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Barra Insight

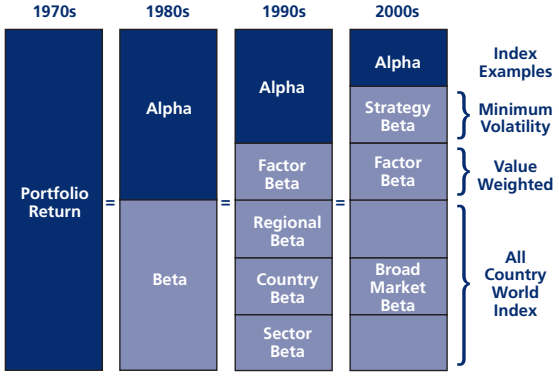
Dynamic Allocation Strategies using Minimum Volatility

Detecting Regime Shifts to Enhance Active & Passive Investing

INTRODUCTION

In the last decade the concept of strategy beta has emerged in the marketplace, continuing the trend of alpha erosion. Beta has evolved to include new classes which were previously the domain of active management, as illustrated in *Figure 1*. As the research surrounding drivers of return has progressed, the amount of return that is commonly classified as alpha has been reduced.

Figure 1. Evolution of Alpha and Beta: Today's Alpha is Tomorrow's Beta



Source: MSCI

With the continual encroachment of beta into the traditional alpha space, active managers are searching for new alpha opportunities that are not currently classified as beta. Some active managers are looking beyond static investment tilts and are evaluating time-dependent strategies. The same holds true for passive investors trying to determine the best allocation between strategies.

In this paper we will analyze several systematic allocation methods which aim to harness the benefits of low volatility investing. The variability in performance of minimum volatility portfolios makes them candidates for dynamic allocation strategies. We analyze volatility triggers, simple moving averages and relative momentum as systematic methods of gaining exposure to this investment style in the most desirable time periods. The results indicate that the possibility exists for passive and active managers to add value through their ability to dynamically allocate capital. However, there are risks accompanying these strategies which must be weighed against any potential benefits.

MOTIVATION

The high-volatility period associated with the financial crisis has increased investors' attention to low-volatility strategies. Assets in low-volatility exchange-traded funds have increased dramatically, to over $12 billion[1,2] under management and are accelerating. The average monthly inflow in 2011 was $100 million. In 2012 this rose to $400 million per month, on average, and in the first four months of 2013 it surged to $1.6 billion.

Investors have been drawn to the minimum volatility investment style because of its attractive risk-adjusted returns which have been driven by its low-risk profile. *Figure 2* highlights the strong performance[3] of the MSCI USA Minimum Volatility Index relative to the MSCI USA Index on which it is based. From the chart it is clear that the sample period can be divided into two segments: low volatility, before the financial crisis of 2008, followed by high volatility. The minimum volatility strategy outperformed the MSCI USA Index in the high volatility period, in line with its interpretation as a safe haven. In the low volatility period, the minimum volatility index underperformed its parent index.

[1] Using Min Vol ETFs to Access Stocks. Dodd Kittsley. BlackRock. February, 2013
[2] ETP Landscape, Industry highlights. BlackRock. April, 2013
[3] The MSCI USA Minimum Volatility Index was launched on May 30, 2008. Data prior to the launch date is back-tested data (i.e., calculations of how the index might have performed over that time period had the index existed). There may be material differences between back-tested or simulated performance results and actual results subsequently achieved by any investment strategy. The analysis and observations in this report are limited solely to the period of the relevant historical data, back-test or simulation. Past performance -- whether actual, back-tested or simulated -- is no indication or guarantee of future performance.

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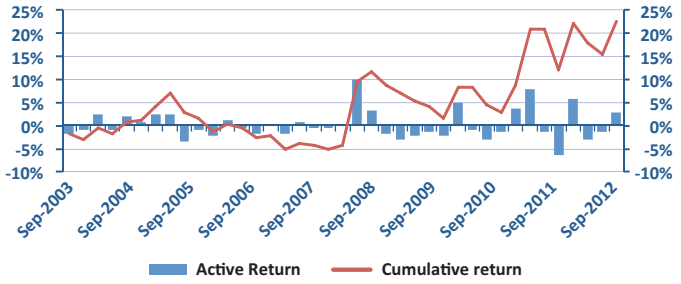
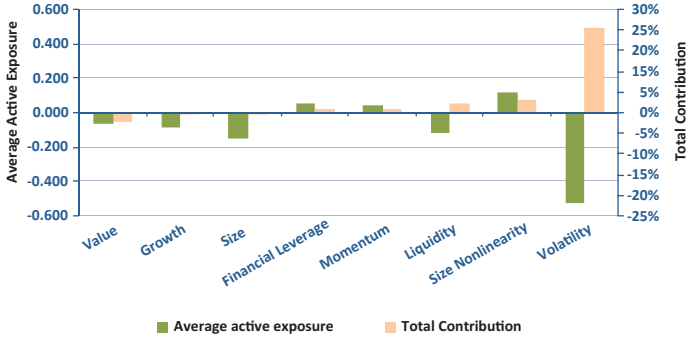
Alternatively, the index could be viewed as mirroring the volatility anomaly, where low volatility stocks outperformed high volatility stocks. According to standard asset pricing theory, one should expect higher-beta securities to be rewarded with higher returns than their lower-beta counterparts. Our analysis confirmed the strong performance of minimum volatility strategies over the sample period consistent with the volatility anomaly discussed in the literature[4].

Figure 2. Historical Performance of the MSCI USA Minimum Volatility Index Relative to the MSCI USA Index



As shown in *Figure 3*, the index has a strong underweight to the Volatility Factor with minimal contribution from other sources of risk, consistent with the index construction methodology[5]. Over the analysis period, this underweight was the largest contributing factor to the returns of the minimum volatility portfolio as shown in *Figure 3*.

Figure 3. Sources of Style Risk and their Contribution to Return for MSCI USA Minimum Volatility Index (2003-2013)



Note: Data compiled with Global Equity Model (GEM2)

The Volatility Factor represents a portfolio that is long high volatility stocks and short low volatility ones, with no contribution from other sources of risk. With this definition the Volatility Factor is an indicator of the market's level of risk aversion[6]. During periods of elevated volatility, investors have tended to move toward lower-risk assets. As higher-risk assets underperformed relative to lower-risk assets, there was a decrease in the performance of the Volatility Factor. With an underexposure to volatility, the minimum volatility portfolio was well positioned to benefit from the risk aversion associated with high volatility regimes. Managers who implement time-varying allocation strategies are attempting to capture periods of outperformance by reacting to these regime shifts.

IMPLEMENTATION

We used Barra Portfolio Manager for all research and analytics in this study. Using Barra Portfolio Manager's backtesting tool, it is possible to evaluate time-varying investment strategies. First, we constructed a minimum volatility portfolio tailored for a dynamic allocation strategy. We used the Barra US Equity Model (USE4) to manage risk and rebalance monthly.The factor structure of the Barra US Equity Model is designed for the US market and contains several advanced methodologies such as Optimization Bias Adjustment as well as an enhanced specific risk model to generate the lowest risk portfolios. The rebalance frequency was selected to accommodate the trade-off between trading opportunities and transaction costs.

For each of the dynamic strategies that we investigated, we considered two portfolios: the MSCI USA Index and the minimum volatility portfolio discussed above. We held one portfolio at a time depending on the dynamic allocation decision. This binary choice led to the clearest presentation of results, though in practice portfolio managers typically implement a more subtle tilt. The following allocation strategies were chosen as examples to illustrate the testing that clients can perform.

ALLOCATION STRATEGIES

We analyzed three different dynamic allocation schemes. Given the large role that the Volatility Factor plays in minimum volatility portfolios, the first strategy relies on the CBOE Volatility Index (VIX), a common measure of volatility of the US equity market. Periods with high VIX levels may coincide with periods of risk aversion in the market potentially resulting in outperformance of the minimum volatility portfolio. We set a value of 30[7] as the trigger to switch to the minimum volatility portfolio as this level has historically been associated with a high level of market stress.

The second strategy took advantage of the strong relative performance of the minimum volatility portfolio during times of market weakness. The aim was to switch to the minimum volatility portfolio, reducing total risk when the market was in decline. To minimize switching costs, we used a measure of underperformance that spans a number of periods. If the level of the MSCI USA Index dropped below its 6-month simple moving average (6M SMA), the strategy switched to the minimum volatility portfolio.

The last variation used an allocation decision that was based on the prior three-month performance of both portfolios. It selected the one with the higher return, capturing recent investor preferences. This led to a benefit in cases where positive returns to the minimum volatility portfolio were not due to increased volatility or market declines, perhaps due to increased flows.

These examples of dynamic allocation schemes are simple representations. We recognize that investors will have sophisticated proprietary indicators that they may use in practice. This study provides a framework for further analysis.

[4] Ang, A., Hodrick, R.J., Xing, Y., Zhang, X., 2006. The cross-section of volatility and expected returns. Journal of Finance 51, 259-299
[5] MSCI Global Minimum Volatility Indices Methodology, January 2012
[6] The Volatility Factor and Risk Aversion. Solares-Moya. MSCI. February 2012
[7] Additional VIX levels were tested with similar results.

RESULTS

The key considerations to a switching strategy, in addition to a high information ratio, are trading costs, maximization of upside capture, and minimization of downside capture. We present the information ratio and returns to the three allocation strategies, and the minimum volatility portfolio over the past 10 years relative to the MSCI USA Index in *Table 1*.

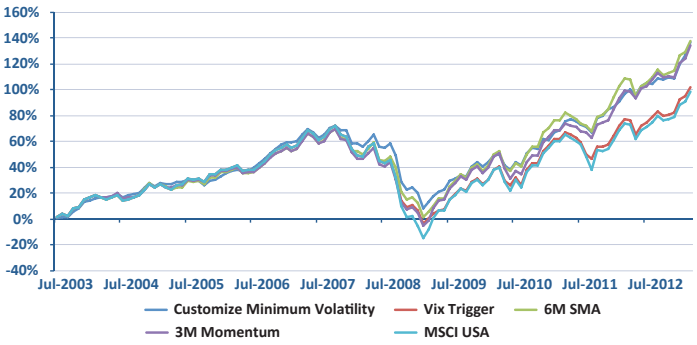
Table 1. Annualized Active Returns Relative to MSCI USA for Dynamic Allocation Strategies (6/30/03 – 3/31/13)

Strategy	Active Return (%)	Active Risk (%)	Information Ratio
Minimum Volatility	1.98	6.38	0.31
Strategy 1 - VIX Trigger	0.22	4.01	0.06
Strategy 2 - 6M SMA	2.02	4.77	0.43
Strategy 3 - 3M Momentum	1.86	4.20	0.44

The VIX-based strategy did not generate any appreciable return above the benchmark portfolio. The VIX captured volatility spikes quickly; however, it was slow to react once volatility had dissipated. This strategy resulted in a defensive portfolio until well after the market had rebounded. Both the 6M SMA and 3M Momentum strategies exhibited higher information ratios than the minimum volatility portfolio. They captured the superior returns of the minimum volatility portfolio, but with much lower risk relative to the MSCI USA Index.

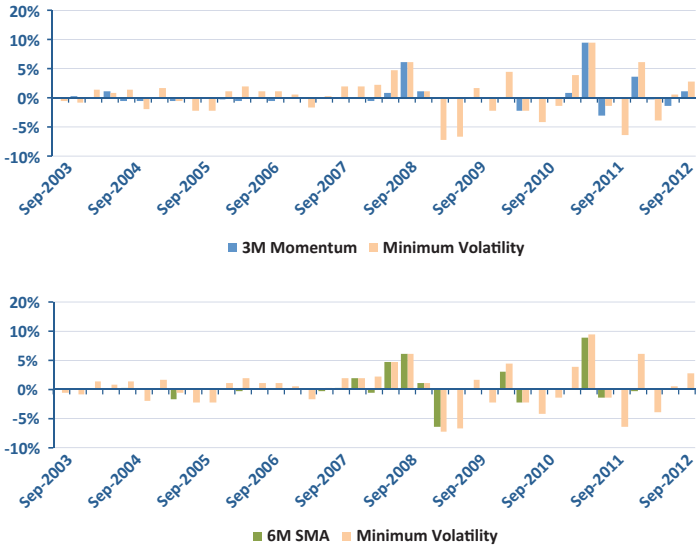
As seen in *Figure 4*, there was no performance spread associated with the lower volatility period; as a consequence in low volatility periods the costs incurred by trading would have been high relative to the potential performance benefit. Therefore, a desirable dynamic allocation strategy would avoid excessive turnover during these types of regimes. In high volatility periods the returns were greater in magnitude and trading decisions would have a larger impact so a switching strategy would be more effective.

Figure 4. Cumulative Performance of the MSCI USA Index vs the Minimum Volatility Portfolio



The shorter horizon of the 3M Momentum strategy was more sensitive to market variations resulting in more trading. This made the strategy more susceptible to trading on noise rather than on sustained moves in the underlying portfolios. In *Figure 5*, we saw this effect in the low volatility period. The benefit of this sensitivity is demonstrated in the high volatility period where the largest negative drawdowns were avoided. Conversely, the 6M SMA avoided excessive turnover in low volatility periods at the cost of a large drawdown in the post-crisis period. However, both strategies were successful in maximizing upside capture while minimizing downside capture.

Figure 5. Quarterly Performance of Dynamic Allocation Strategies Relative to MSCI USA



CONCLUSION

Alpha erosion is causing active and passive managers to move beyond static allocations and investigate time-dependent strategies. Flows into minimum volatility products have been high, due in part to their tendency to perform well when the market is risk-averse and volatility is high.

Over the analysis period, the 3M Momentum and 6M SMA dynamic allocation strategies captured the return of the minimum volatility portfolio constructed for illustrative purposes with lower active risk. They achieved this by strategically targeting periods of outperformance.

With dynamic allocation strategies there is a tradeoff between the sensitivity of regime detection and excessive trading. We recognize that investors have more sophisticated signals to detect regime shifts, appropriate for their portfolios. Using this backtesting framework, investment professionals can gain valuable insight into the behavior of dynamic allocation strategies.

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Philippe Durand is a Vice President and Client Consultant within the Americas coverage organization at MSCI. In this role he supports MSCI's asset manager clients, focusing on portfolio construction and risk management. Prior to joining MSCI, Mr. Durand was a Quantitative Portfolio Manager at Iron Peak Capital Management, LLC and a Quantitative Analyst and Trader at Tequesta Capital Advisors, LP. Mr. Durand received an MBA from Cornell University. Additionally, he holds a BSc in Mathematics and Engineering from Queen's University. Mr. Durand is a CFA Charterholder.

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[1] *As of September 30, 2012, as published by eVestment, Lipper and Bloomberg on January 31, 2013*

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