Low Volatility Equity Insights

A case for active investing in low volatility equity

Low volatility equity strategies have become an increasingly popular solution in the investor toolbox. This is largely the result of an increasing awareness of the low volatility anomaly[1] and a growing use of lower volatility seeking smart-beta strategies. Smart-beta strategies employ rules-based investment processes and alternative indexes seeking to better manage risk, improve diversification or enhance total returns. Typically, the objective of these quantitative strategies is to outperform a traditional index.

The increased popularity of low volatility strategies also reflects a greater appreciation of the damage caused by large portfolio drawdowns. These strategies have become an important option in smart-beta investing because they seek to outperform the market with significantly lower risk, while also providing diversification relative to cap-weighted strategies. They seek to offer these benefits by focusing on three key objectives: reducing the overall risk/beta of the portfolio, providing significant downside protection, and retaining meaningful upside participation.

As many investors take a closer look at low volatility strategies, an important question is whether to choose an actively managed or passive approach. In order to answer this question, we believe low volatility investors should focus on three criteria when selecting a strategy:

- Risk reduction
- Return generation potential
- Adaptability (or lack thereof) of the investment process

In this paper, we'll explore these criteria and explain why we believe they make the case for choosing an actively managed approach over a passive implementation.

The BMO low volatility equity team

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Evaluating a low volatility strategy

Risk reduction

We believe the top priority of any low volatility strategy is to deliver lower portfolio risk relative to the cap-weighted benchmark. The goal of this is to provide an investor with smoother returns, smaller risk of a significant drawdown and less dependence on the timing of cash flows. Strong risk reduction also leads to a compounding benefit, or lower "variance drag," which is key to low volatility's potential outperformance in the long run.

Variance drag can best be understood by example. This one is from Bernstein:[2]

Varying standard deviation (SD)[3] also varies return, via so-called "variance drag." Say you begin with an annual return of 10% each and every year (zero SD). You will of course wind up with a 10% annualized return over the long haul. But crank in a normally distributed random term with 20% SD, and you find that your range of annualized returns falls to a median of about 8%.

Reducing portfolio risk requires forecasting the potential future volatility of individual equities as well as all pairwise correlations among them. Risk forecasts can be thought of along two dimensions:

- Single vs. multiple: Low volatility strategies can use one or more measures to forecast risk.
- Simple vs. sophisticated: Low volatility strategies use estimates ranging from simple trailing volatility calculations to estimates produced by increasingly complex, multifactor models.

Risk measures: Single or multiple?

Passive low volatility options often rely on only a single measure to assess the riskiness of stocks. Active managers, however, can measure risk in several ways, using different techniques; doing so provides a more robust, diversified view of risk that may result in lower realized volatility. We believe that a multifaceted approach to risk management gives managers a greater chance of identifying emerging risks in the market.

For example, a 50-stock portfolio based solely on trailing 1-year price volatility as of December 31, 2014 would include a 40% weight in Real Estate Investment Trusts (REITs).[4] While each REIT may individually be low risk, this portfolio ends up quite concentrated, introducing a risk that could have been easily identified using additional measures.

Risk measures: Simple or sophisticated?

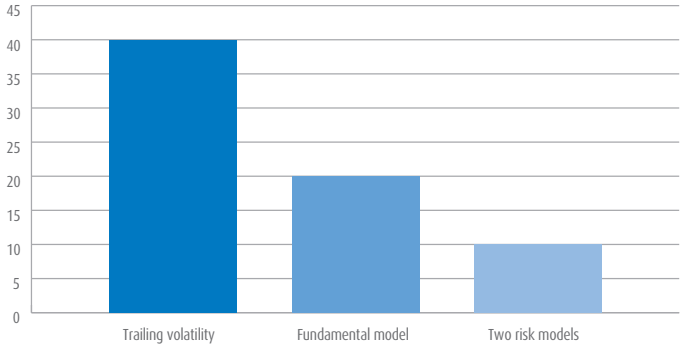
Another significant decision that must be made when building low volatility portfolios is whether to take a simple or more sophisticated view of estimating risk. Sophisticated approaches often use complex, multifactor risk models that consider underlying drivers of risk in the market. These models also use correlation estimates when determining stock weights. The argument for including correlation estimates during construction is straightforward: adding stocks with low or negative correlation to a portfolio reduces the overall risk of the portfolio regardless of that stock's standalone risk.

We believe managers who use a more sophisticated approach to risk forecasting are typically better equipped to manage correlations during portfolio construction, and are better able to deliver a low risk portfolio rather than just a portfolio concentrated in low risk stocks. Going back to our 40% REIT portfolio example, we can consider two additional low volatility portfolios that use more robust risk forecasting techniques.

- Starting with the same Russell 1000 universe, we built a low volatility portfolio by minimizing total portfolio risk as measured by a fundamental multifactor risk model, which includes correlation estimates. This portfolio cuts the weight in REITs to 20% of the portfolio.
- A second, more robust portfolio could be constructed by also including a macroeconomic risk model, as REITs contain significant interest rate exposure. A portfolio that considers both the fundamental and macroeconomic risk models further reduces the weight of REITs to only 10%.

Weight in REIT industry

Percent of portfolio weight



Sources: Axioma, Inc., BMO Global Asset Management

As these examples demonstrate, there are many different ways to build low volatility portfolios, and the choices made in portfolio construction can lead to significantly different portfolios.

Finally, another key portfolio construction decision for low volatility strategies is whether to frame portfolio constraints, such as maximum sector weights or risk factor exposures, in terms of the cap-weighted benchmark. Since an investor in a low volatility strategy recognizes (implicitly at least) that market-cap-weighted benchmarks are not efficient, any portfolio construction parameter that tilts a low volatility portfolio back toward market cap weighting dilutes the low volatility nature of the portfolio and increases expected risk.

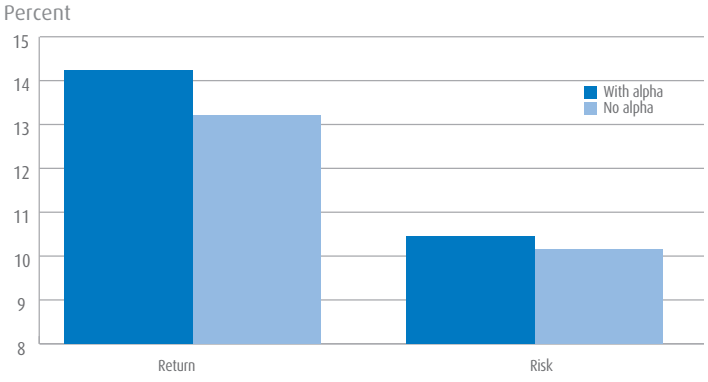
We believe less constrained low volatility strategies should deliver lower risk and more attractive diversification compared to any strategy with constraints based off of the cap-weighted benchmark, and thus should be favored by investors.

Return generation

One of the more compelling arguments for investing in an active low volatility strategy is the ability of an active manager to infuse return forecasts into the portfolio construction process. Passive low volatility strategies take no view on the potential returns of the stocks they own. In fact, the minimum variance portfolio, which selects stocks solely based on their squared standard deviation, takes the extreme and naïve view that every stock has the same expected return. In contrast, an active manager can favor stocks with higher expected returns. Therefore, though many portfolios will deliver similar levels of volatility reduction, they will offer very different levels of expected return.

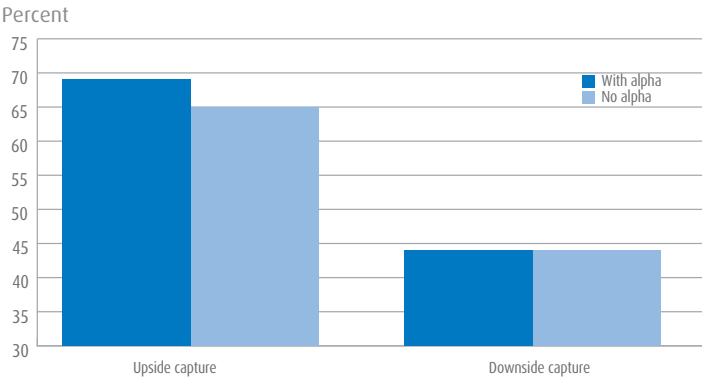
Managers who have displayed stock-picking skill in the broader market should be able to apply that skill in the low volatility space as well. Our research suggests adding a return expectation to a low volatility strategy potentially increases returns by enhancing the upside capture with little to no impact on downside capture—and with little to no impact on overall portfolio risk.[5]

Return versus risk



Sources: Axioma, Inc., FactSet Research Systems Inc., BMO Global Asset Management

Upside capture versus downside capture



Sources: Axioma, Inc., FactSet Research Systems Inc., BMO Global Asset Management

Adaptive process

A final consideration is whether a low volatility strategy can adapt to changing market conditions. Most investors understand risks evolve over time, and factors and stocks that have not been historically risky can become risky very quickly as economic forces change.

By definition, passive low volatility strategies follow rigid and predetermined portfolio construction techniques. In contrast, an active low volatility manager has the flexibility to adapt the portfolio as market conditions warrant. For example:

- Changing market risks: An active manager has the flexibility to observe changes in the market and reprioritize to focus on the most important risks, while passive strategies rely on the same measure of risk regardless of its expected importance in the current market. Sometimes these risks will be captured by risk forecasts, but sometimes they will not. For example, in 2013 interest rate risk increased rapidly during the "taper tantrum." Many fundamental risk models do not account for interest rates, and historical volatility did not identify this risk.
- Rebalance frequency: An active manager has the flexibility to monitor risk and rebalance the portfolio whenever necessary, while passive strategies follow a predetermined schedule, often reassessing the portfolio's risk only once or twice a year. This flexibility is likely to be most valuable in highly volatile markets — when the low volatility portfolio is expected to deliver the greatest benefit.

  For passive strategies with regularly scheduled rebalancing, their inflexibility also means portfolios become increasingly risky as the calendar progresses, only to be rebalanced at an arbitrary point in time.
- Trade off risk and return: One of the key advantages active managers have over passive low volatility indexes is the flexibility to trade off risk and return decisions over time. That is, managers can focus on risk reduction during periods of higher volatility, while offering more return generation during periods of lower volatility.

Over the long term, smart adaptability should benefit both the upside and downside capture ratios of a low volatility portfolio.

Active flexibility versus passive simplicity

As the market for low volatility equity strategies has emerged, many of the largest index providers have constructed low volatility benchmarks. These benchmarks have increasingly been used to manage passive strategies, including exchange traded funds (ETFs) and smart-beta portfolios. The case for these approaches is to provide a cheap, transparent way to implement a low volatility portfolio. There are three major providers of low volatility indexes, and we have included a table evaluating each of them along the dimensions discussed in the paper. The takeaway is that active management can provide far greater benefits than simple passive approaches. General descriptions of the indexes are provided on page 6, but for more complete information, please see the index provider websites.

	S&P 500 Low Volatility	MSCI USA Minimum Volatility	Russell 1000 Defensive	Active
Sophisticated risk forecast		✓		✓
Multiple views of risk			✓	✓
Non-cap-weighted constraints	✓			✓
Use of correlation		✓		✓
Use of return forecasts				✓
Rebalance frequency	✓			✓
Rebalance flexibility				✓

Conclusion

As investor attention increasingly turns toward outcome-based solutions and smart-beta products, we expect low volatility equity strategies to continue growing in popularity. However, when choosing a low volatility provider, it's important to remember all solutions are not created equal. Strategies featuring more robust risk forecasts and unconstrained portfolio construction methods should provide lower realized risk and thus better downside protection. Furthermore, strategies using reliable return forecasts potentially provide higher realized returns and improved upside participation. Finally, a skillful manager should be able to adapt to emerging risks in the market, and balance the risk/return trade-off as opportunities in the market arise. Investors should evaluate all of these characteristics when determining which low volatility strategy to use.

Case study

MSCI ACWI Minimum Volatility Index May 2015 reconstitution

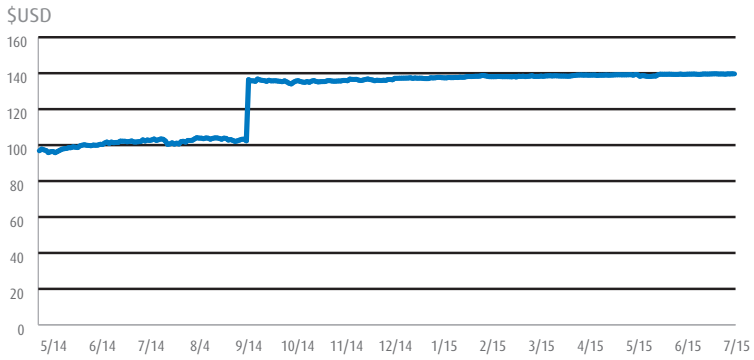
The May 2015 reconstitution of the MSCI ACWI Minimum Volatility Index gives us an opportunity to understand the benefits of active management within low volatility strategies. Our analysis highlights two specific benefits of active investing over passive approaches: understanding the limitations of risk models and process flexibility.

Understanding the limitations of risk models: Acquisition targets

During reconstitution, the largest addition to this MSCI index was Sigma-Aldrich (SIAL), a specialty chemical company based in the United States. In September of 2014, Merck KGaA (MRK.Germany) announced an all-cash offer to take over SIAL for $140/share. Following the offer's acceptance, the stock price traded flat for over 8 months.

Through the lens of a risk model, SIAL is an extremely low risk stock with negligible correlation to equity markets, making it a potentially attractive addition to a low risk portfolio. However, active managers would recognize this stock is behaving more like cash than equity and will not provide the intended equity-like exposure. Furthermore, the risk model is unaware of the true risk of the stock (deal termination). Active managers generally avoid acquisition targets in favor of more appropriate stocks. Note that this is not an unusual event, as another large addition in this reconstitution was Pepco Holdings (POM), a utility company being purchased by Excelon Corp (EXC).

SIAL closing price



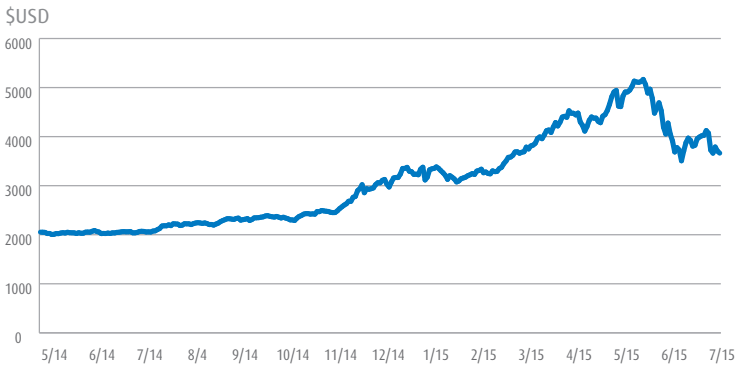
Sources: Bloomberg L.P., BMO Global Asset Management

Process flexibility: China equity exposure

Our analysis highlighted another example of how active investing in low volatility equity can differ from passive approaches. Passive approaches generally include a meaningful China exposure because it appears to offer a diversification benefit to the portfolio, even though these stocks on average tend to be higher risk. For example, leading up to the reconstitution, the weight of China in the MSCI index portfolio was 6.4%.

Since the end of 2014, the Chinese equity market had a spectacular rise of over 100% as a result of margin-driven speculative retail trading, with volatility increasing significantly in early May. Passive approaches can be slow to adapt to market changes, and in this reconstitution, MSCI only reduced China's weight to 5.7%. However, active managers can recognize the changing market conditions and, in particular, the greater likelihood of drawdowns that low volatility strategies specifically aim to avoid. Active managers can use this knowledge to make forward-looking decisions, rather than basing decisions solely on historical data. They can also use flexible rebalance schedules to continually trim positions as they become more risky. Since May, we've seen a major correction in the highly volatile China equity market, but passive investors must maintain their exposure until the next reconstitution.

SHCOMP closing price

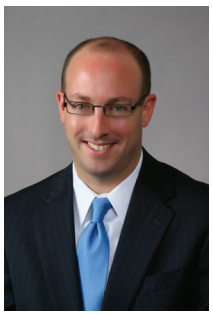


Sources: Bloomberg L.P., BMO Global Asset Management

While the transparency and consistency of passive low volatility equity indices can be appealing, their inherent lack of flexibility can penalize investors when trailing measures of risk are incomplete, or when market conditions rapidly change. We believe that investors in these products benefit from the right active manager.

Security references are for illustrative purposes only and are not a recommendation to buy or sell any specific security.

Team bios



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Portfolio Manager

David joined the firm in 2008 and is responsible for equity portfolio management and research. He entered the investment industry in 1999, and has served as a Quantitative Equity Portfolio Manager/Researcher at Northern Trust Global Investments and as a Quantitative Equity Research Analyst at Citigroup Asset Management.

He holds an MBA from Harvard Business School and a BS in Mathematics and Quantitative Economics from the University of Wisconsin. In addition, he holds the Chartered Financial Analyst® (CFA) designation and is a member of the CFA Institute, the CFA Society of Chicago and the Chicago Quantitative Alliance.

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Jason joined the firm in 2008 and is responsible for equity portfolio management and research. He began his experience in the investment industry in 1998, and was the Managing Director, Head of Research for Quantitative Services Group.

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Jay Kaufman, CFA
Portfolio Manager

Jay is responsible for equity portfolio management and research. He began his investment experience in 2006 and joined BMO Asset Management Corp. in 2010. Prior to joining BMO, Jay worked as a Quantitative Investment Analyst at Strategic Investment Group.

He holds an MBA from the University of Chicago with High Honors, concentrating in analytic finance, econometrics and statistics. He also holds a BS in Economics from the Wharton School at the University of Pennsylvania, concentrating in finance. In addition, Jay is a Chartered Financial Analyst® charterholder and is a member of the CFA Institute, the CFA Society of Chicago and the Chicago Quantitative Alliance.

Ernesto Ramos, PhD
Head of Equities

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Head of Equities

Ernesto is Head of Equities and a Portfolio Manager; he leads the teams responsible for portfolio management and research for all equity strategies. He joined the firm in 2005.

Ernesto began his investment management career in 1992 with Batterymarch Financial Management. He was Partner and Lead Portfolio Manager at Nicholas-Applegate Capital Management LLC, and Software Developer at Bolt, Beranek, and Newman. His career features investment management and research, econometric research, statistical research, and computer graphics research.

He holds a Ph.D. and an MA in Statistics from Harvard University and a BS in Mathematics from the Massachusetts Institute of Technology.

[1] Corris, David, Hans, Jason, Kaufman, Jay, and Ramos, Ernesto. 2013. "Finding opportunities through the low-volatility anomaly." http://bmogamviewpoints.com/wp-content/uploads/2014/08/BMOGAM-Low-VolatilityPaper.pdf

[2] Bernstein, William J. 2001. "The Retirement Calculator From Hell - Part II." http://www.efficientfrontier.com/ef/101/hell101.htm

[3] Standard deviation is the measurement of the spread or variability of a probability distribution; the square root of variance. It is a simple, symmetrical distribution where 66% of all outcomes fall within +/-1 standard deviation of the mean, 95% of all outcomes fall within +/-2 standard deviations and 99% of all outcomes fall within 2.5 standard deviations. Standard deviation is widely used as a measure of risk for the portfolio investments.

[4] Example portfolio consists of 50 equally weighted stocks from Russell 1000 with lowest total return volatility over the past year, based on daily returns

[5] Upside capture is calculated by taking monthly returns during months when the benchmark had a positive return and dividing it by the benchmark return during that same month. Downside capture is calculated by taking monthly returns during the periods of negative benchmark performance and dividing it by the benchmark return. An upside capture over 100 indicates outperformance during periods of positive returns for the benchmark, and a downside capture of less than 100 indicates underperformance during periods of negative returns for the benchmark.

[6] Model portfolio positions were limited to a 2% weighting

Investment cannot be made in an index.

The S&P 500® Low Volatility Index measures performance of the 100 least volatile stocks in the S&P 500. The index benchmarks low volatility or low variance strategies for the U.S. stock market. Constituents are weighted relative to the inverse of their corresponding volatility, with the least volatile stocks receiving the highest weights.

MSCI USA Minimum Volatility Index aims to reflect the performance characteristics of a minimum variance strategy applied to the US large and mid cap equity universe. The index is calculated by optimizing the MSCI USA Index, its parent index, for the lowest absolute risk (within a given set of constraints).

Russell 1000® Defensive Index® measures the performance of the large-cap defensive segment of the U.S. equity universe. It includes those Russell 1000 Index companies with relatively stable business conditions which are less sensitive to economic cycles, credit cycles, and market volatility based on their stability variables. Stability is measured in terms of volatility (price and earnings), leverage, and return on assets.

The MSCI ACWI Minimum Volatility Index aims to reflect the performance characteristics of a minimum variance strategy applied to large and mid cap equities across 23 Developed Markets (DM) and 23 Emerging Markets (EM) countries. The index is calculated by optimizing the MSCI ACWI Index, its parent index, in USD for the lowest absolute risk (within a given set of constraints).

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