LOW VOLATILITY INVESTING: TOPICAL CONCERNS

June 2016

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INTRODUCTION

Recent market-beating performance of low volatility strategies in rising markets[1] has brought them much attention. We believe several aspects of these strategies, however, have been lost in the glare of this recent performance. These issues fall under two categories:

- the aspects of performance other than return (such as its defensiveness and exposure to value) , some of which have been unexpected and even counterintuitive; and
- the topical concerns such as crowdedness and interest rate sensitivity

We examine a few factors from each of these categories across six types of low volatility strategies, with a primary focus on minimum variance, the favored low volatility approach among quantitative managers. The different aspects highlighted in this exercise reveal how sensitive low volatility strategies can be to the details of implementation. This sensitivity presents an opportunity for the skilled manager to fully exploit the benefits of low volatility investing.

DATA AND FRAMEWORK

We rely on two equity universes that span the last thirteen years (2003–2015): MSCI World Index and largest 3,000 US stocks. In the case of Minimum Variance, the universe goes back to 1976 using the largest 1,000 US stocks. Six kinds of low volatility strategies are considered (table 1). These constructs are merely illustrative. They are simplistic in that they contain no real world constraints such as sector controls or liquidity constraints; this simplicity, however, provides the transparency to illustrate the essence of these strategies.

Table 1. Six kinds of low volatility strategies

Minimum Variance	Solve for the lowest predicted portfolio volatility
High Dividend Yield	Highest dividend yield quintile of the universe, equal weighted
High Quality	f(ROA, leverage, earnings risk), capitalization weighted
Low Total Volatility	Lowest realized stock volatility, capitalization weighted
Defensive[2]	Equal combination of High Quality and Low Total Volatility
Inverse Specrisk	Weight in inverse proportion to stock-specific risk

HOW SIMILAR ARE THESE LOW VOLATILITY STRATEGIES?

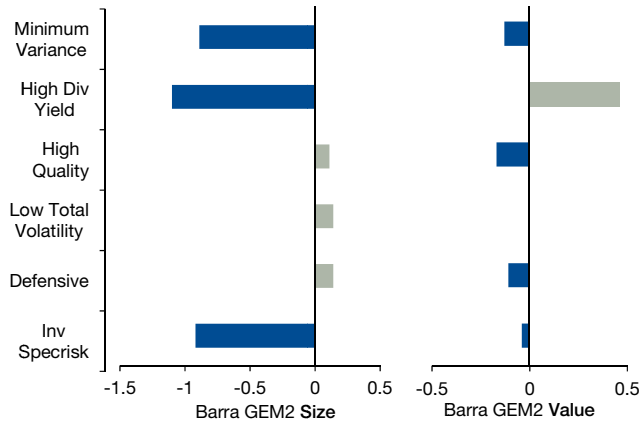
Overlap among the six illustrative strategies is low (table 2) with the exception of the overlap among High Quality, Low Total Volatility, and Defensive, which are inter-related.

Correlation of the total return of these strategies would be dominated by their market exposure. We focus on the return in excess of the cap-weighted portfolio to illustrate the similarity of these strategies (table 3).

Further, alternative implementations are possible for each of these strategies that result in different overlap or performance patterns. For example, High Dividend Yield can be built cap-weighted or with constraints on dividend sustainability instead of equal-weighted as constructed here.

These six strategies also differ in their exposure to factors like value and size (chart 1).

Chart 1. Size and Value exposure of low volatility strategies with respect to those of a cap-weighted portfolio



Source: Numeric, MSCI, and Barra. MSCI World Index universe, 2003 – 2015.

Key Point: Low volatility strategies differ widely. A thoughtful investor should choose a strategy based on how it differs from others and the attendant exposures it carries.

1. E.g., over a multi-year period ending on December 31, 2015, whether it starts from the end of any year 2001– 2014, the MSCI ACWI Minimum Volatility Index has outperformed the MSCI ACWI Index (USD, GD). Source: Bloomberg. While the expectation of low volatility strategies is that they should produce market-like returns, we believe the market-beating performance during this period is likely a result of risk-aversion and compounding drag from repeated market inflections.

2. This is a definition along the same lines as the Russell 1000® Defensive Index. It should not be confused with the non-capitalized "defensive," which we use in this document to denote the property of strategies with lower drawdowns than the market; as opposed to being "cyclical".

Table 2. Overlap in holdings among various low volatility approaches is not always high

Overlap	Minimum Variance	High Dividend Yield	High Quality	Low Total Vol	Defensive	Inv Specrisk
Minimum Variance	100%					
High Dividend Yield	9%	100%				
High Quality	4%	12%	100%			
Low Total Volatility	6%	19%	64%	100%		
Defensive	6%	16%	83%	80%	100%	
Inv Specrisk	6%	24%	38%	43%	41%	100%

Source: Numeric and MSCI. MSCI World Index universe, 2003 – 2015.

Table 3. Excess return correlation among low volatility strategies varies widely

Overlap	Minimum Variance	High Dividend Yield	High Quality	Low Total Vol	Defensive	Inv Specrisk
Minimum Variance	100%					
High Dividend Yield	-23%	100%				
High Quality	37%	-70%	100%			
Low Total Volatility	84%	-43%	56%	100%		
Defensive	73%	-59%	79%	93%	100%	
Inv Specrisk	38%	39%	-26%	12%	-5%	100%

Source: Numeric and MSCI. MSCI World Index universe, 2003 – 2015.

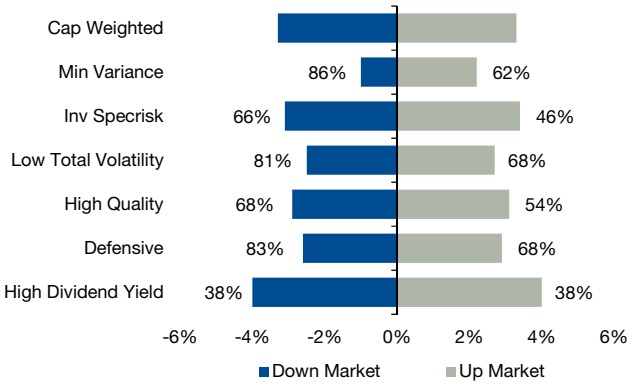
HOW DEFENSIVE IS LOW VOLATILITY?

The expectation of a low volatility strategy is that it should fall less than the market in a down-market and perhaps even rise less than the market in an up-market.

One can also examine the "hit rate"– how often a low volatility strategy falls less than the market in down markets.

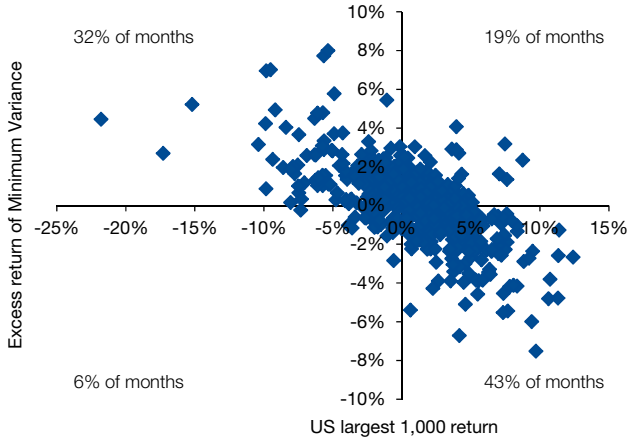
Minimum Variance, Low Total Volatility, and Defensive generally fall less in down markets and have high "hit rates" (chart 2).

Chart 2. Average monthly returns in up- and down-markets. Percentage numbers indicate how often a strategy lags in up- or down-markets



Source: Numeric and MSCI. MSCI World Index universe, 2003 – 2015.

Chart 3. Excess return of Minimum Variance versus that of a cap-weighted portfolio. Negative relationship is expected. Counterintuitive behavior in top right and bottom left quadrants are of note



Source: Numeric and Barra. US largest 1,000 universe, 1976 March – 2015 December.

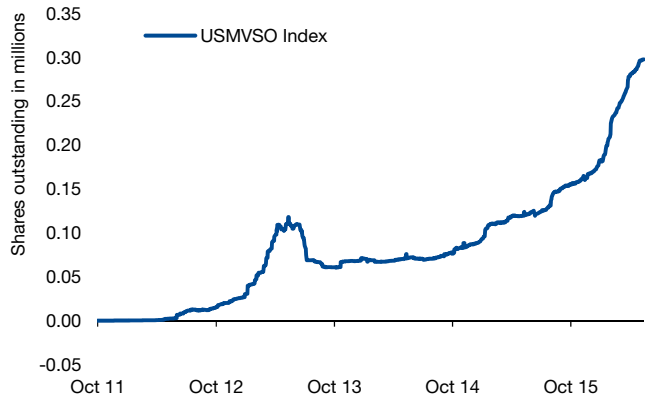
Empirically, Minimum Variance has in general behaved as expected – falling less in down-markets and rising less in up-markets – over the past 40 years (chart 3). Though it should be noted that about 6% of the time the strategy underperformed in a down-market. No strategy delivers as promised all the time.

Key Point: Not all strategies labelled as "low volatility" are similar. They are not all equally defensive. No approach is defensive at all times. An investor should choose the strategy that provides the performance characteristics he or she needs.

CROWDING

Low volatility strategies are said to be increasingly crowded, based in part on inflows from institutional assets, mutual funds, or ETFs (E.g., chart 4)

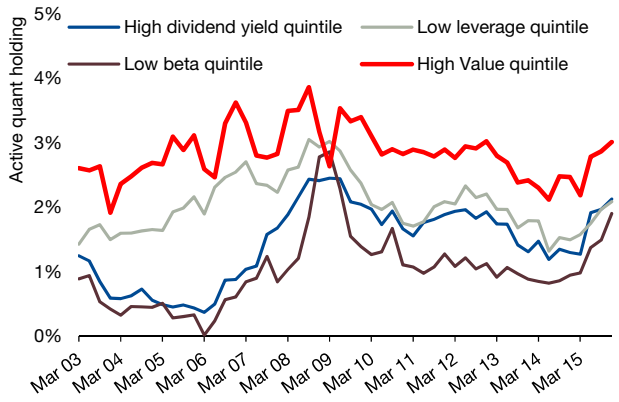
Chart 4. Shares outstanding of US Minimum Volatility iShares ETF



Source: Numeric and Bloomberg. October 19, 2011 – April 4, 2016.

Active quant holdings in any stock can be inferred from US regulatory filings of select managers[3]. Average active holding in the low volatility tail of Barra GEM2 leverage, beta, and yield show a recent increase (chart 5).

Chart 5. Active quant holdings in the tails of various Barra GEM2 styles



Source: Numeric, Thomson Reuters and Barra. Russell 3000® Index universe, 2003 – 2015.

None of these low volatility factor tails are as crowded as the cheap tail of Value presently (chart 5). Investing in low volatility strategies at current levels of crowding seems no more alarming than investing in Value[4].

Although the level of crowding in low volatility strategies has increased as of late, it should be viewed in the context of its historical measure (still below their 2008-2009 peaks).

Key Point: Crowding presents an opportunity for skilled managers to create differentiated portfolios that sidestep this pitfall and still deliver low volatility.

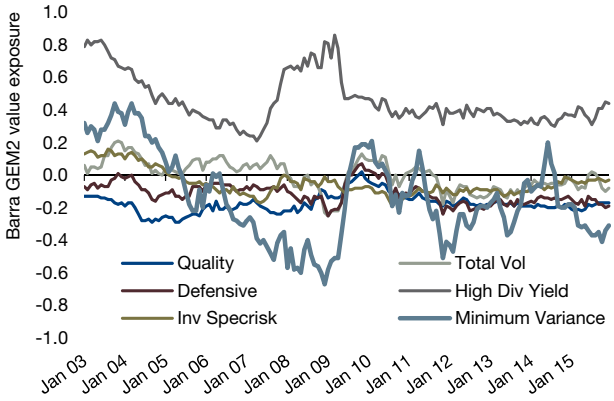
The overlap among the six low volatility strategies considered here is on average around 40%. The choice of risk models, trading frequency, and other methods of implementation will provide an opportunity for even further differentiation by skilled managers.

VALUE

Value exposure of Low Volatility strategies changes over time. Why? Does changing value exposure foretell performance?

High Dividend Yield is currently inexpensive[5] (chart 6). Most of the others are close to neutral. The value exposure of Minimum Variance has evolved over time. As risk models perceive the evolving risk of Value, a Minimum Variance portfolio will also change its exposure to Value. It is difficult to disentangle whether Value became risky or whether Minimum Variance became expensive.

Chart 6. Value exposures, with respect to a cap-weighted portfolio



Source: Numeric and MSCI. MSCI World Index universe, 2003 – 2015.

Has being expensive hurt Minimum Variance? Examples exist for and against this argument (table 4).

Table 4. Change in Value exposure not always indicative of relative performance of Minimum Variance

	Market Relative Value Exposure	Return of Min Variance and Cap-wted
2008 Jan – 2010 Feb	-0.6 to 0.2	1.6% vs -2.2%
2011 Nov – 2014 Jun	-0.5 to 0.2	12.2% vs 18.2%

Source: Numeric and MSCI. MSCI World Index Universe, 2008 – 2014.

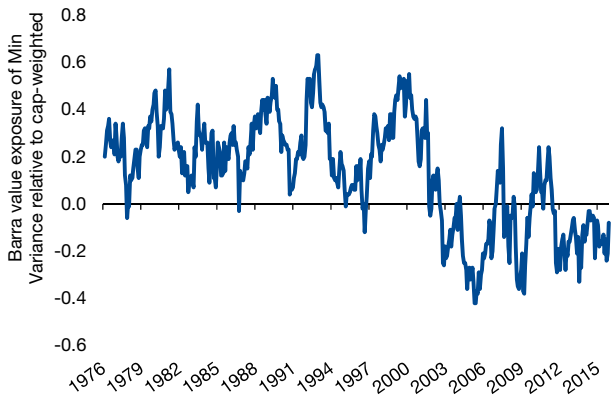
3. Managers were arbitrarily selected as quants based on what is publicly known about them. Active holdings are defined here as what is held by managers in excess of benchmark weights, as a ratio of total shares outstanding.

4. Intuitively, it makes sense that more assets are deployed in an attempt to harvest Value, one of the most popular investment strategies, than to harvest low volatility approaches. If investors are comfortable investing in Value at its current level of crowdedness, then the lower extent of crowding in low volatility factors ought not to dissuade them from investing in those factors.

5. Value exposure is measured with respect to Barra's GEM2 value which includes divided yield as part of its definition.

While Minimum Variance was inexpensive until late 1990s, it has since become expensive. We believe crowdedness can be posited as a cause in the recent past, however, it is unlikely to have attributed to it earlier, for example in 2004, as such strategies captured widespread attention only post the Global Financial Crisis in 2007. Value's volatility could potentially be driving expensiveness (chart 7).

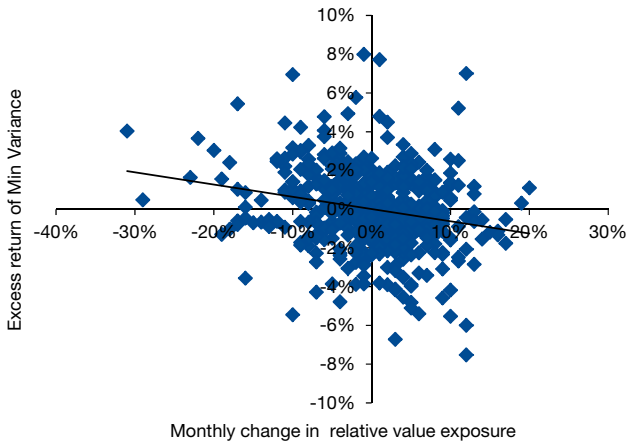
Chart 7. Minimum Variance was cheaper than cap-weighted through 1990s and has since turned expensive



Source: Numeric and Barra. US largest 1,000 universe, 1976 March – 2015 December.

Key Point: There is no strong relationship between monthly changes in value exposure and concurrent performance (chart 8).

Chart 8. Monthly excess return of Minimum Variance versus monthly changes in value exposure, both measured with respect to a cap-weighted portfolio. The R-squared (i.e., how much variation in excess return is explained by coincident changes in value exposure) is only about 5%



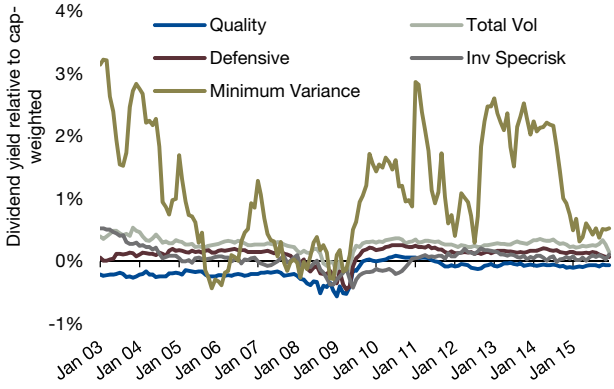
Source: Numeric and Barra. US largest 1,000 universe, 1976 March – 2015 December.

INTEREST RATE SENSITIVITY

Are low volatility strategies likely to disappoint in rising-rate environments because of their higher yield?

Not all the strategies have a higher yield than cap-weighted (chart 9). Minimum Variance's yield, however, varies over time.

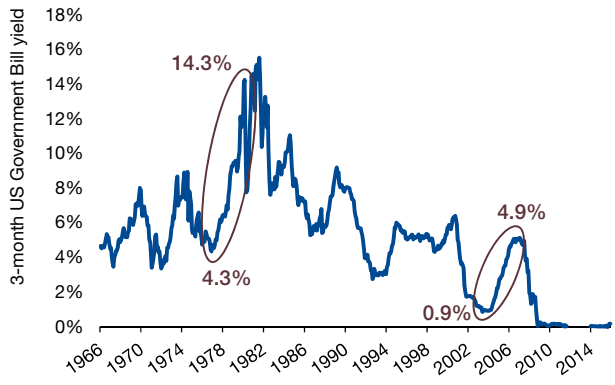
Chart 9. Yield of various Low Volatility strategies with respect to cap-weighted. High Div Yld is not shown in this example as one would expect it to be the highest measure given its construct



Source: Numeric and Barra. Russell 3000® Index universe, 2003 – 2015.

In the last 40 years there have been two periods of rapid rate increase: 1976 – 1980 and 2004 – 2006 (chart 10).

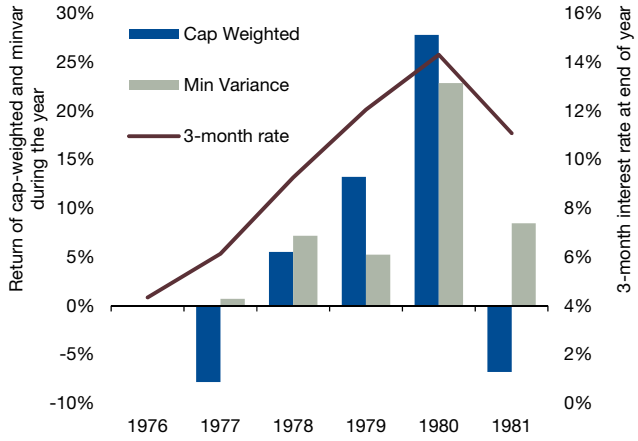
Chart 10. US 3-month T-Bill rates. Two periods of rapid rate rise



Source: Numeric and Bloomberg.

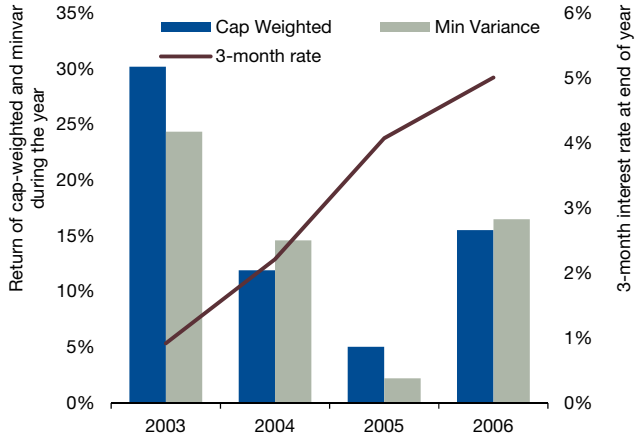
Minimum Variance did not suffer unduly during these periods (charts 11 and 12), considering the strong up-markets that occurred during these periods.

Chart 11. When rates rose from 1977 - 1980, Minimum Variance trailed the market by 3.6%,while the markets rose 15% per year



Source: Numeric and Bloomberg. US largest 1,000 universe, 1976 March – 2015 December.

Chart 12. When rates rose from 2004 - 2006, Minimum Variance trailed the market by 0.2% while the market rose about 10% per year. Incidentally, during this period, Minimum Variance had an average dividend yield 1.4% higher than that of the market



Source: Numeric and Bloomberg. US largest 1,000 universe, 1976 March – 2015 December.

Monthly changes of 3-month rates explained less than 2% of monthly excess returns of Minimum Variance from March 1976 through December 2015 (results not shown).

Key Point: Rate increases seldom occur in isolation. Inflation, growth, and other factors play a role. Thus a uni-dimensional expectation based on rates seems naïve. Further, only unexpected interest rate changes should have performance consequences.

SUMMARY

Defensive nature, crowdedness, value exposure, and interest-rate sensitivity all remain relevant concerns for the low volatility investor. There is much more to low volatility, that none of these concerns by themselves, in our view, become deal breakers. Skilled managers have the opportunity to build differentiated portfolios given the need for thoughtful implementation and the sensitivity of low volatility strategies to the details of portfolio construction.

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Jay joined Man Numeric ('Numeric') in 2004 and is a member of the Portfolio Management team, with primary product responsibility for the U.S. Small Cap strategies. He also serves as a co-portfolio manager on the U.S. Large Cap and Global strategies. Prior to assuming the current role, Jay served as a co-portfolio manager of Numeric's World Market Neutral strategy since its inception in 2006. He was also a member of Numeric's Strategic Alpha Research team and conducted research with a focus on the Low Volatility strategy and Numeric's value investing process. Before joining Numeric, he worked at Independence Investments in Boston as a quantitative analyst. Earlier, Jay served as a quantitative portfolio manager in the student-run Cayuga M.B.A. hedge fund at Cornell University. Jay has an M.B.A. with distinction from Cornell University, a Ph.D. in Physical Oceanography from the University of Rhode Island, and a Bachelor of Technology (Honors) from the Indian Institute of Technology, Kharagpur, India. He is a member of the Chicago Quantitative Alliance, the CFA Institute and the Boston Security Analysts Society. Jay is a CFA charterholder.

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