Understanding Smart Beta Returns

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In this paper, we use a performance analysis framework to analyze Smart Beta strategies against their benchmark. We apply it to Minimum Variance Strategies for which live track records exist for all major equity markets. We illustrate how naïve return comparison could be misleading and suggest ways to assess the added value of these strategies. We extend our analysis to other equity strategies and look at robustness across regions.

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Alpha versus Risk effect

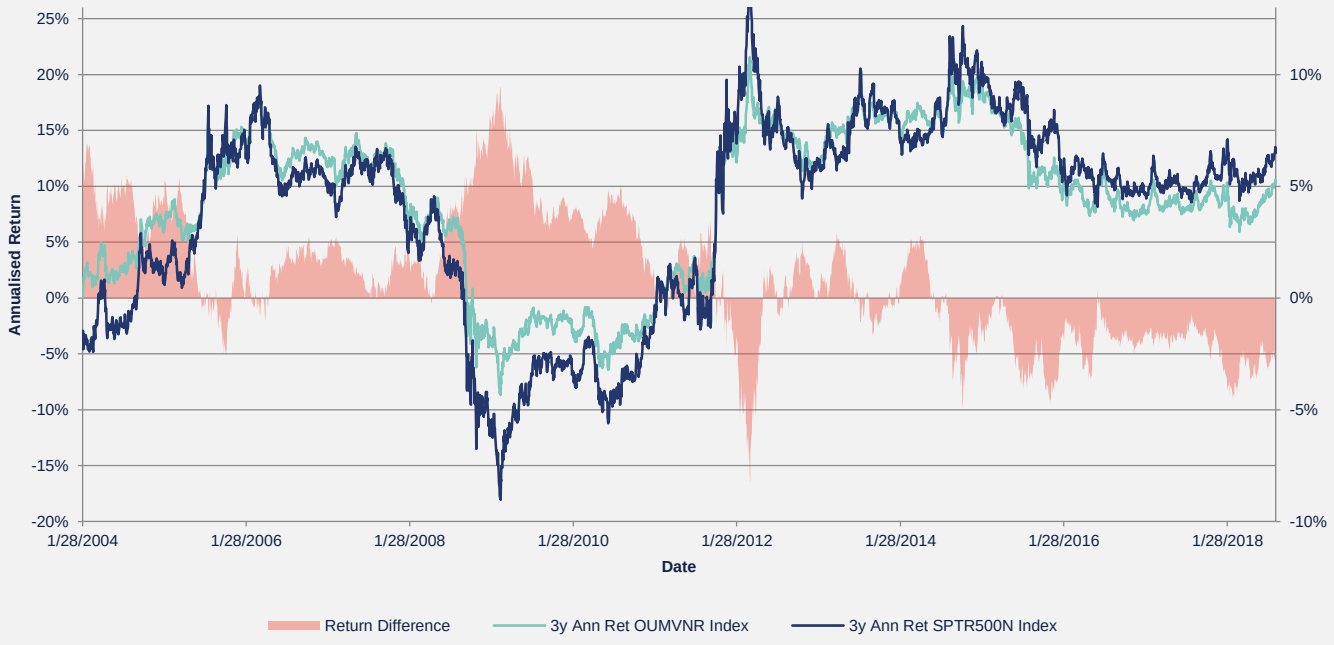
Smart Beta strategies might add value to investors in two ways:

- Enhancing return, commonly referred to as “Alpha”, for a certain level of risk (commonly measured by volatility or beta to the market); or
- Reducing risk while maintaining the same level of expected returns. One could then outperform by increasing its exposure to the strategy (e.g. using leverage) and achieving higher return for the same level of risk.

These are obviously the 2 sides of the same problem and are equally valuable for investors. It is however difficult to assess one effect against the other by simply comparing returns.

Exhibit 1 shows the rolling annualized three-year[1] performance of the US Minimum Variance NR Index (OUMVNR Index)[2], and its benchmark, the S&P 500 Net Return Index. On a three-year basis, the Minimum Variance strategy has outperformed, on average, by about 0.86% p.a. One can however notice times of strong outperformance, for instance during the period ended in Mars 2009 (which corresponds to the financial crisis when equity market considerably underperformed), and the recent underperformance (period of strong equity rally).

Exhibit 1: Left axis: 3 years annualized rolling return for the US Minimum Variance NR Index (OUMVNR Index), the benchmark S&P 500 Net Total Return Index (SPTR500N Index). Right axis: Point in time difference between the 3 year returns of the Minimum Variance Strategy and its benchmark.



Source: Bloomberg – Calculation by Ossiam in USD from January 2004 to August 2018

Following common industry practice and academic literature, we suggest splitting the performance coming from the different risk level of market risk of the strategy (the Beta effect) from Jensen’s Alpha (the Alpha effect), which remains the real added value of the strategy. For this, we write the generic return decomposition as:

$$R^{Strat} - R^{Bench} = \underbrace{\{\mathrm{R}^{\mathrm{Strat}} - R^{Cash} - \beta(R^{Bench} - R^{Cash})\}}_{\{\textbf{Alpha Effect}\}} + \underbrace{\{(\beta - 1)(R^{Bench} - R^{Cash})\}}_{\{\textbf{Beta Effect}\}}$$

[1] We use three years as a compromise between usual investment horizon and capturing changes in market cycles. The points raised here remain valid for other time windows.

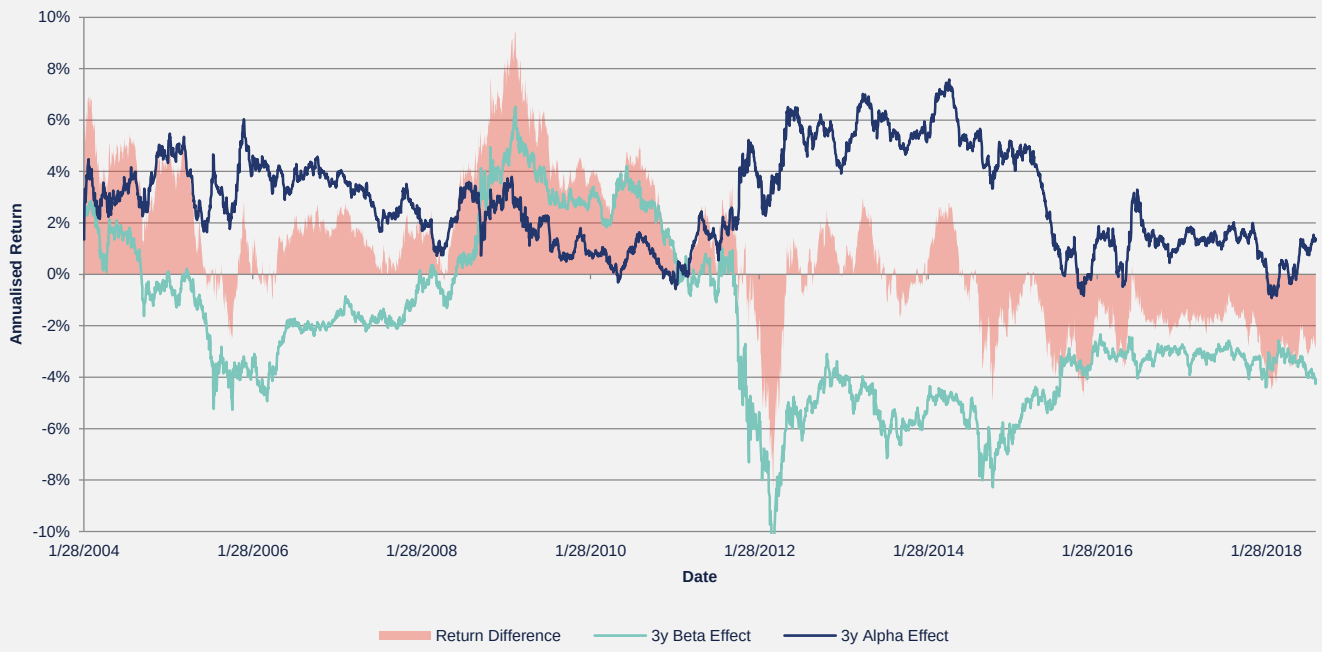
[2] The US Minimum Variance strategy considered here selects, on a monthly basis, among the top 250 liquid stocks in the S&P 500 Index, the portfolio with minimal variance under a maximum sector constraint at 20%, maximum weight constraint at 4.5% and a diversification target at 50, measured by the Herfindahl index. This strategy was underlying the Ossiam US Minimum Variance Index (OUMVNR Index) until June 16th 2017. We extended the strategy’s performance up to August 31st, 2018 by applying the same methodology. For data before 06/06/2011 (launch date of the index), performance for the Ossiam US Minimum Variance Index NR reflects calculations performed by Ossiam based on backtest data provided by Standard & Poor’s. Backtested performance results do not represent the performance of actual trading using client assets, but are achieved by means of the retroactive application of a model. This model assumes reinvestment of net dividends.

R^{Strat} (R^{Bench}) is the return of the smart beta strategy (the benchmark), R^{Cash}[3] is the return of cash. β represents the classic CAPM market beta of the Minimum Variance strategy over the benchmark.

For strategies with a beta below 1, therefore relatively less risky, the Beta effect is a drag on performance during periods of strong market returns. On the other hand, those would benefit from their lower beta in a down-trending market environment.

Beta can easily be adjusted to reflect investors' market anticipation or willingness to take risk. The unquestionably difficult challenge is however to find "smart" strategies which deliver positive alpha over full market cycles.

Exhibit 2: The 3-year rolling Alpha and Market Risk (Beta) effect over a three-year window for the US Minimum Variance NR Index (OUMVNR Index)[1] vs S&P 500 Net Total Return Index (SPTR500N Index).



Source: Bloomberg – Calculation by Ossiam in USD from January 2004 to August 2018

From Exhibit 2, the strategy looks rather "smart" as the Alpha effect is almost always positive over the last 15 years, averaging at around 2.82% p.a. By contrast, as the strategy beta is significantly below 1 and markets have performed well over the observation period, the Beta effect is on average negative (-1.96% p.a.). It is also much more volatile.

Consequently, the periods of strong outperformance (Mars 2009) and recent underperformance are mainly explained by the Beta effect, while the strategy almost constantly delivering positive alpha.

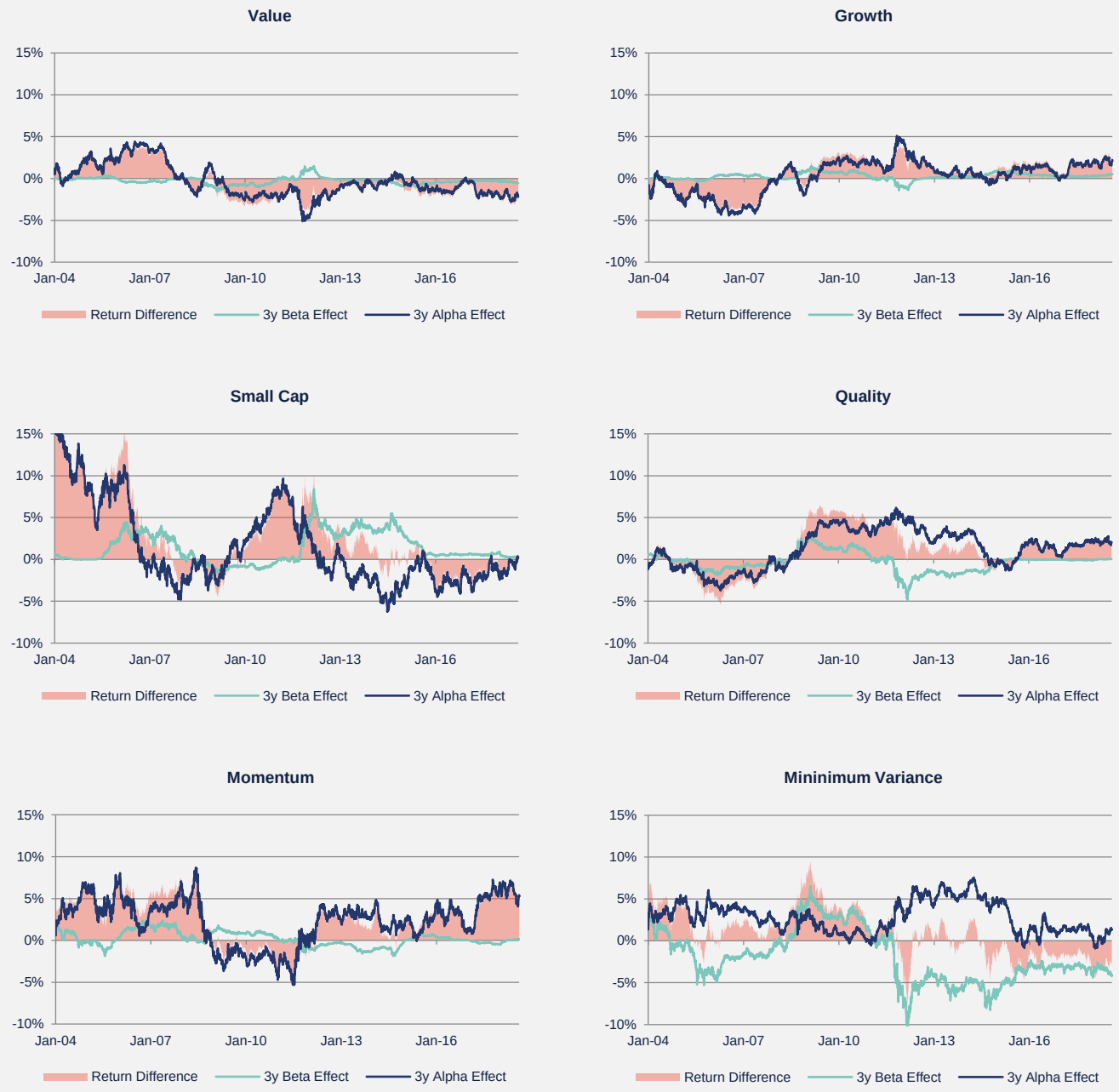
Comparing Smart Beta Strategies

In this section, we apply a similar approach to various common factor-based strategies. We use a range of MSCI indices which are consistently derived from the MSCI USA index. We show how separating Alpha and Beta effects helps understanding the performance of these strategies across market cycles.

Exhibit 3 shows the Alpha and Beta effects computed over a 3-year rolling window for five MSCI factor-based strategies and the US Minimum Variance strategy over their benchmark.. We use the MSCI USA Value Net TR Index (M1US000V Index, hereafter *Value*), the MSCI USA Growth Net TR Index (M1US000G Index, hereafter *Growth*), the MSCI USA Small Cap Net TR Index (M1USSC Index, hereafter *Small Cap*), the MSCI USA Quality Net TR Index (M1USQU Index, hereafter *Quality*) and the MSCI USA Momentum Net TR Index (M1USMMT Index, hereafter *Momentum*)

[3] Return of a deposit growing at the risk free rate

Exhibit 3: Alpha and Beta effect on the rolling 3-year returns difference of MSCI factor-based strategies and the MSCI USA Net Total Return Index (NDDUUS Index), and US Minimum Variance NR Index[1] vs S&P 500 Net Total Return Index.



	Beta [Min - Max]	Average 3y Outperformance	Average Alpha Effect	Average Beta Effect
Value	[94% - 109%]	-0.65%	-0.28%	-0.38%
Growth	[91% - 106%]	0.57%	0.30%	0.27%
Minimum Variance	[57% - 78%]	0.86%	2.82%	-1.96%
Quality	[82% - 101%]	1.01%	1.33%	-0.32%
Momentum	[77% - 126%]	2.60%	2.40%	0.20%
Small Cap	[92% - 143%]	2.71%	1.34%	1.37%

Source: Bloomberg – Calculation by Ossiam in USD from January 2004 to August 2018

Exhibit 3 highlights the materially different behavior of those strategies.

The Value and Growth strategies have betas consistently close to 1 therefore the contribution of the Beta effect is close to zero. Value stocks strongly outperformed during the period leading to the 2008 financial crisis. Growth stocks have outperformed since then.

The Small Cap strategy has a beta usually above 1 and the Beta effect strongly contributed to its historical outperformance, at least until 2015. Its alpha has however been very volatile, with periods of strong positive contribution but also long periods of negative impact.

The beta of the quality strategy varies a lot. It was below 1 until the most recent period when it has remained very close to 1. Consequently, the Beta effect was positive during the financial crisis and negative during the subsequent equity rebound. The Alpha effect was negative prior to the financial crisis but has been positive most of the time since then.

The beta of the Momentum index alternates between periods where it stays significantly below 1 and periods well above 1. This is expected considering the trend following nature of the strategy. The beta effect has been globally positive over the observation window. The alpha effect was also positive, except during the equity rally post financial crisis, which makes it the most consistently performing strategy among the MSCI factor-based strategies.

It is indeed difficult to find a strategy which delivers alpha across all different market cycles. Most of them alternate periods of strong positive and negative alpha. In this context, the Minimum Variance strategy delivers the most consistent positive alpha on the US Large Cap equity market over the observation period.

Robustness

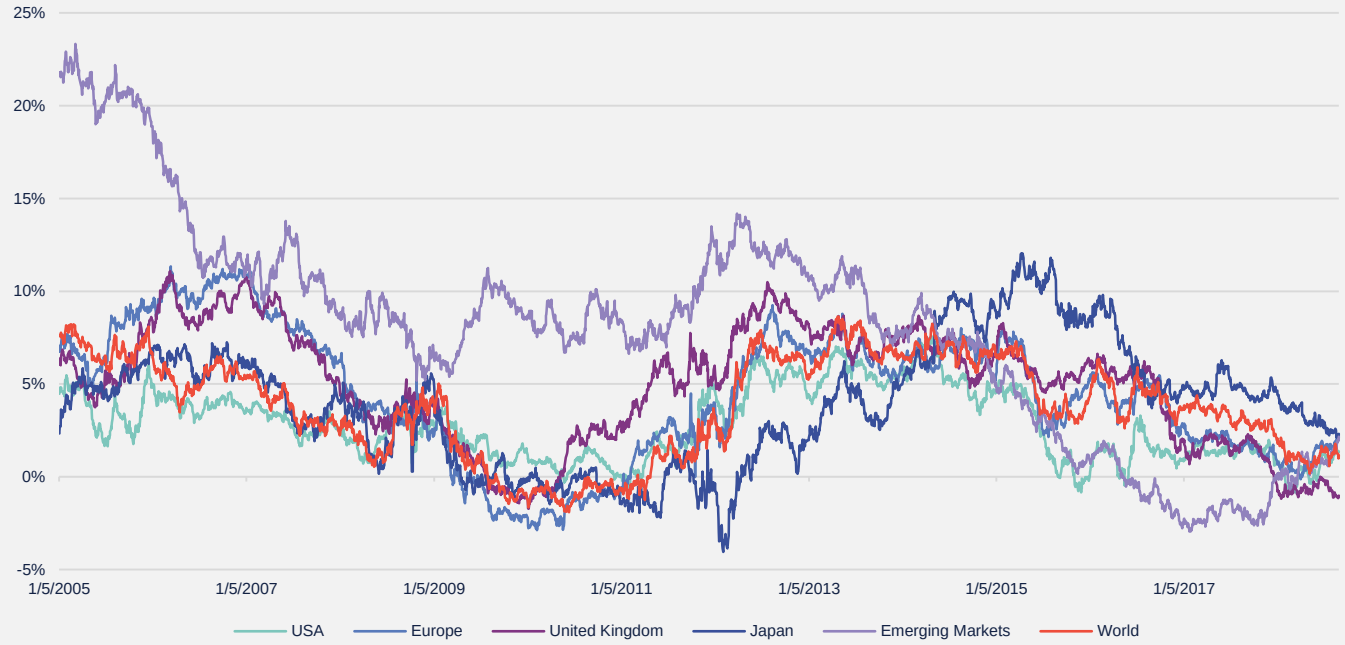
The biggest risk of systematic strategies is “overfitting”; i.e. the risk that a strategy, designed to “fit” too closely one market path, performs materially differently in the future. This happens commonly when one uses too many parameters materially influencing the risk and return profile of the strategy. Strategies which look too good historically (e.g. the ones which reduced equity risk prior to the financial crisis) are very unlikely to perform when the market environment is different.

To limit this risk and further assess the robustness of a smart beta strategy, it is recommended to analyse it on a variety of universes (e.g different regions for equities).

We then look at the alpha of the Minimum Variance Strategies in Europe, the UK, Japan, Emerging Market and World Developed universes offered by Ossiam through Exchange Traded Funds[4].

Exhibit 4 shows the Alpha effect on three-year returns as defined in previous sections for different universe S&P500 (USA), Stoxx 600 (Europe), FTSE 100 (UK), S&P TOPIX 150 (Japan), S&P IFCI (Emerging Markets), and S&P Global 1200 (World).

Exhibit 4: Alpha effect on the rolling 3-year returns.



	Strategy Live Date	Average Annualised Alpha	Standard Deviation	Min	Max
USA	6 Jun 2011	2.8%	1.9%	-0.9%	7.6%
Europe	22 Jun 2011	4.4%	3.5%	-2.9%	11.3%
United Kingdom	19 Dec 2011	4.9%	3.1%	-1.7%	11.1%
Japan	22 Dec 2015	3.9%	3.3%	-4.1%	12.0%
Emerging Markets	6 Feb 2012	8.0%	5.9%	-3.0%	23.3%
World	5 Sep 2012	3.8%	2.7%	-1.9%	8.6%

Source: S&P/STOXX/FTSE/Bloomberg – Calculation by Ossiam in USD from January 2005 to August 2018

The Alpha of Minimum Variance strategies is remarkably almost always positive across all regions. It delivers significant positive alpha in most periods except periods of strong equity rebound post market drawdowns. For instance, Alpha is negative in the USA, Europe, United Kingdom and World universes during the period from Mid-2007 to Mid-2010, a period of sharp equity drop and subsequent rebound. In Japan, equity market drawdown lasted much longer until 2011. Comparatively, Emerging markets have performed relatively well during the financial crisis. They however subsequently underperformed to reach post crisis low levels at the beginning of 2016 before rebounding.

[4] Please note that some degree of performance between an ETF and its underlying index is to be expected as a result of index replication costs, tracking error and fees applied. In addition, all the data presented in this paper are net of charge

Conclusion

We demonstrated in this paper the importance of separating the impacts of Beta exposure and Alpha generation when analyzing performance of Smart Beta strategies. Comparing alphas gives a better picture of the value added of a particular strategy for a certain level of risk.

Using this metric, the Minimum Variance strategy looks the “smartest” among all strategies analysed in this paper. It delivers the most consistently positive alpha across regions and market cycles, still it requires a higher invested nominal to match the market risk exposure of a similar market cap weighted index.