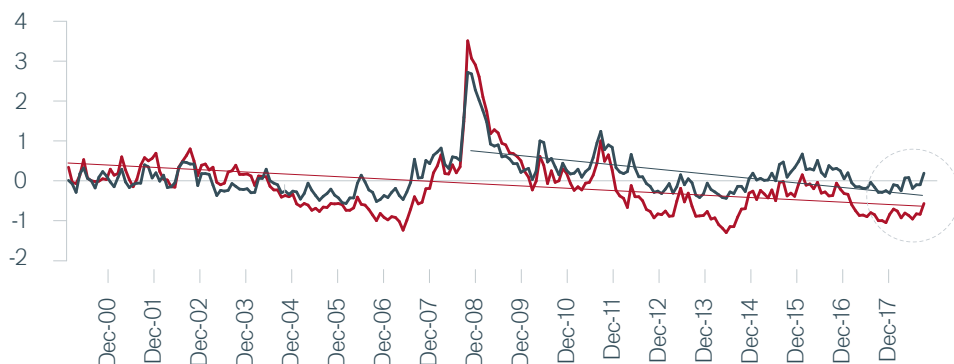
One tool that we find particularly useful when observing and measuring financial stress and volatility is the Bank of America Merrill Lynch Global Financial Stress Indicator (GFSI). The GFSI is a cross-market measure of risk consisting of 23 indicators, including equity, interest rate, commodity and foreign exchange volatility. Other input measures include asset spreads, liquidity, option skew, fund flows and trade volume. The GFSI and its heat map of sub-indices highlight current macro trends and provide a useful calibration tool for gauging short-term events versus those that warrant shifts in overall portfolio positioning.

As shown in Exhibit 2, despite recent upticks in the GFSI and its volatility indicator (GFSIRMK), market stress levels appear relatively benign at the moment. Additionally, the downward trend exhibited by the VIX and the MOVE is likewise obvious in the GFSI volatility indicator.

Exhibit 2: GFSI Trending Lower

Similar to the VIX and the MOVE, the GFSI volatility indicator is also trending downward, as is the GFSI in the years following the Global Financial Crisis

— GFSIRMKT — GFSIRMKT Trendline — GFSI — GFSI Trendline



Despite recent upticks, current readings suggest minimal levels of market stress.

Source: Bloomberg, as of 10/31/18

Note: GFSI is a cross-market measure of risk, hedging demand and investor flows in the global financial system. GFSIRMKT is a measure of future price swings implied by options markets in global equities, rates, currencies and commodities. Levels greater/less than 0 indicate more/less market stress than is normal.

The Fed's Influence

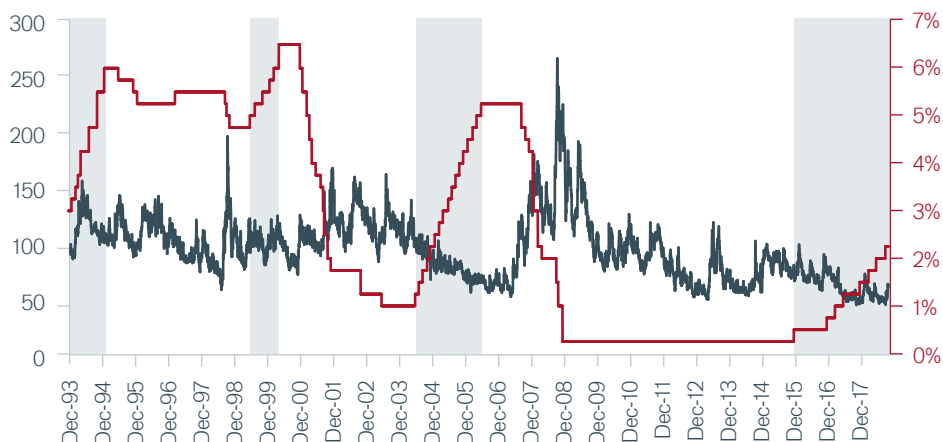
We believe that greater transparency from the Federal Reserve (Fed) is the most significant factor influencing the decline in average interest rate volatility over time. As demonstrated in Exhibit 3, interest rate volatility has drifted lower in recent tightening cycles. This downward trend stems from the fact that the Fed does not raise interest rates at random. Rather, once the Fed starts hiking, it tends to persist in a fairly predictable pattern until the economy slows. It is when the Fed risks overtightening that we typically see spikes in volatility.

Fed transparency has greatly increased, particularly in the years following the Global Financial Crisis. Current Chairman Jerome Powell has also pledged to continue telegraphing Fed intentions. While we are cognizant of potential spikes in broad market volatility, going forward, we expect the Fed's transparency to continue dampening long-term average interest rate volatility.

Exhibit 3: Interest Rate Volatility in Rising-Rate Regimes

Interest rate volatility has drifted lower in tightening cycles as a result of the Fed's predictable approach to hiking

— MOVE Index (LHS) — Fed Funds Target Rate, Upper Bound (RHS) ■ Rising-Rate Environments



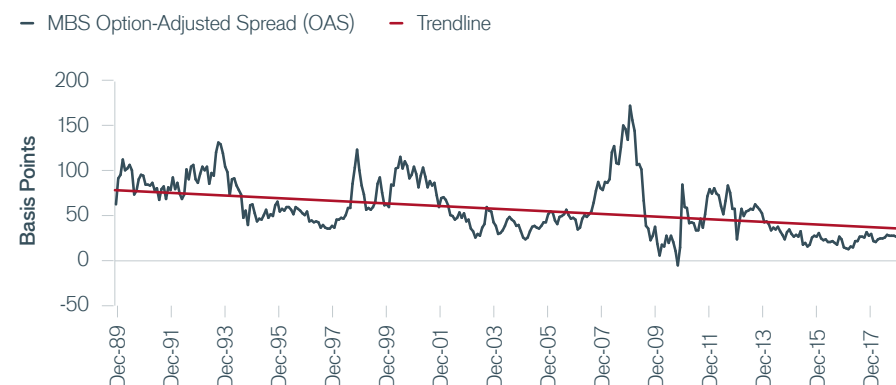
Source: Bloomberg, as of 10/31/18

Volatility and MBS Valuations

While understanding volatility trends is important, an appreciation for volatility's impact on asset spreads over time is equally as critical. Given that MBS valuations are intimately tied to interest rate volatility, we took a closer look at trends in MBS spreads. When observing the time series of MBS in Exhibit 4, we note that, similarly to interest rate volatility, spreads are trending lower. We attribute this to investors requiring less compensation for MBS as volatility has declined.

Exhibit 4: MBS Spreads

Similar to interest rate volatility, MBS spreads are trending lower



Source: Bloomberg, as of 10/31/18

Note: Depicts Bloomberg Barclays U.S. MBS Index OAS

While many types of fixed income assets have embedded options, the vast majority of these can only be exercised at a particular time. MBS, on the other hand, can be called away at any time. Homeowners carrying a mortgage have the option to prepay that mortgage whenever they wish. Prepayments occur for many reasons, including (but not limited to) refinancing as interest rates decline, taking cash out, relocating or trading up to a bigger home. By far the biggest driver of mortgage prepayments is lower interest rates, and, according to Cornerstone Research, from the creation of MBS, lower rates have presented borrowers with the opportunity to prepay their mortgage at least every two years.

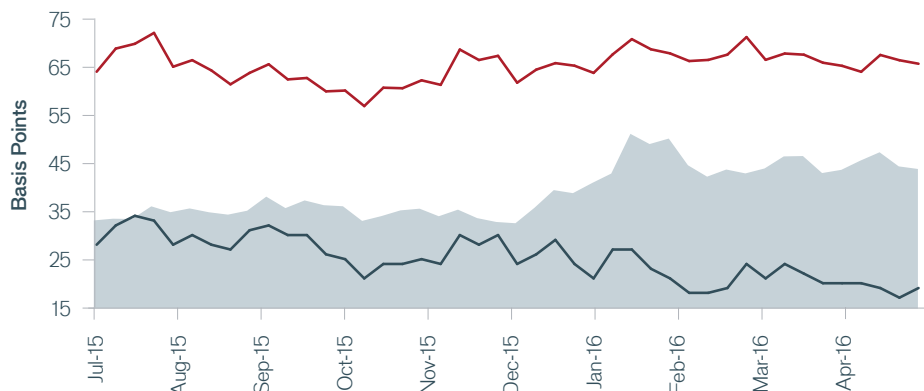
The holder of an MBS security must attempt to value the prepayment option of the underlying assets. The value of the option is highly dependent on not only the level of rates, but also the volatility of rates. Greater fluctuation in rates provides a borrower with an increased number of opportunities to prepay his or her mortgage, leading to a decline in the worth of the MBS. Exhibit 5 highlights that as rate volatility spiked in 2016, when investors thought the Fed might tighten in excess of what the economy could handle, MBS nominal (ZV) spreads stayed almost flat. However, the climb in volatility led to tighter MBS OAS. The increased risk and decline in compensation made MBS look less attractive.

Conversely, we anticipate MBS will perform well amid the current tightening cycle. As the Fed hikes at its measured, well-telegraphed pace, and we expect interest rate volatility to continue drifting downward, we would argue that investors should consider tactically overweighting MBS in their core fixed income portfolios.

Exhibit 5: MBS Spreads versus Interest Rate Volatility

Elevated interest rate volatility in 2016 made MBS look less attractive

- 30-Year MBS Current Coupon Treasury OAS
- 30-Year MBS Current Coupon Treasury ZV Spread
- 1-Year/10-Year Payer at the Money Forward Implied Yield Volatility



Source: Bloomberg, 7/31/15-5/27/16

The Opportunity in Vol

In addition to MBS, higher volatility also affects the spreads of other risk assets. As volatility increases, investors demand wider spreads to compensate for that uncertainty. This begs the question: Can volatility measures be used to predict asset spread widening? We looked at several measures of volatility and its predictive effects on high-yield OAS. We used high-yield OAS because it is one of the most volatile spread assets, and its value is determined less by the level of interest rates and more by pure credit risk.

In Exhibit 6, it is obvious that there is a strong correlation between moves in volatility and high-yield OAS. In fact, the correlation between high-yield OAS and the GSFI volatility measure is 0.93. Even after differencing the data to remove the trending bias, the correlation remains relatively high at 0.51. We then used regression analysis to look for any predictive abilities of volatility toward high-yield spreads. Unfortunately, no matter what time lag we used, the predictive ability was not evident.

Despite the fact that most analysis of volatility is backward looking, given its mean-reverting nature, we remain confident that we can make assumptions on the efficacy of volatility on a forward basis. Most importantly, we believe that being well calibrated to the effects of volatility on asset pricing – and therefore portfolio returns – makes a portfolio manager a better manager of risk overall.

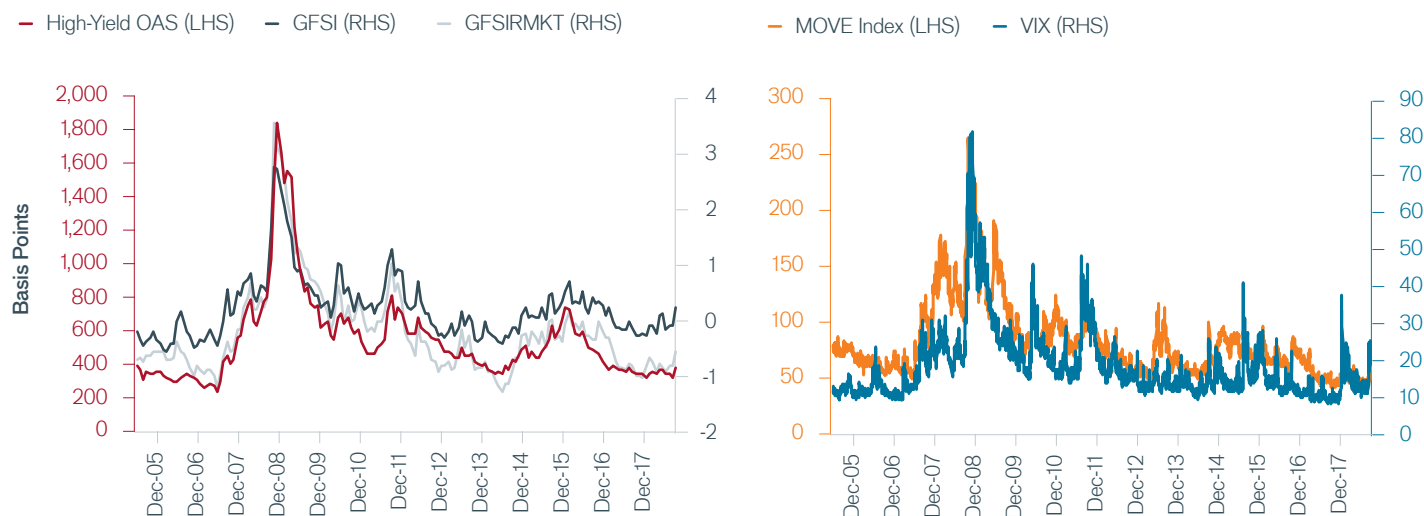
We would like to emphasize that volatility itself is not a risk outright, nor is it inherently detrimental to portfolios. The key for asset managers is to ensure that they are receiving fair compensation for taking risk when volatility is elevated. Short-term spikes in volatility often present opportunity for active managers to add risk at attractive levels. However, it is imperative to have tools in place to monitor for more systemic events and to be able to dynamically shift positioning if signals warrant a more defensive stance.

Janus Henderson Fixed Income believes in the importance of designing portfolios with volatility in mind and both establishing and managing to a clear set of risk parameters. In our view, it is paramount to openly discuss with our investors the risks that our portfolios are allowed to take and the implications for the future volatility of portfolio returns. We dedicate ourselves to understanding metrics like volatility to help us better align our portfolios with investor expectations and deliver on our goal of building highly optimized, risk-adjusted fixed income portfolios.

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Exhibit 6: High-Yield Spreads Correlate to Volatility

While there is a strong correlation between moves in volatility and high-yield OAS, volatility measures are not predictive of asset spread widening



Source: Bloomberg, as of 10/31/18

Note: High-Yield OAS represents Bloomberg Barclays U.S. High-Yield Corporate Index OAS

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Past performance is no guarantee of future results.

Investing involves risk, including the possible loss of principal and fluctuation of value. There is no assurance the stated objective(s) will be met.

Fixed income securities are subject to interest rate, inflation, credit and default risk. The bond market is volatile. As interest rates rise, bond prices usually fall, and vice versa. The return of principal is not guaranteed, and prices may decline if an issuer fails to make timely payments or its credit strength weakens.

Mortgage-backed securities (MBS) may be more sensitive to interest rate changes. They are subject to extension risk, where borrowers extend the duration of their mortgages as interest rates rise, and prepayment risk, where borrowers pay off their mortgages earlier as interest rates fall. These risks may reduce returns.

High-yield or "junk" bonds involve a greater risk of default and price volatility and can experience sudden and sharp price swings.

U.S. Treasury securities are direct debt obligations issued by the U.S. Government. With government bonds, the investor is a creditor of the government. Treasury Bills and U.S. Government Bonds are guaranteed by the full faith and credit of the United States government, are generally considered to be free of credit risk and typically carry lower yields than other securities.

Actively managed portfolios may fail to produce the intended results. No investment strategy can ensure a profit or eliminate the risk of loss.

Basis Point (bp) equals 1/100 of a percentage point. 1 bp = 0.01%, 100 bps = 1%. **Correlation** measures the degree to which two variables move in relation to each other. A value of 1.0 implies movement in parallel, -1.0 implies movement in opposite directions, and 0.0 implies no relationship. **Option-Adjusted Spread (OAS)** measures the spread between a fixed-income security rate and the risk-free rate of return, which is adjusted to take into account an embedded option.

Standard Deviation measures historical volatility. Higher standard deviation implies greater volatility.

Bloomberg Barclays U.S. Corporate High Yield Bond Index measures the U.S. dollar-denominated, high yield, fixed-rate corporate bond market.

Bloomberg Barclays U.S. Mortgage Backed Securities (MBS) Index tracks the performance of U.S. fixed-rate agency mortgage backed pass-through securities.

Index performance does not reflect the expenses of managing a portfolio as an index is unmanaged and not available for direct investment.

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