VOLATILITY ASSUMPTIONS

Moving toward a (slightly) more volatile future

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IN BRIEF

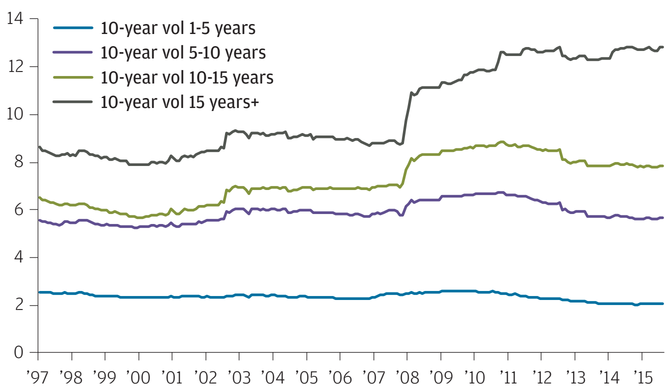
- Volatility forecasts are marginally higher this year for most asset classes, which is unsurprising given the two market corrections and the unexpected Brexit vote experienced in the last 12 months.
- Along with the broad decline in expected returns for asset classes across the risk spectrum, risk-adjusted returns have been lowered once again in this year's Long-Term Capital Market Assumptions.
- Credit continues to steal the spotlight as one of the most attractive risk-adjusted asset classes, along with alternatives for investors that are willing to bear the illiquidity premium.
- Government bond risks are no longer compensated as the duration premium erodes, with Sharpe ratios at or below zero.

EXPECT HIGHER VOLATILITY FOR SHORT-DURATION INSTRUMENTS AND HIGHER QUALITY CREDITS

Volatility will likely be higher for short-duration instruments as quantitative easing (QE) unwinds, and for higher quality credits as corporate behavior evolves. The unconventional central bank policies of recent years are creating unusually low volatility in fixed income markets, especially in the short end of the curve. **Exhibit 1** shows the historical 10-year rolling volatility by bond maturity. The bottom line (in blue) highlights this distortion, with volatility breaking its historical range. Our volatility assumptions incorporate normalizing volatility levels for short-duration instruments to reflect the gradual removal of QE and other central bank stimulus measures over our forecast horizon.

Volatility is unusually low at the short end of the Treasury curve

EXHIBIT 1: ROLLING 10-YEAR HISTORICAL VOLATILITY BASED ON MONTHLY DATA (%)



Source: J.P. Morgan Securities LLC, J.P. Morgan Asset Management; data from December 1997 to July 2016.

Selective credit markets are also likely to experience higher volatility over the forecast horizon. The investment grade corporate bond market has been experiencing a gradual decline in quality over the past decade. **Exhibit 2** shows the composition of the investment grade corporate bond market over time. With cheap financing readily available for a wide spectrum of borrowers, including those with relatively lower quality balance sheets and a poorer ability to pay, companies have little incentive to pursue the elite rating status. AAA rated companies have become a rarity, and the majority of U.S. investment grade bonds are now BBB rated vs. A rated in the early 2000s. A similar decline in credit quality is observed in Europe as well.

Corporates are also lengthening the maturity of their new issuance to lock in low rates. We do not expect a change in these behaviors as rates stay low relative to history and credit remains the bright spot in the fixed income market, generating solid demand. As a result, the volatility of investment grade credits is expected to be higher than history. We see a similar deterioration in credit quality in the leveraged loan market, with an increase in issuance by lower-rated companies and an increase in loans with fewer investor protections, and thus we forecast leveraged loan volatility to be higher than historical levels.

Our volatility and correlation methodology anchors off historical experiences

Long-term asset class volatilities and correlations tend to exhibit stability when measured over multiple cycles. As such, we use the following estimation process for the main asset classes:

1. **Monthly historical return data**
   - The starting point for our forward-looking risk forecasts in the capital market assumption process
2. **Filter data outliers**
   - Raw data is winsorized to improve robustness
3. **Construct anchor matrix**
   - Variance-covariance is calculated using the filtered data set
4. **Adjustment for key themes and structural changes**
   - Key themes and structural changes that are expected in the forecast horizon, such as those highlighted in this article, are reflected in the long-term risk forecast accordingly

This year's capital market assumption matrix includes the monthly volatilities annualized by the widely used square root of 12 factor. We continue to recommend the use of annualized volatilities based on log-returns for the appropriate users, such as those focused on simulations and other algorithms. Our 2015 Long-Term Capital Market Return Assumptions publication contains more details on our volatility and correlation methodology.[1]

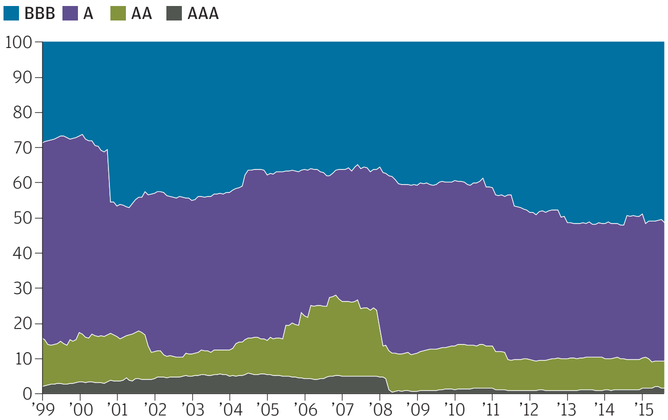
A look into hedge fund volatility: Standard hedge fund return indices such as HFRI may be a good measure of industry-wide performance. However, most hedge fund allocators hold about 15 to 25 funds. The broad industry composite return diversifies away most of the idiosyncratic (or uncorrelated) returns and therefore underestimates the volatility of hedge fund investments for typical investors. To address this, we use a random bootstrapping method to create 1,000 unique, equally weighted portfolios containing three to five funds. Volatility is then estimated for the portfolios using up to 10 years of monthly return history. We analyze the distribution of the 1,000 volatility estimates to create volatility projections. For further details, please see our publication "Focusing on hedge fund volatility: Keeping alpha with the beta."

[1] See "Creating more robust forward-looking risk statistics," Daniel Scansaroli and Michael Feser, J.P. Morgan Asset Management Long-Term Capital Market Return Assumptions 2015.

Investment grade credit markets are declining in quality, and maturities are lengthening

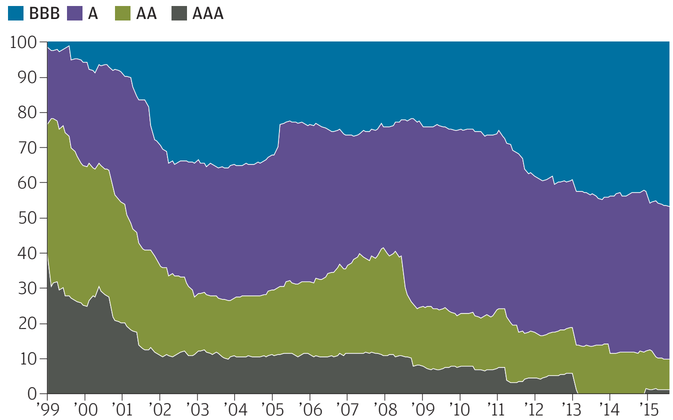
EXHIBIT 2: EVOLUTION OF THE INVESTMENT GRADE CORPORATE BOND MARKET

Market share by credit rating for U.S. corporate investment grade



Source: J.P. Morgan Securities LLC, J.P. Morgan Asset Management; data from December 1999 to July 2016.

Market share by credit rating for European corporate investment grade



Source: J.P. Morgan Securities LLC, J.P. Morgan Asset Management; data from December 1998 to July 2016.

An increase in emerging market debt (EMD) volatility relative to history is consistent with our gradually declining outlook for emerging markets. The EMD market experienced a boost in the past decade as the ratings of many emerging countries migrated from below investment grade to investment grade.This tailwind is no longer in place and may partially reverse (**Exhibit 3**). Along with headwinds such as deleveraging, volatility is likely to be higher than historical levels for the asset class.

The tailwinds behind the drop in EMD volatility may partially reverse

EXHIBIT 3: EMD ROLLING 10-YEAR HISTORICAL VOLATILITY BASED ON MONTHLY DATA (%)

Source: J.P. Morgan Securities LLC, J.P. Morgan Asset Management; data from December 1999 to July 2016.

Not all roads lead to an increase in volatility relative to historical standards in credit markets. European high yield, for example, is expected to be less volatile in the future, as the quality of the market has improved in recent years and fallen angels are expected to regain their investment grade status over the forecast horizon.

LITTLE CHANGE IN EQUITY VOLATILITY, FOR MOST

Equity volatility is expected to be broadly in line with history, in our view, with the exception of European equities for dollar investors, where volatility is expected to be lower. The historical long-run co-movement (based on 10 years of monthly data) between European currencies and their respective equity markets may be higher than expected in the future. A number of crises have hit the European region over the past decade, creating bearish sentiment and sparking outflows from both the region's equity and foreign exchange markets. Shorter-term measures also suggest a more normalized co-movement behavior, and we concur. This translates to lower volatility for U.S. dollar investors investing into European/UK equities relative to history. The U.S. REITs market also experienced an extreme crisis in recent history, which we do not expect to reoccur in our forecast horizon. Historical volatility of U.S. REITs would therefore overstate the likely future volatility, in our opinion.

LV–JPM31755 | 10/16 | 4d03c02a8003e6c6

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