Guest Editorial

Can environmental factors improve stock selection?

The concern over the sustainability of mankind's use of natural resources has found a receptive audience in many parts of the world. As evidence of environmental challenges such as global climate change continue to grow, it is likely that sustainability issues will be raised by financial institutions, especially those exposed to property loss or product liability. Given this backdrop, it is not surprising that there have been a number of studies attempting to answer the question of whether 'social responsibility' or 'sustainability' improves or detracts from investment performance.

While a number of studies based on the performance of socially responsible mutual funds have attempted to answer the performance question, they have limitations, since there are a number of factors, such as manager skill, that also meaningfully affect returns. One recent study by Derwall *et al*. (2004) made a great leap ahead in that it used a sophisticated multifactor framework on which to evaluate whether strong environmental performance translates into superior equity performance. They concluded that their 'findings provide evidence suggesting that the benefits of considering environmental criteria in the investment process can be substantial' (Derwall *et al*., 2004: 15).

It was on this basis that State Street Global Advisors (SSgA) set out to study whether Innovest environmental information provided an independent non-correlated source of excess return in its active portfolios. We chose to use Innovest ratings for the robust analytical framework they use to evaluate companies on over sixty different environmental criteria. We chose the S&P500 stock universe for the study in order to achieve statistically significant results, since large cap US equities had the best ratings coverage by Innovest over the period studied. The results suggest that environmental information, particularly in the extreme, has value in the stock selection process.

We used the proprietary quantitative investment model, US Active Equity alpha, as a baseline to construct eco-efficiency alphas. We selected this strategy because it is a fully active strategy and has been relatively successful in both up and down markets. The baseline alpha model is primarily a linear combination of factors categorised in the areas of value, earning estimate sentiment, price momentum pattern and earnings quality. All the securities in the universe studied were first assigned to the baseline alpha scores and then 'tilted' by adding different values to the scores, based upon their Innovest ratings (see Table 1). While Alpha Tilt 1 tested the positive correlation between environmental rating and equity performance, Alpha Tilt 2 tested the hypothesis that returns are negatively correlated with Innovest ratings, and

Table 1 Alpha Construction Based on US Active Alpha and Innovest Ratings (January 1998 to February 2003)

Innovest Rating	Environmental performance	Eco_val	Tilt value added to the baseline Alpha		
			Alpha Tilt 1	Alpha Tilt 2	Alpha Tilt 3
AAA	Best	7	2.0	–2.0	1.0
AA		6	1.0	–1.0	0.5
A		5	0.5	–0.5	0.0
BBB	Average	4	0.0	0.0	0.0
BB		3	–0.5	0.5	0.0
B		2	–1.0	1.0	–0.5
CCC	Worst	1	–2.0	2.0	–1.0

Alpha Tilt 3 investigated the 'tails effect' of the Innovest ratings.

The first series of simulations had a number of important constraints as part of the portfolio construction process. Among these constraints were the maximum tracking error of 4 per cent, maximum active industry weight of 5 per cent and the maximum active security weight of 2 per cent. Further, we tightly controlled the stock specific and systematic risk and rebalanced the portfolio monthly. Turnover was restricted to 90 per cent (one-way) per annum and transaction costs were incorporated as part of the optimisation process. Lastly, the period tested was from the beginning of January 1998 to the end of February 2003.

Interestingly, the environmental information added value to both the Alpha Tilt 1 and Alpha Tilt 3 portfolios relative to the baseline portfolio: the information ratio was 0.93 and 1.06 for Alpha Tilt 1 and 3, respectively, while the baseline portfolio had an information ratio of 0.64 over the whole simulation period. The cumulative excess return was also impressive for the environmentally enhanced portfolios: Alpha Tilt 1 outperformed the S&P500 Index by 27.35 per cent, while Alpha Tilt 3 beat the benchmark by 28.05 per cent over the simulation period, compared with 13.39 per cent for the baseline portfolio.

In contrast, the results did not support the hypothesis that the environmental rankings are negatively correlated with price performance. Both cumulative excess return (+7.10 per cent) and information ratio (+0.42) fell relative to the baseline when we over-weighted the poorly ranked companies and under-weighted the best ranked companies in Alpha Tilt 2. This result challenges the belief that a firm's environmental improvements, and their associated costs, are a net drag on the bottom line and would not be valued by investors in the financial market.

The results of the analysis to this point did not take into account any style biases that may have been introduced by the environmental rankings. In order to address this matter, we also conducted a style bias investigation using a Beta123 risk model ($\beta 1$, $\beta 2$ and $\beta 3$) to construct portfolios with complex risk-return trade-offs. They are the jointly determined exposures to the overall market (Russell 3000 minus risk free risk for $\beta 1$), to growth minus value (Russell 3000 Growth minus Russell 3000 Value for $\beta 2$), and to large minus small (Russell 1000 minus Russell 2000 total return for $\beta 3$). The neutral levels of the betas are: 1.0 for $\beta 1$; 0.0 for $\beta 2$ (positive for growth, negative for value); 0.0 for $\beta 3$ (positive for large, negative for small). In general, the larger beta deviation allowed from the neutral levels, the higher risk level permitted relative to the benchmark.

In the second simulation series, we

constrained $\beta 1$, $\beta 2$, and $\beta 3$ to allow their values to deviate by 0.10 from the benchmark to control the issue of style biases. On the scale from 0 to 1, the higher the value allowed for these risk measures to deviate from the benchmark, the greater the risk exposure and reward for the portfolio. We selected a modest level of bias exposure, hoping to strike a balance such that our portfolio characteristics were very similar to that of our underlying baseline yet allowed the portfolio to benefit from the diverse return sources. We eliminated the Alpha Tilt 2 test from this exercise, since there was no evidence that environmental factors were negatively correlated with stock price performance.

With the new style constraints, both the cumulative excess return relative to the benchmark and information ratio improved in the baseline portfolio; a result that is consistent with our own quantitative research, which indicates that $\beta 1$, $\beta 2$ and $\beta 3$ are effective risk measures. We also observed that the cumulative excess return for the Alpha Tilt 1 portfolio declined from 27.35 per cent to 22.90 per cent over the benchmark, suggesting that style did play a role in performance contribution over the measured timeframe. When style was constrained, the information ratio (IR) of the Alpha Tilt 1 strategy dropped from 0.93 to 0.80, while the baseline portfolio improved its IR from 0.64 to 0.80. The positive impact of incorporating environmental data, while still measurable, was diminished by the style constraints in the Alpha Tilt 1 construct.

More strikingly, the Alpha Tilt 3 portfolio held up reasonably well under the style constraints. In this test, the information ratio remained relatively high at 0.96, down from 1.06 in the first test. Also, the cumulative excess return of the Alpha Tilt 3 portfolio over the benchmark remained high at 25.95 per cent, down from 28.05 per cent in the prior test, suggesting again that environmental data, particularly on extreme performers, do add value.

CONCLUSION

The ecologically enhanced versions of the quantitative strategy were superior to those of the baseline portfolio, although all the active strategies exceeded the benchmark for the time frame tested, even after accounting for transaction costs and incorporating style constraints. It was found that the information ratio on the portfolio is most significantly improved when the extreme ratings are incorporated into the process. The results of this analysis support the assertion that sensitivity to environmental issues, particularly for the extreme performers, may enhance returns of an active strategy over time.

A more complete description of this work can be found at http://www.

Kimberly Gluck, CFA, Principal
Ying Becker, PhD, Principal
State Street Global Advisors
Boston, MA 02111

Reference

Derwall, J., Gunster, N., Bauer, R. and Koedijk, K. (2004), 'The Eco-Efficiency Premium Puzzle', Working Paper, Erasmus University Rotterdam.