# US Market Report

## 2011 – A Year for Minimum Volatility

January 2012

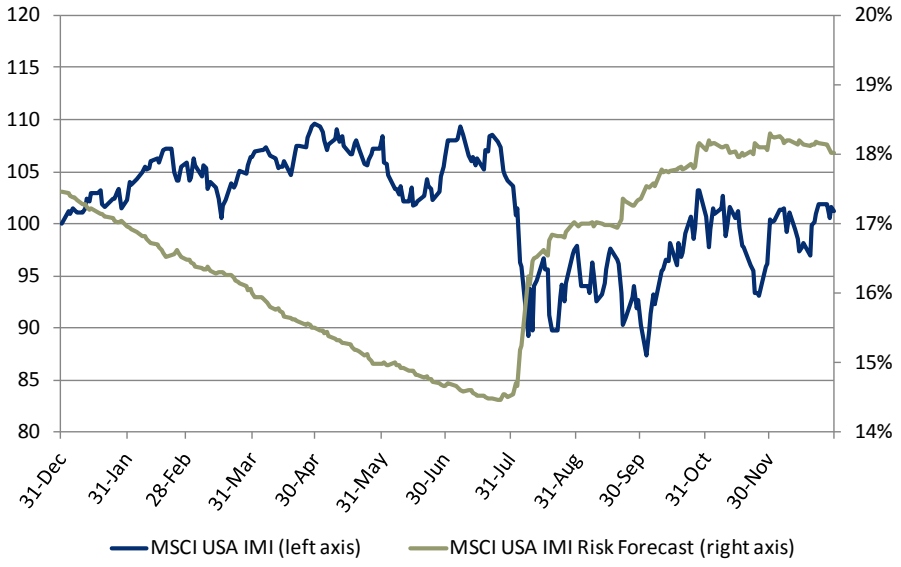
# Turbulent Times and a Sliver of Light

2011 was a difficult and turbulent year for institutional investors as sovereign debt problems haunted market participants. In the US, this culminated in July with the congressional debate over the debt ceiling. Despite the agreement forged by lawmakers, the perceived government instability cost the US its AAA rating. This downgrade did not leave the equity market unaffected as market risk increased abruptly.

The highly volatile environment continues to be a tough test for the MSCI USA Minimum Volatility Index. This Index and similar low risk strategies passed 2011 with an A+ compared to more traditional equity strategies as a result of downside protection and superior absolute and risk-adjusted performance. In this report, we analyze the performance drivers of the MSCI USA Minimum Volatility Index from the perspective of the Barra US Equity model (USE4) [1].

In Figure 1, we plot the risk forecast for the US market — using the Barra USE4 model — and market performance as measured by the MSCI USA Investable Market Index (MSCI USA IMI)[2].

**Figure 1: MSCI USA IMI Index Performance (total return) and Risk Forecast**




[1] We use the long horizon version of the model (USE4L) throughout this analysis.

[2] The MSCI USA IMI index captures large , mid, and small cap companies and contains roughly 2,600 secutites.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The downward trend in market volatility observed in the first half of the year was broken by the S&P bond rating downgrade for the US in early August. At the same time, year-to-date market gains were wiped out. Year over year, risk hardly changed (17.5 vs 18%) and market performance was feeble (1.2%) at best. One might say not much had happened, but many investors experienced a number of sleepless nights and, dependent on their actions, they might have suffered or profited from the ups and downs of 2011.

In the next section we want to focus on the bright spots of 2011 equity investing and decompose the superior performance of low risk strategies as exemplified by the MSCI USA Minimum Volatility Index.

# The MSCI USA Minimum Volatility Index

According to modern portfolio theory, given the assumptions on asset covariances, it is possible to construct — out of risky assets only — a unique portfolio that has minimum ex-ante risk. This Minimum Variance portfolio has drawn the attention of academics as well as practitioners.[3] Particularly since the beginning of the crisis in 2007, a number of asset managers, consultants and index providers have investigated the empirical properties of the minimum risk portfolio and have launched products, indices, and ETFs all geared towards capturing the low volatility risk premium.[4]

The USA Minimum Volatilty Index is constructed using the Barra US Equity Model (USE4). By imposing constraints on asset and sector weights, factor exposures and turnover, the MSCI Minimum Volatility Index reflects an investable passive representation of the theoretical minimum variance portfolio.

**Table 1: Performance Decomposition of the MSCI USA Minimum Volatility Index relative to the MSCI USA IMI Index (1/1/2011 to 12/31/2011)**

| Source of Return | Return | Risk | Risk/Return Ratio |
|---|---|---|---|
| **Total Managed** | **12.9%** | **16.7%** | **0.77** |
| **Total Active** | **10.9%** | **7.5%** | **1.45** |
| Common Factor | 10.4% | 7.0% | 1.48 |
| Risk Indices | 8.0% | 6.3% | 1.27 |
| Industry | 2.4% | 1.6% | 1.53 |
| Specific | 0.5% | 1.5% | 0.31 |
| **Total Benchmark** | **2.0%** | **23.0%** | **0.09** |

In Table 1, we show the performance attribution of the USA Minimum Volatility Index using the Barra US Equity Model (USE4). The Sharpe ratio of the MSCI Minimum Volatility Index (0.77) was good especially compared to the MSCI USA IMI index (0.09). The MSCI Minimum Volatility Index delivered a 10.9% outperformance in 2011 though, as expected, with considerably high active risk or tracking error (7.5%) relative to the MSCI USA IMI Index. The decomposition shows that style factors were the main source of

[3] See Nielsen, Aylursubramanian, 'Far From the Madding Crowd – Volatility Efficient Indices' for a discussion of the characteristics of Minimum Risk portfolios.
[4] BlackRock's iShares for example launched a family of Minimum Volatility ETFs in 2011 that are based on the MSCI Minimum Volatility Index family


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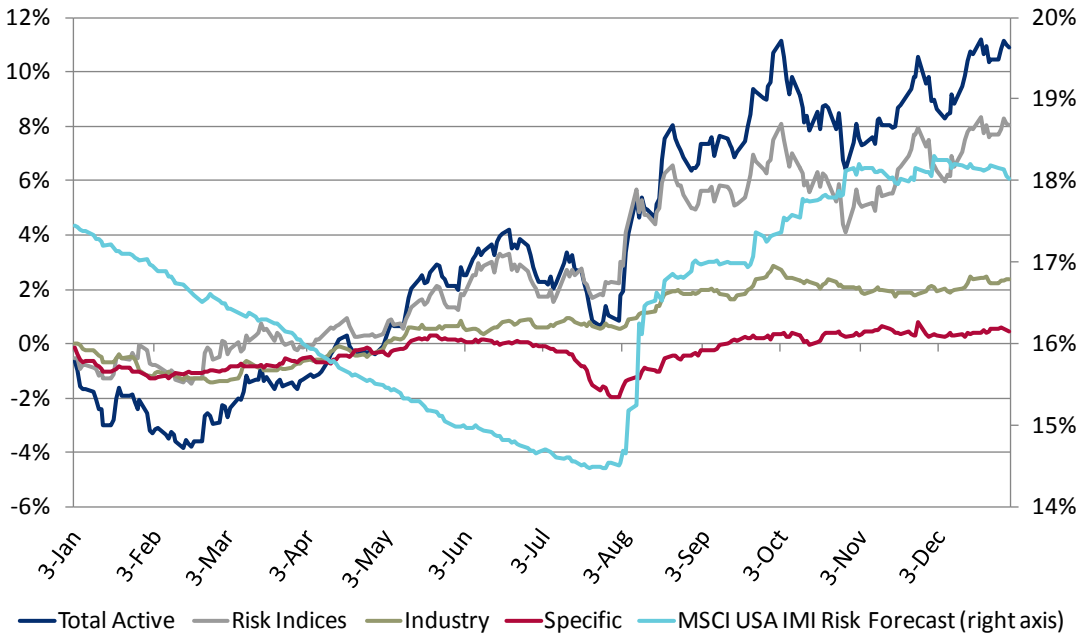
the performance (8.0%) relative to the MSCI USA IMI Index, whereas industries and asset selection played a less important role (2.4% and 0.5%, respectively).

Figure 2 highlights how the outperformance relative to the MSCI USA IMI Index was almost uninterrupted, with the exception of the first two months of the year, and early summer. We can also see the downside protection at work. When the market declined sharply in early August and market risk rose significantly, the Index was able to deliver strong performance.

**Figure 2: Decomposition of MSCI Minimum Volatility Index Performance**




We can further analyze the sources of the Index performance by looking at style factor and sector exposures. Table 2 shows that the Minimum Volatility Index had a very negative exposure — (-0.75) to the USE4 Beta factor, which means that the Index was weighted towards low beta stocks. Other important factor exposures were Non-linear Beta (0.62), Dividend Yield (0.35), Size (-0.25), and Liquidity (-0.27). However, the size of the exposure is only part of the story. In order for a factor to be an important contributor, the factor return had to be significant. Among the factors mentioned above, only Beta and Liquidity had a significant contribution to the performance.

Table 2 also shows the important sector weights of the Index. Financials, Information Technology and Consumer Discretionary — more cyclical sectors — were heavily underweighted and Utilities, Consumer Staples and Health Care — more defensive sectors — were heavily overweighted relative to the MSCI USA IMI Index.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### Table 2: Summary Statistics for Exposures to Style Factors and Sectors relative to the MSCI USA IMI Index

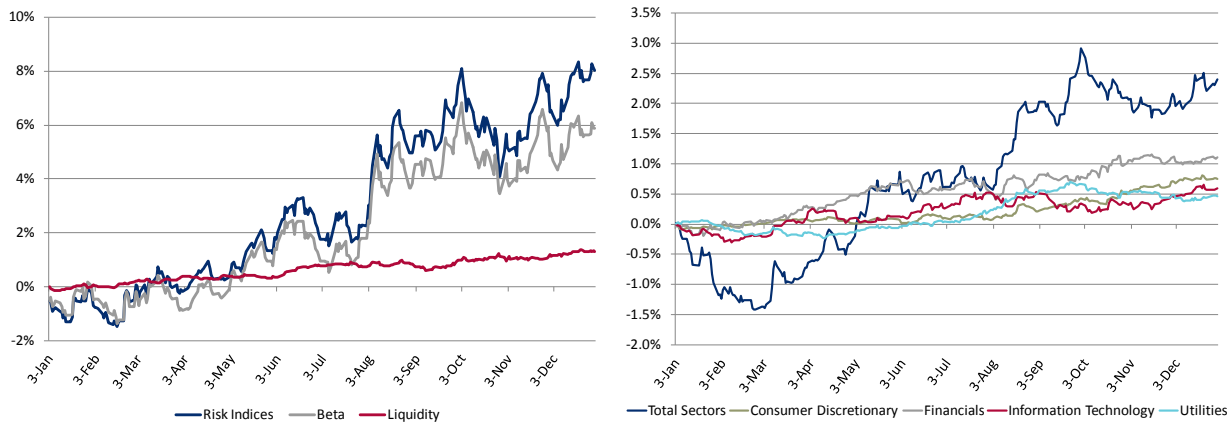
| Active Exposure | Beta | Book-to-Price | Dividend Yield | Earnings Yield | Growth | Leverage | Liquidity | Momentum | Non-linear Beta | Non-linear Size | Residual Volatility | Size |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mean | **-0.75** | **-0.19** | **0.35** | **-0.12** | **-0.18** | **-0.16** | **-0.27** | **0.01** | **0.62** | **0.16** | **0.13** | **-0.25** |
| Std Dev | 0.04 | 0.03 | 0.05 | 0.07 | 0.05 | 0.05 | 0.02 | 0.20 | 0.06 | 0.02 | 0.05 | 0.03 |
| Min | -0.82 | -0.35 | 0.24 | -0.25 | -0.24 | -0.39 | -0.34 | -0.34 | 0.51 | 0.13 | 0.03 | -0.33 |
| Max | -0.67 | -0.15 | 0.49 | 0.00 | -0.01 | -0.09 | -0.22 | 0.40 | 0.72 | 0.21 | 0.23 | -0.20 |

| Active Exposure | Consumer Discretionary | Consumer Staples | Energy | Financials | Health Care | Industrials | Information Technology | Materials | Telecommunication Services | Utilities |
|---|---|---|---|---|---|---|---|---|---|---|
| Mean | **-1.68** | **4.36** | **-4.73** | **-5.39** | **4.76** | **0.46** | **-5.40** | **-0.31** | **2.92** | **5.01** |
| Std Dev | 0.41 | 0.36 | 0.30 | 0.88 | 0.39 | 0.58 | 0.77 | 0.26 | 0.61 | 0.21 |
| Min | -2.31 | 3.59 | -5.37 | -12.63 | 3.82 | -1.46 | -7.01 | -0.79 | 2.07 | 4.59 |
| Max | -0.92 | 5.46 | -3.93 | -3.73 | 5.33 | 1.46 | -3.25 | 0.13 | 4.44 | 5.47 |

Note: We highlighted the factors with the most important contributions.

In Figure 3, we show the time evolution of total style and industry factor contributions, as well as the most important individual factor contributions.

### Figure 3: Style and Industry Contributions to MSCI USA Minimum Volatility relative to MSCI USA IMI Index




The 8% cumulative style factor contribution came largely from the Beta factor: the large negative exposure to Beta combined with the negative performance of the factor in 2011 yielded this impressive result. The Liquidity factor was a steadier contributor with 1.3%. The second panel in Figure 3 shows that the sector weights were also important positive contributors. Here, the distribution of results is more even as there is not a single sector that dominated the relative performance.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# Conclusion

The MSCI USA Minimum Volatility Index reflected downside protection coupled with low volatility during a nerve racking 2011. The factor analysis of the Index showed that the intended weighting towards low beta stocks was responsible for most of the strong performance relative to the MSCI USA IMI. Sector weights were also important, reinforcing the index methodology's aim to reflect a protection strategy of overweighting less risky, often defensive sectors, and underweighting risky, often cyclical, sectors.


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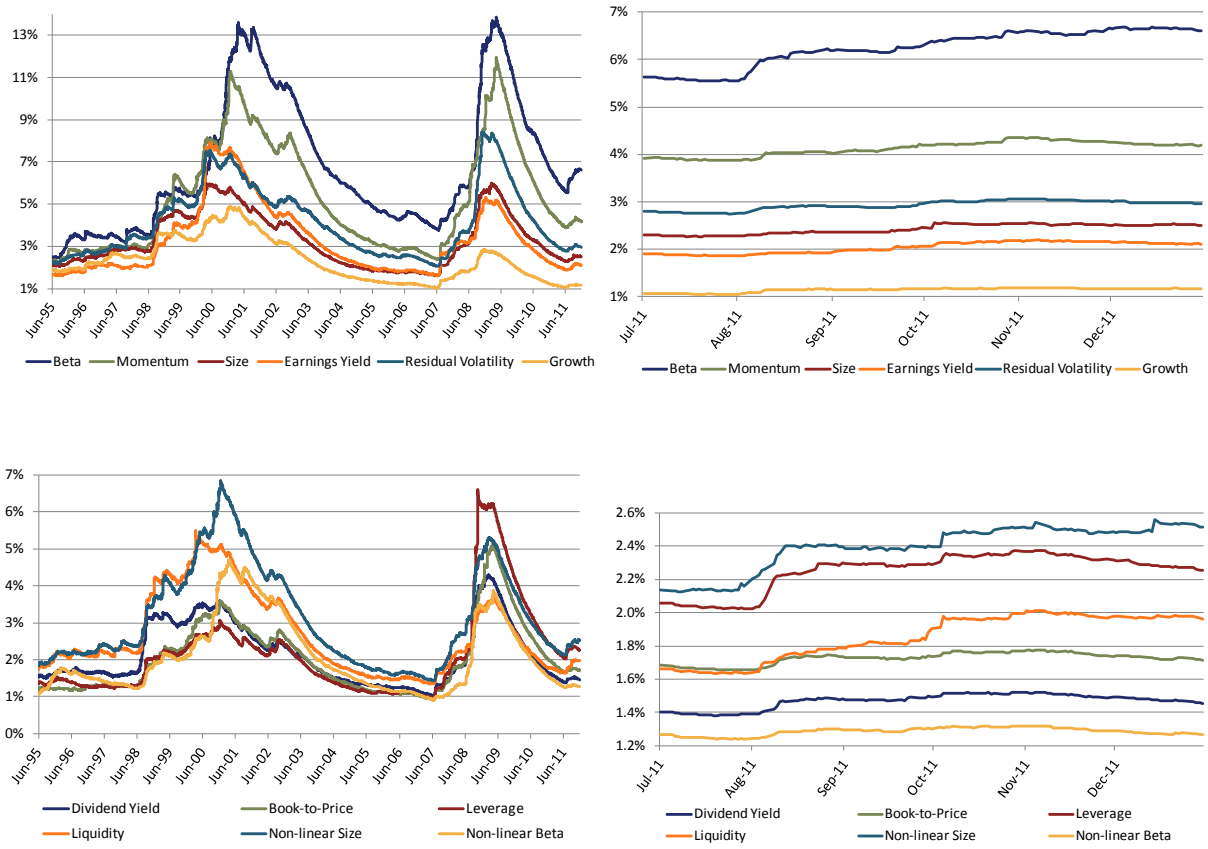
# Appendix

### Figure 4: Risk Forecasts for USE4Style Factors (1995 – 2011) and Last 6 Months




### Table 3: Changes in Style Factor Risk Forecasts Over the Last 6 Months

| USE4 forecasts | 7/1/2011 | 12/30/2011 | Change | Relative change |
|---|---|---|---|---|
| **Liquidity** | 1.7% | 2.0% | 0.3% | 18.1% |
| **Non-linear Size** | 2.1% | 2.5% | 0.4% | 17.7% |
| **Beta** | 5.6% | 6.6% | 1.0% | 17.1% |
| **Earnings Yield** | 1.9% | 2.1% | 0.2% | 11.0% |
| **Leverage** | 2.1% | 2.3% | 0.2% | 9.5% |
| **Size** | 2.3% | 2.5% | 0.2% | 8.6% |
| **Growth** | 1.1% | 1.2% | 0.1% | 8.5% |
| **Momentum** | 3.9% | 4.2% | 0.3% | 7.1% |
| **Residual Volatility** | 2.8% | 3.0% | 0.2% | 5.6% |
| **Dividend Yield** | 1.4% | 1.5% | 0.1% | 3.7% |
| **Book-to-Price** | 1.7% | 1.7% | 0.0% | 1.7% |
| **Non-linear Beta** | 1.3% | 1.3% | 0.0% | -0.2% |


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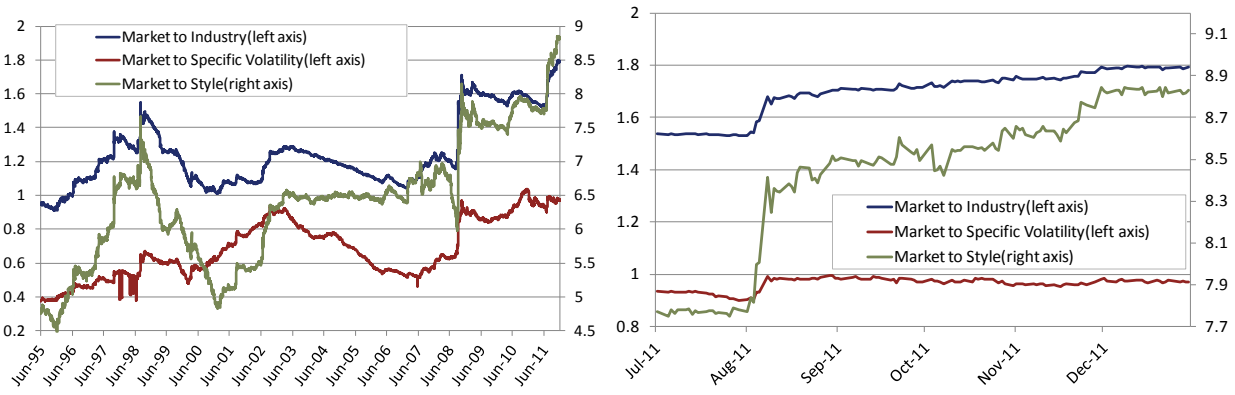
**Figure 5: Ratio of Market Risk to Industry, Style and Specific Risk (1995 – 2011) and Last 6 Months**



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[1] *As of June 30, 2011, based on eVestment, Lipper and Bloomberg data.*


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