Low volatility is a well-known factor in the equity world. Academic research has documented strong support for the “Low Volatility Anomaly”, as many investors who lack the ability to use leverage have a tendency to overweight high-beta assets, thus bidding up the price of these assets. In the long run, this means that risky, high-beta assets offer lower risk-adjusted returns than safer, low-beta assets. This implies that over the long term, low-beta assets provide higher returns than predicted by standard portfolio theory. As such, they are an attractive option for investors with a focus on managing volatility.

Research has shown that this effect not only exists in equities, but also in other asset classes, including corporate bonds. In this paper, we discuss how—similar to a low volatility factor in equities—a low volatility factor applied to high yield bonds has the potential to offer significant downside risk reduction during credit sell-offs. At the same time, it can potentially deliver competitive performance and income over the long term.

**Measuring the Volatility of High Yield Bonds**

Historical price volatility, which is typically used to measure volatility in equity strategies, is not a reliable predictor of individual bond volatility. This is due to less frequent trading in the bond market and the fact that bonds mature over time. In short, since a bond’s duration is not constant, it can skew the volatility, as measured by historical prices. In practice, bond managers estimate credit risk using a market-based volatility measure called “Duration Times Spread” (DTS). The DTS measure was first introduced in 2005 in a well-known research paper. In particular, it established the fact that the excess return volatility of a bond is proportional to its spread times its duration. Since the publication, this measure has been widely used and tested by a broad range of market participants and has lived up to its reputation, even through the credit crisis.

To measure a bond’s volatility relative to the broad market, we further introduce the concept of “Marginal Contribution to Risk” (MCR), which measures the additional risk the bond contributes to the broad market. MCR is simply the difference between the DTS of the bond and the DTS of a bond trading at the average market credit spread level. MCR serves as a useful estimation of a bond’s credit risk, as the higher the MCR, the more implied credit risk the bond contributes to the broad market. Bonds with positive MCR tend to add risk to the broader market, whereas bonds with negative MCR tend to reduce risk of the broader market.

While DTS serves as a good measure of a bond’s absolute volatility, bonds trading under distressed conditions and very wide credit spreads can sometimes have a fairly low DTS ranking (i.e., less risky). That’s because the bond most likely will have a short spread duration. In contrast, using MCR, bonds trading at distressed levels will have a positive MCR ranking, which will more likely be classified as risky and, therefore, not make it into the low volatility high yield portfolio.
MCR as an Early Indicator of Credit Rating Changes

As one can see in the sample bond illustrated in Figure 1, MCR serves as a much more timely and relevant measure for credit risk than credit ratings. In this case, the XYZ Energy bond was downgraded several notches from October 2014 to June 2016. It’s worth noting that the bond’s MCR ranking worsened considerably from October 2014 to April 2015, which turned out to be a very useful predictor of the subsequent rating downgrades. However, an investor looking at ratings alone would have incorporated this quality deterioration too late from a market-timing perspective.

### Figure 1: A timely measure of credit risk

![Figure 1: A timely measure of credit risk](image)

Sources: Bank of America Merrill Lynch, New York Life Investment Management, 2016. The above is for illustrative purposes only, based on an actual high yield energy bond.

The example provided in Figure 1 is not unique. In fact, reviewing all rating changes from B to BB and vice versa from 1997 to 2016 (a total number of 1,343 rating upgrades and 1,888 downgrades), we calculated the average path for a bond’s ranking versus peers from 48 months before the rating change until 10 months after it. As shown in Figure 2, a bond’s MCR ranking generally started deteriorating long before (25-30 months) the rating downgrade actually happened (shown in red). Conversely, a bond’s MCR ranking generally started improving 25-30 months before the rating upgrade actually happened (shown in green). These results provided evidence that the MCR measure had desirable properties when assessing the credit risk of high yield bonds, as it provided more timely information than simply a credit rating.

### Figure 2: An early indicator of rating changes

![Figure 2: An early indicator of rating changes](image)

Source: New York Life Investment Management, as of 12/31/16.
The Potential for Risk-Adjusted Returns

MCR offers an objective, market-based measure of a bond’s credit risk relative to its peers. By applying this measure to the liquid high yield corporate bond universe, investors have the potential to identify lower volatility high yield bonds that offer potential income while, at the same time, manage downside risk.

To show the efficacy of the low volatility factor, we calculated the MCR measure for each bond in the high yield corporate bond universe (HY Index).* We then ranked them in ascending order and compared the performance of the low MCR bonds (bonds ranked 0-50% in the universe) and the high MCR bonds (bonds ranked 51-100% in the universe).

Figure 3 illustrates that bonds with a low MCR have similar performance as the high yield index on average over a 20-year period, but with only 60% of the downside risk, as measured by Value at Risk (VaR). A risk/return profile this attractive cannot be achieved by the simplest method of deleveraging, which would be holding a combination of cash and the high yield corporate bond index. Bonds with a low MCR exhibited a better risk/return profile than bonds with a high MCR. This study provided evidence of a low volatility anomaly in high yield bonds, as low MCR bonds provided enhanced risk-adjusted returns. Furthermore, low MCR bonds have ~26% lower VaR than the BB Sub Index, the highest rated bonds deemed to be high yield, without sacrificing return.

Research has shown that MCR as a market-based measure, has the potential to help manage downside risk better than relying on credit ratings, therefore providing a smarter way to play defense in high yield bonds.

Figure 3: High yield risk/return profile

(2/28/1997 - 11/30/2016)

Sources: Bank of America Merrill Lynch, New York Life Investment Management, 2016. High Yield Index is represented by Merrill Lynch High Yield Master II Index. BB Index is represented by the Merrill Lynch US High Yield BB Index. Cash is represented by the 3-month LIBOR. Cash dilution is represented by a combination of cash and the HY Index.

Figure 4 shows the cumulative performance of low MCR and high MCR bonds relative to the HY index over time. The outperformance of the low MCR bonds is most significant during periods of widening credit spreads, where the low MCR bonds demonstrate lower market volatility and drawdown risk.

Figure 4: Total return ratio vs. high yield spread


* Represented by the Merrill Lynch High Yield Master II Index.

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Figure 5 shows the cumulative performance during periods of market stress for low MCR bonds and high MCR bonds versus the high yield and BB index. The risk reduction effect of low MCR bonds is clearly exhibited during periods of market stress, such as the 2000 tech bubble, the 2008 financial crisis, and the 2015 energy crisis.

<table>
<thead>
<tr>
<th>Credit spread widening period (trough to peak)</th>
<th>Low MCR Bonds</th>
<th>High MCR bonds</th>
<th>HY Index</th>
<th>BB Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. DOT-COM CRASH</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>February 2000-December 2000</td>
<td>5.10%</td>
<td>-17.38%</td>
<td>-4.81%</td>
<td>2.63%</td>
</tr>
<tr>
<td>April 2002-September 2002</td>
<td>-1.12%</td>
<td>-19.99%</td>
<td>-9.81%</td>
<td>-9.39%</td>
</tr>
<tr>
<td>II. FINANCIAL CRISIS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>June 2007-November 2008</td>
<td>-20.92%</td>
<td>-46.22%</td>
<td>-33.23%</td>
<td>-24.90%</td>
</tr>
<tr>
<td>III. U.S. CREDIT DOWNGRADE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>April-September 2011</td>
<td>-2.34%</td>
<td>-9.24%</td>
<td>-5.39%</td>
<td>-2.80%</td>
</tr>
<tr>
<td>IV. OIL PRICE COLLAPSE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>July 2014-January 2016</td>
<td>0.59%</td>
<td>-20.98%</td>
<td>-8.92%</td>
<td>-2.38%</td>
</tr>
</tbody>
</table>

* See appendix for calendar year performance.

Source: New York Life Investment Management, as of 12/31/16. High Yield Index is represented by Merrill Lynch High Yield Master II Index. BB Index is represented by the Merrill Lynch US High Yield BB Index. Past performance is no guarantee of future results. You can not invest directly in an index.

The outperformance of low MCR bonds during crisis periods comes as no surprise if one is to look at the sector composition difference between low MCR bonds and the high yield index. MCR, as a market-based measure, was quick to detect stress in the sectors—as reflected in the market price—and tended to underweight troubled sectors before rating agencies took action. Beginning in 1999, low MCR bonds started to underweight the telecommunications and technology sectors. In 2005-2006, low MCR bonds underweighted the automobile and financial sectors. And as early as 2014, low MCR bonds started to underweight the energy sector (Figure 6).

Addressing Liquidity Concerns in High Yield Investing

Liquidity concerns can be addressed by incorporating liquidity filters in the high yield bond universe before applying the MCR concept to deliver an investable strategy. Based on research on bond liquidity and common practice by asset managers, one may consider excluding small issues and aged bonds. Further, one may exclude distressed bonds, based on their spread and duration levels. In addition to a liquidity filter, a trading “buffer” could be established to mitigate the turnover of the strategy. Existing bonds in the strategy would then be allowed to drift a bit higher in the MCR ranking before being removed from the low MCR universe.
How Can Investors Use Low Volatility High Yield in Their Portfolio?

Given the low level of interest rates, finding yield is a challenge for many investors. Of course, high yield doesn’t come without incurring additional risk—sometimes significant risk. Figure 7 compares several popular asset classes' income versus their risk profiles from 2008 to 2016. As you can see, historically low MCR high yield bonds have provided a competitive income/risk trade-off compared to other income-producing asset classes.

To further this point, Figure 8 plots the average income generated by several income generating asset classes, including low MCR high yield bonds, versus their maximum drawdown from 2008 to 2016. As demonstrated, low MCR high yield bonds generated competitive income relative to the amount of downside risk they encountered.

Sources: NYLIM, Bloomberg, 2016. High dividend stocks are represented by the Dow Jones U.S. Select Dividend Index. MLP is represented by the Alerian MLP Index. Long term Treasury is represented by the ICE U.S. Treasury 20+ Year Bond Index. Mortgage REIT is represented by the FTSE NAREIT All Mortgage Capped Index. Emerging market bonds are represented by the J.P. Morgan EMBI Global Core Index. Investment grade bonds are represented by the Markit (iBoxx) USD Liquid Investment Grade Index. High yield bonds are represented by the Merrill Lynch High Yield Master II Index. Short duration high yield bonds are represented by the Merrill Lynch 1-5 Year US Cash Pay High Yield Index. Average income is measured by the average yield of the index. Volatility is measured by the annualized monthly volatility of the index. Maximum drawdown is measured by the maximum loss from a peak to a trough of a portfolio, before a new peak is attained. Income/Volatility is a ratio of the average income divided by volatility. Income/Drawdown is a ratio of the average income divided by maximum drawdown. REITs must distribute at least 90% of their taxable profit as dividends to shareholders. An MLP only has to distribute the amount set forth in the partnership agreement. Distributions made to shareholders may be considered dividend income, non-taxable return of capital or capital gain. Funds that invest in bonds are subject to interest-rate risk and can lose principal value when interest rates rise. Bonds are also subject to credit risk, in which the bond issuer may fail to pay interest and principal in a timely manner. Treasury securities are backed by the full faith and credit of the U.S. government. Past performance is no guarantee of future results. You can not invest directly in an index.
Balancing the Income/Risk Trade-off

Needless to say, within the high yield universe, not every bond offers the same income/risk trade-off. As shown in Figure 9, a snapshot of the high yield universe illustrates that removing 20% of the riskiest bonds will reduce the yield from 6.17% to 5.0%. This means that a portfolio of low MCR bonds will always have a current yield that is lower than the yield of major high yield indices. Nevertheless, despite the lower starting point for low MCR bond yields, research has shown in the longer run, low MCR bonds have the potential to generate income and returns that are not dramatically lower than high yield bonds in general, while offering the potential to significantly reduce downside risk.

High Yield Low Volatility: An Attractive Option, Given the Current Environment

Forecasting market-turning points is always a difficult exercise, but historically, the MCR measure has been a valuable early warning indicator of potential dangers in the marketplace. In addition, the competitive risk/return profile makes low volatility high yield an option that’s well-suited for investors focused on income, as well as for those concerned about market volatility. The current stage of the market cycle, coupled with uncertainties regarding future monetary/fiscal policy and potential political risks, trading in some yield for the potential of improved downside protection could be a favorable choice for investors looking to manage volatility.

While on the surface it may seem counterintuitive, replacing all or part of an existing allocation to riskier corporate bonds with lower volatility high yield bonds could be a smarter way of managing portfolio risk than reallocating towards cash or higher-rated bonds. What’s more, a low volatility high yield strategy can help maintain a competitive trade-off between income and overall portfolio risk.

Income-oriented investors that own high dividend stocks and are concerned about market volatility may also wish to consider replacing part of their allocation with a low volatility high yield strategy. Based on research, such a reallocation has the potential to enhance their portfolio yield, while lowering downside risk.

Finally, with the Federal Reserve Bank taking steps toward normalizing monetary policy, a low volatility high yield strategy may also be an attractive option for investors concerned about the impact of rising rates. As shown in Figure 10, credit-sensitive products have historically offered a cushion against duration risk, given the historical negative correlation between spreads and rates.

---

**Figure 9: High income skewed towards riskiest bonds**

Source: NYLIM, as of 12/31/16. Data is based on applying the MCR methodology to the Merrill Lynch High Yield Master II Index. Past performance is no guarantee of future results. You can not invest directly in an index.

**Figure 10: Total return correlation**

<table>
<thead>
<tr>
<th></th>
<th>Intermediate U.S. Treasury</th>
<th>Low MCR Bonds</th>
<th>Aggregate Index</th>
<th>Investment Grade Corporate Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intermediate U.S. Treasury</td>
<td>1.00</td>
<td>(0.04)</td>
<td>0.87</td>
<td>0.54</td>
</tr>
<tr>
<td>Low MCR Bonds</td>
<td>(0.04)</td>
<td>1.00</td>
<td>0.35</td>
<td>0.66</td>
</tr>
<tr>
<td>Aggregate Index</td>
<td>0.87</td>
<td>0.35</td>
<td>1.00</td>
<td>0.85</td>
</tr>
<tr>
<td>Investment Grade Corporate Index</td>
<td>0.54</td>
<td>0.66</td>
<td>0.85</td>
<td>1.00</td>
</tr>
</tbody>
</table>

Sources: Bank of America Merrill Lynch, Bloomberg, 1996-2016. The Intermediate U.S. Treasury is represented by the Bloomberg Barclays Capital Intermediate U.S. Treasury Index. The Aggregate Index is represented by the Bloomberg Barclays US Aggregate Index. The Investment Grade Corporate Index is represented by the Bloomberg Barclays Capital U.S. Corporate Investment Grade Index. Past performance is no guarantee of future results. You can not invest directly in an index.
Conclusion

Historically high yield bonds have been compelling because they offer attractive income and provide a cushion against duration risk due to the negative correlation between spreads and interest rates. However, credit risk has been a key concern for investors that may have deterred them from investing in the asset class. Our research shows that MCR is a more effective way to measure credit risk than credit ratings. By eliminating bonds with high MCR, investors gain access to potentially lower volatility without substantially sacrificing income or returns over the long term. Bonds with low MCR have historically captured 80–90% of the income stream from high yield bonds, with only 60–70% of the volatility, acting as an effective building block in an income-oriented portfolio.
References
5. Pictet Asset Management, Risk management – Making the difference in fixed income investing, September 2014.
6. Andrew Colin, Running Attribution on Credit Portfolios with Duration Times Spread, Flanetree Technologies PTY Ltd.

Appendix
Cumulative year returns

<table>
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<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>High Yield Index</td>
<td>13.24%</td>
<td>2.98</td>
<td>2.45</td>
<td>-5.16</td>
<td>4.46</td>
<td>-1.93</td>
<td>28.13</td>
<td>10.87</td>
<td>2.74</td>
<td>11.76</td>
<td>2.19</td>
<td>-26.39</td>
<td>57.51</td>
<td>15.19</td>
<td>4.38</td>
<td>15.58</td>
<td>7.42</td>
<td>2.50</td>
<td>-4.64</td>
<td>17.49</td>
</tr>
<tr>
<td>Low MCR Bonds</td>
<td>12.10%</td>
<td>6.58</td>
<td>2.08</td>
<td>4.46</td>
<td>10.61</td>
<td>5.86</td>
<td>17.50</td>
<td>8.12</td>
<td>2.58</td>
<td>6.89</td>
<td>3.77</td>
<td>-17.06</td>
<td>33.21</td>
<td>12.30</td>
<td>6.15</td>
<td>12.88</td>
<td>4.38</td>
<td>4.86</td>
<td>0.98</td>
<td>8.80</td>
</tr>
<tr>
<td>High MCR Bonds</td>
<td>14.65%</td>
<td>-0.72</td>
<td>3.08</td>
<td>-17.39</td>
<td>-4.32</td>
<td>-11.38</td>
<td>43.96</td>
<td>14.52</td>
<td>2.94</td>
<td>17.42</td>
<td>0.67</td>
<td>-36.88</td>
<td>104.04</td>
<td>18.74</td>
<td>1.90</td>
<td>19.35</td>
<td>11.72</td>
<td>-0.67</td>
<td>-12.11</td>
<td>30.64</td>
</tr>
</tbody>
</table>

High Yield Index is represented by BofAML US High Yield Master II Index. BB Index is represented by the BofA Merrill Lynch US High Yield BB Index. Past performance is no guarantee of future results. You can not invest directly in an index.

Definitions
Alérian MLP Index is the leading gauge of energy Master Limited Partnerships (MLPs). The float-adjusted, capitalization-weighted index, whose constituents represent approximately 85% of total float-adjusted market capitalization, is disseminated real-time on a price-return basis and on a total-return basis.
Barclays Capital Intermediate U.S. Treasury Index includes all publicly issued, U.S. Treasury securities that have a remaining maturity of greater than or equal to 1 year and less than 10 years, are rated investment grade, and have $250 million or more of outstanding face value.
Bloomberg Barclays Capital U.S. Corporate Investment Grade Index is designed to track a more liquid subset of the US Corporate Index, which measures the market for investment grade, fixed-rate, taxable corporate bonds.
Bloomberg Barclays US Aggregate Bond Index is a broad-based flagship benchmark that measures the investment grade, US dollar-denominated, fixed-rate taxable bond market. The index includes Treasuries, government-related and corporate securities.
Merrill Lynch High Yield Master II Index is a commonly used benchmark index for high-yield corporate bonds. The index is a measure of the broad high yield market.

Dow Jones U.S. Select Dividend Index aims to represent the U.S.’s leading stocks by dividend yield.

FTSE NAREIT All Mortgage Capped Index measures the performance of the residential and commercial real estate, mortgage finance, and savings associations sectors of the U.S. equity market.

ICE U.S. Treasury 20+ Year Bond Index measures the performance of Treasury securities and is selected by a Market Value process.

J.P. Morgan EMBI Global Core Index is a broad, diverse U.S. dollar denominated emerging markets debt benchmark that tracks the total return of actively traded debt instruments in emerging market countries.

Markit iBoxx USD Liquid Investment Grade Index has been designed to be a subset of the broader USD corporate bond market which can be used as a basis for tradable products, including ETFs. Multiple contributor pricing and support for the index from leading financial institutions ensure that the index is a tradable reflection of the corporate bond market.

Merrill Lynch 1-5 Year U.S. Cash Pay High Yield Index is an unmanaged index used as a general measure of market performance consisting of fixed-rate, coupon-bearing bonds with an outstanding par which is greater than or equal to $50 million, a maturity range greater than or equal to one year, and must be less than BBB/Baa rated, but not in default.

Correlation, in the finance and investment industries, is a statistic that measures the degree to which two securities move in relation to each other. Correlations are used in advanced portfolio management.

Marginal Contribution to Risk (MCR) measures the additional risk the bond contributes to the broad market. MCR is simply the difference between the duration times the spread (DTS) of the bond and the DTS of a bond trading at the average market credit spread level. MCR serves as a useful estimation of a bond’s credit risk as the higher the MCR, the more implied credit risk the bond contributes to the overall portfolio. Bonds with positive MCR tend to add risk to the broader market, whereas bonds with negative MCR tend to reduce risk of the broader market. Low MCR bonds are bonds ranked 0-50% in the universe and the high MCR bonds are ranked 51-100% in the universe.

Value at risk (VaR) is a statistical technique used to measure and quantify the level of financial risk within a firm or investment portfolio over a specific time frame.

Yield to worst (YTW) is the lowest yield an investor can expect when investing in a callable bond.

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About Risk
As with all investments, there are certain risks of investing in the Fund. The Fund’s shares will change in value, and you could lose money by investing in the Fund.

High yield securities generally offer a higher current yield than the yield available from higher grade issues, but typically involve greater risk. Securities rated below investment grade are commonly referred to as “junk bonds.”

Funds that invest in bonds are subject to interest-rate risk and can lose principal value when interest rates rise. Interest rates in the United States are near historic lows, which may increase the Fund’s exposure to risks associated with rising interest rates. Bonds are also subject to credit risk, which is the possibility that the bond issuer may fail to pay interest and principal in a timely manner.

The Underlying Index seeks to provide exposure to U.S. dollar denominated high yield corporate bonds that are measured to have less credit risk based on their Marginal Contribution to Risk. As with any measure of a bond’s credit risk, Marginal Contribution to Risk may fail to accurately reflect the credit risk of an individual bond. In addition, Marginal Contribution to Risk is not predictive of the price performance of fixed income securities. In addition, there is no guarantee that the construction methodology of the Underlying Index will accurately provide exposure to U.S. dollar denominated high yield corporate bonds with lower credit risk.

To the extent that the Underlying Index is concentrated in a particular industry, the Fund also will be concentrated in that industry. Concentrated Fund investments will subject the Fund to a greater risk of loss, as a result of adverse economic, business, or other developments than if its investments were diversified across different industry sectors.

Investments in foreign securities may be riskier than investments in U.S. securities. Differences, including less stringent investor protections and disclosure standards, less liquid trading markets, and political and economic developments in foreign countries, may affect the value of the Fund’s investments in foreign securities.

As a new fund, there can be no assurance that it will grow to or maintain an economically viable size, in which case, it may experience greater tracking error to its Underlying Index than it otherwise would at higher asset levels, or it could ultimately liquidate.

MainStay Investments® is a registered service mark and name under which New York Life Investment Management LLC does business. MainStay Investments, an indirect subsidiary of New York Life Insurance Company, New York, NY 10010, provides investment advisory products and services. IndexIQ® is an indirect wholly owned subsidiary of New York Life Investment Management Holdings LLC. ALPS Distributors, Inc. (ALPS) is the principal underwriter of the ETFs. NYLIFE Distributors LLC is a distributor of the ETFs and the principal underwriter of the IQ Hedge Multi-Strategy Plus Fund. NYLIFE Distributors LLC is located at 30 Hudson Street, Jersey City, NJ 07302. ALPS Distributors, Inc. is not affiliated with NYLIFE Distributors LLC. NYLIFE Distributors LLC is a Member FINRA/SIPC.