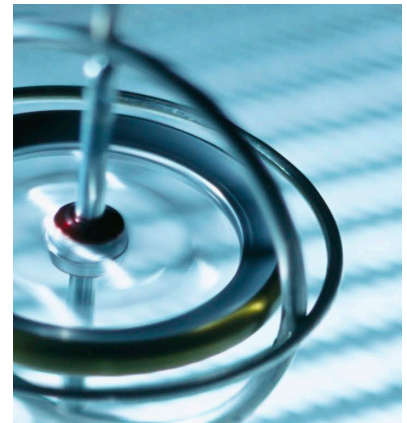


Equity Market Neutral: Diversifier Across Market Cycles

September 2009

Equity Market Neutral funds take both long and short positions in stocks while seeking to minimize exposure to the systemic risk of the market (i.e., a beta of zero is desired) with the aim of being uncorrelated to market movements and delivering pure alpha. These funds aim to exploit investment opportunities presented by a specific group of stocks, while maintaining a neutral exposure to broad groups of stocks such as sector, industry, market capitalization, country, or region. The strategy's market neutrality essentially seeks to eliminate the problem of timing the investment from the investor's perspective. Statistical arbitrage and traditional quantitative long/short are the two main sub-sectors in the strategy.

Jordan Low, CFA
Director
Quantitative Equities Group



Executive Summary

One of the lessons investors may have learned from the financial crisis of 2007-2009 is the degree to which different hedge fund strategies vary in their adaptability to changes in market cycles. Many investors were unpleasantly surprised to find that a large number of hedge funds ended 2008 in negative territory, particularly since hedge funds posted overall positive returns for the previous ten years; the Credit Suisse/Tremont Hedge Fund Index finished 2008 down 19.07% and has had a 9.1% annualized average return since 1994 as of July 31, 2009. Certain strategies such as Long/Short Equity or Fixed Income Arbitrage that generated returns in the growth part of the economic cycle, i.e., March 2003 - October 2007, were significantly challenged in a stressed market environment such as 2008.

This variance in performance among hedge fund strategies highlights the importance of diversification, not just across asset classes but also across hedge fund strategies. There is a growing awareness, however, that achieving a diversification that will hold up in volatile market environments is more difficult than had been previously assumed. This is because correlations between asset classes and hedge fund strategies began to change dynamically and converged when the recent financial crisis reached peak levels in 4Q 2008. The Equity Market Neutral strategy (EMN) was one of a few strategies that were less affected by the market forces that drove the synchronized moves of the previously uncorrelated asset classes. Thus, we believe that EMN stands out as potential diversifier given the low beta it showed to the 2008 equity markets in what was a historically volatile year (See Figure 1). Figure 2 suggests that EMN also has lower annualized volatility than other hedge fund strategies over the long term, indicating that the strategy has avoided the downside risk of markets over time and provided generally positive risk-adjusted returns over the last ten years.

Another important consideration when analyzing quantitative strategies such as EMN is that of diversification of managers' factors and models. Quantitative funds experienced heavy declines in August 2007 (which rebounded later in the month) due to the heavy unwinding of crowded trades, significantly beyond the historical range of the strategy's volatility. Certain managers have used that singular event as a learning experience, implementing new risk controls and creating proprietary factors and models to seek to avoid crowded trading situations. Diversification of factors and models within the strategy was a key element in 2008 for the strategy's ability to weather market volatility and will likely remain the cornerstone of alpha generation for the strategy going forward.

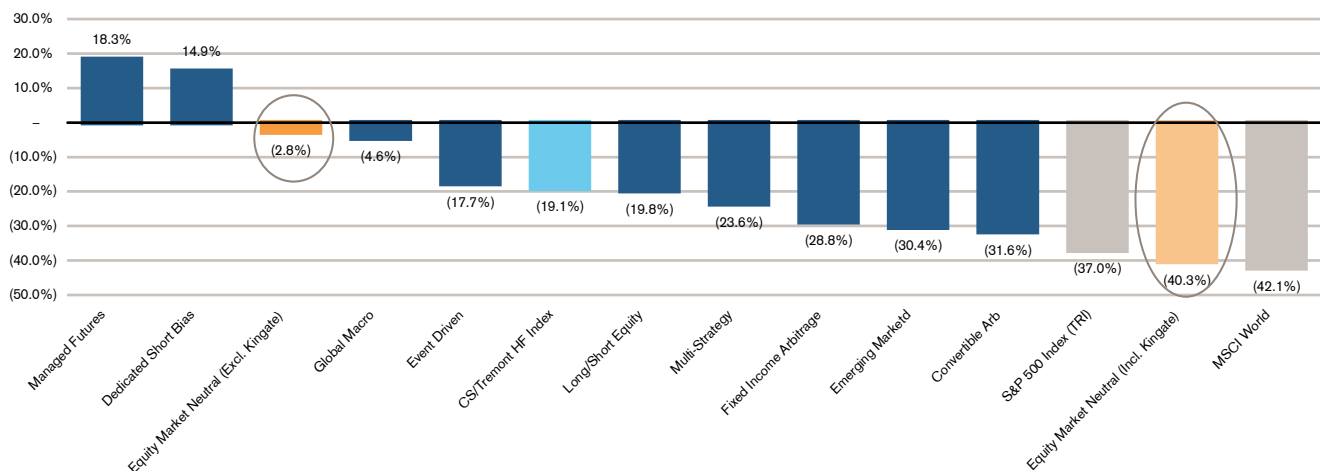
The Diversification Challenge of Shifting Correlations

Because correlations have converged toward one during severe market drops such as that which followed the Lehman Brothers bankruptcy in September 2008, one of the biggest challenges facing investors is achieving a true diversification of asset classes that will resist the shifting correlations during times of market stress. As can be seen in Figure 1, EMN was one of the top three performers in 2008, having lower net exposures to the market beta in a year that saw the Chicago Board Options Exchange Volatility Index (VIX) hit its all-time intraday high of 89.5 in October 2008; as a point of reference, the VIX average from January 1990 to October 2008 was 19.0. Thus, EMN has shown that

its multi-factor approach has enabled it to profit from a variety of environments and has provided an effective counterbalance in diversified portfolios during periods of market volatility.

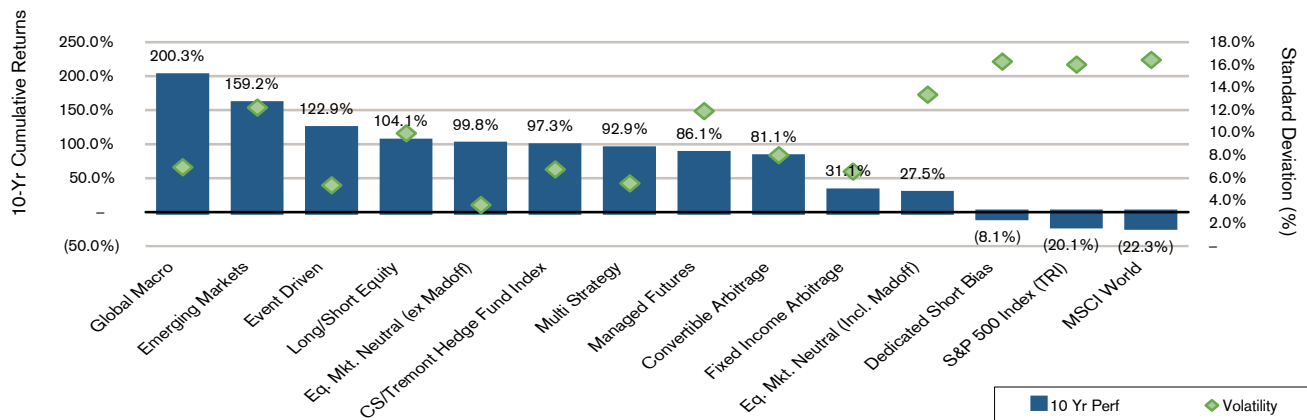
Managers point out that an investor seeking to improve the efficient frontier in their portfolio by using EMN as a diversifier might start with a couple of considerations: first, at the portfolio level EMN has low beta to other hedge fund strategies and equity markets on a longer range basis as well (Table 1); second, within the EMN strategy investors need to be aware that some managers are more diversified in their range of factors and signals than others, making them less vulnerable to undesirable market beta exposures.

Figure 1: 2008 Performance for Strategies in the Credit Suisse/Tremont Hedge Fund Index and Equity Markets¹



Source: Credit Suisse/Tremont Hedge Fund Index, Bloomberg.

Figure 2: 10-Year Performance and Volatility for Strategies in the Credit Suisse/Tremont Hedge Fund Index and Equity Markets (Excluding the Kingate-related Nov. 2008 writedown): Jul. 1999 – Jun. 2009



Source: Credit Suisse/Tremont Hedge Fund Index, Bloomberg.

¹ This performance chart shows the Credit Suisse/Tremont Equity Market Neutral Sector's performance in two ways: A) The performance number excluding the writedown taken by the Credit Suisse/Tremont Hedge Fund Index in November 2008 for the investment in the Kingate Fund which had a substantial allocation to the Madoff Fund which was discovered to be fraudulent and B) The performance number including the Madoff-related writedown.

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Table 1: Beta of Equity Market Neutral to the Credit Suisse/Tremont Broad Index and the S&P 500 Index

Beta*	Credit Suisse/Tremont Equity Market Neutral - Ex Kingate
Credit Suisse/Tremont Hedge Fund Index (USD)	0.23
S&P 500 TR Index	0.11
Dow Jones World Index (USD)	0.12

* Based on Credit Suisse/Tremont Hedge Fund Index data from January, 1994, ex data from the Kingate Fund.
Source: Credit Suisse/Tremont Hedge Fund Index

Undesirable correlation between EMN managers was experienced during the liquidity event in August 2007 which occurred as a result of the mainstreaming of quantitative finance in the last few years (more on this dislocation below). This has raised the bar for managers to expand the scope of their models.

While EMN may not capture the full beta of bull markets (being neutral by definition results in more range-bound results in both up and down markets; (see Figure 3) for EMN performance during the months in which the S&P 500 has positive performance).

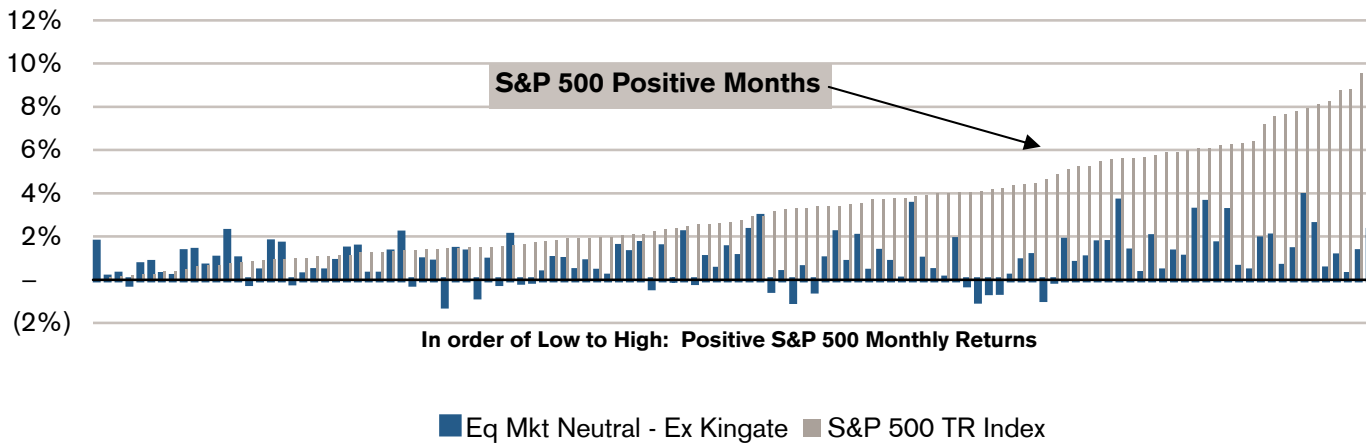
On the other hand, EMN managers generally tend to avoid the full beta of down

markets as is evident in Figure 4. Since January 1994, the S&P 500 has had 21 months when it was down 5% or more, while EMN during that same period was down four of those months and only one of those months had a performance below -5%.

Equity Market Neutral Overview

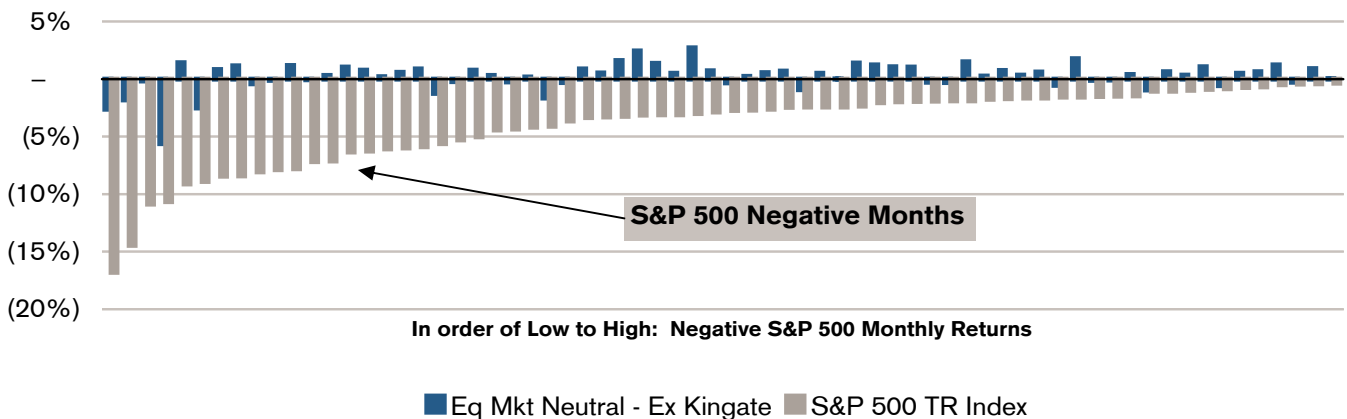
Most funds within the EMN strategy utilize sophisticated quantitative models to determine movements in the prices of securities as well as relationships between securities and exploits this information to seek returns uncorrelated to overall market movements. There are two main categories within the strategy based on different investment approaches: the first are factor-based

Figure 3: Equity Market Neutral in S&P 500 Positive Months (Jan. 1994-Jun. 2009)



Source: Credit Suisse/Tremont Hedge Fund Index, Bloomberg.

Figure 4: Equity Market Neutral in S&P 500 Negative Months (Jan. 1994 – Jun. 2009)



Source: Credit Suisse/Tremont Hedge Fund Index, Bloomberg.

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managers who typically find pair-wise neutral trades in which exposure to the beta of the markets is neutralized and who look at inputs such as account variables, earnings forecasts and economic indicators; the second are statistical arbitrage (StatArb) managers.

Factor-based Quant: Factor-based EMN quantitative (Quant) models can be considered both a science and an art despite the popular perception of quant traders as being purely “model-driven.” EMN managers often find themselves in an ongoing process of adjusting one’s models to capture value in the markets and generate alpha. The EMN managers look to add ways to capture soft data into their models (for example, the quality of a company’s management team), which can be proprietary factors. These types of customized factors have become an increasingly important way of diversifying from the models used by peers. Stock picking is done within a carefully controlled risk framework with the aim of neutralizing sector risks as well as market beta.

StatArb: StatArb managers use highly technical, short-term mean reversion strategies involving large numbers of securities, short holding periods and automated trading platforms. The origin of the strategy was a simpler pairs-trade approach in which stocks are put into pairs based on market-based similarities and the poorer performing stock is bought long with the expectation that it will climb towards its better performing partner while the better performer is sold short. Market movement risk is thus generally hedged as a result. The underlying assumption is that two financial instruments with similar characteristics should have similar pricing and are tied together by a common trend. The implication is that the prices of the paired stocks will fluctuate around an equilibrium level with the spread quantifying the degree of mispricing between the two securities. Deviations from the equilibrium level (or mean price) is assumed to be temporary and that because of the principle of mean reversion will correct itself over time.²

Some of the StatArb portfolios rebalance every 5-15 minutes whereas a traditional investment fund might rebalance weekly, monthly or even quarterly. To handle the high turnover and large number of stocks, StatArb funds use high-powered, high-velocity computer trading systems often involving several linked computers. Because of the complexity of the algorithmic models and technology involved, many of the successful funds in this space have been founded by computer scientists, mathematicians and engineers rather than by economists or fundamental investors.³

Many investors who were faced with illiquid hedge fund investments during the recent credit crisis may be attracted by the fact that EMN managers mostly trade in very liquid securities, offering anywhere from daily to monthly liquidity. In some cases, the lines have become somewhat blurred between these two EMN categories with a number of funds incorporating elements of both the Quant and StatArb approaches.

Lessons Learned from August 2007 and how they applied to 4Q 2008

EMN strategies experienced a significant dislocation in early August 2007 and many of the quantitative funds suffered unprecedented losses in the course of three days starting August 6th. There was a strong recovery a few days later for those funds who stayed the course and relied on their models (50% of the losses were recovered by Friday, August 10th), but others liquidated their positions during the unwind and suffered losses. This dislocation led to many managers subsequently re-assessing their models to prevent getting caught in a future negative, deleveraging spiral such as occurred during that event (see Figure 5).

One of the main issues that created the conditions for the unwind was the commonality problem or the “mainstreaming” of quantitative finance. When the dislocation occurred the bull market was still going strong (the S&P 500 hit its peak of 1565 two months later on October 9, 2007) and a large num-

ber of funds were following the same models using much of the same research which resulted in crowded trades and significant asset growth.⁴ One manager relates anecdotally that many managers were relying on the same third-party risk models. Thus, when everyone received their monthly update on the co-variance matrix they saw that they were off by x% and everyone made the same adjustments; thus, correlations went up and the unwinding effect was magnified.

As a result of the August 2007 dislocation, many managers have increased the range of data they use, including building proprietary data and risk models. An example of lessons learned might be assigning higher risk penalties to well-owned stocks in their scoring system or those with trading patterns that might indicate a de-leveraging impact since leverage exacerbates the spiral in a broad-based unwind.

Diversification in Action

Diversification through a multi-factor model has become a well-researched and documented approach.⁵ EMN hedge funds not only diversify via the quantity of factors that they use (which can form a wide range of anywhere from 8 to 100 factors in categories such as sensitivity to stock price, style, yields, volatility and economic trends), but the quality of the factors and the manager’s investment process as well. Qualitative dimensions that could lead to a reduction in correlated performance can include:

- Diversified specializations in the team members’ expertise
- Independent research
- Proprietary data sets
- Use of multiple or blended risk models
- Fundamental insight
- Value
- Macro analysis
- IT systems

As an example of the bearing of factors on performance Figure 6 shows the impact of two different factors on performance⁶: traditional value versus price momentum. As

² Triantafyllopoulos, K. and Montana, G., 2009. Dynamic Modeling of Mean-Reverting Spreads for Statistical Arbitrage.

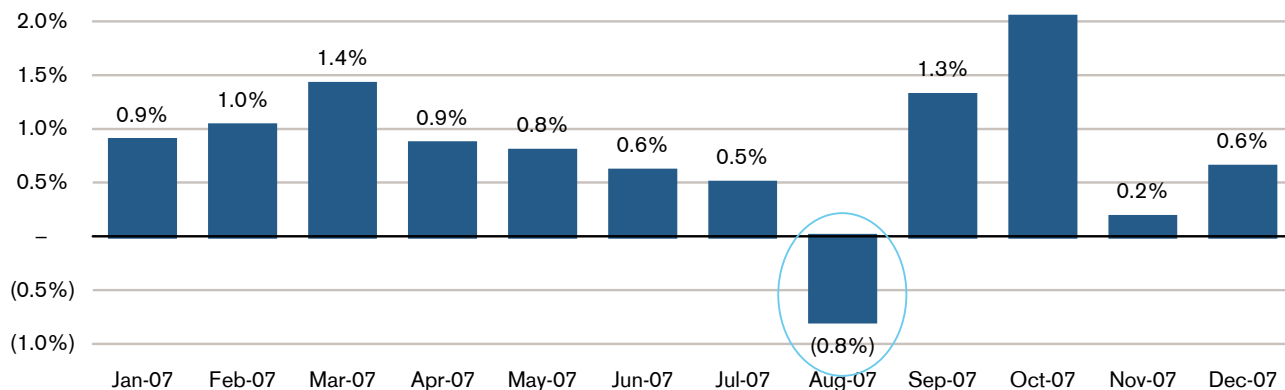
³ Amir E. Khandani and Andrew W. Lo. “What Happened To The Quants In August 2007?,” MIT Sloan School of Management, September 20, 2007.

⁴ Amir E. Khandani and Andrew W. Lo. “What Happened To The Quants In August 2007?,” MIT Sloan School of Management, September 20, 2007.

⁵ Foerster, Stephen, 2006. “What Drives Equity Market Neutral Hedge Fund Returns?” Business School, University of Ontario.

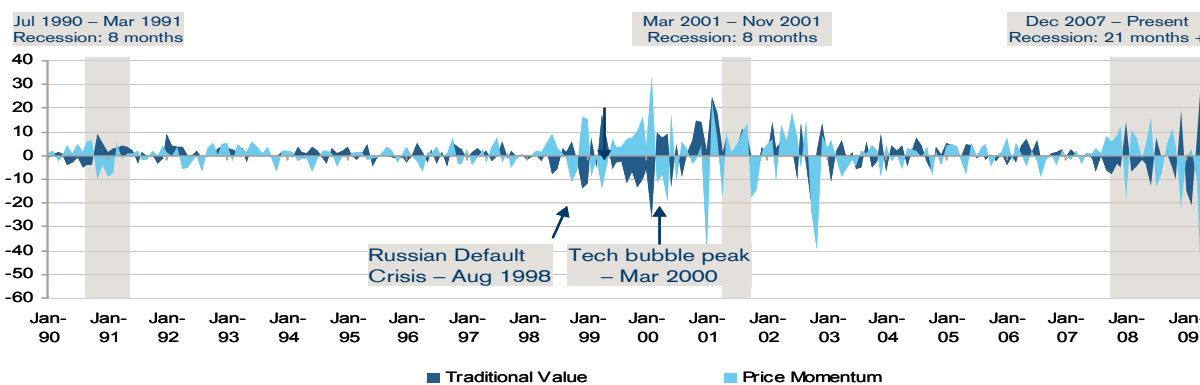
⁶ Data supplied by Credit Suisse Quantitative Research team led by Pankaj Patel.

Figure 5: Equity Market Neutral 2007 Monthly Performance



Source: Credit Suisse/Tremont Hedge Fund Index

Figure 6: Example of Two Factors' Performance: Traditional Value vs. Price Momentum Jan.1990 – Jun. 2009



Source: Credit Suisse/Tremont Hedge Fund Index, Credit Suisse Quantitative Research.

can be seen in the graph each factor contributes to performance at different times, a contrast that is most stark during periods of high volatility (such as the years leading up to the tech bubble bursting and since the beginning of the 2008-2009 credit crisis).

An efficient frontier analysis based on the same data⁷ (See Figure 7) shows the additive effect of the Value and Earnings Momentum factors which are two relatively well-known and widely used factors. The outperformance of the most diversified portfolio suggests (confirming a widely acknowledged investment principle) that

no matter what the risk tolerance of the investor might be, best results in this case came from adding different factors to the base scenario of T-bills, bonds (as represented by the Barclays Aggregate Bond Index), and equities (as represented by the S&P 500).

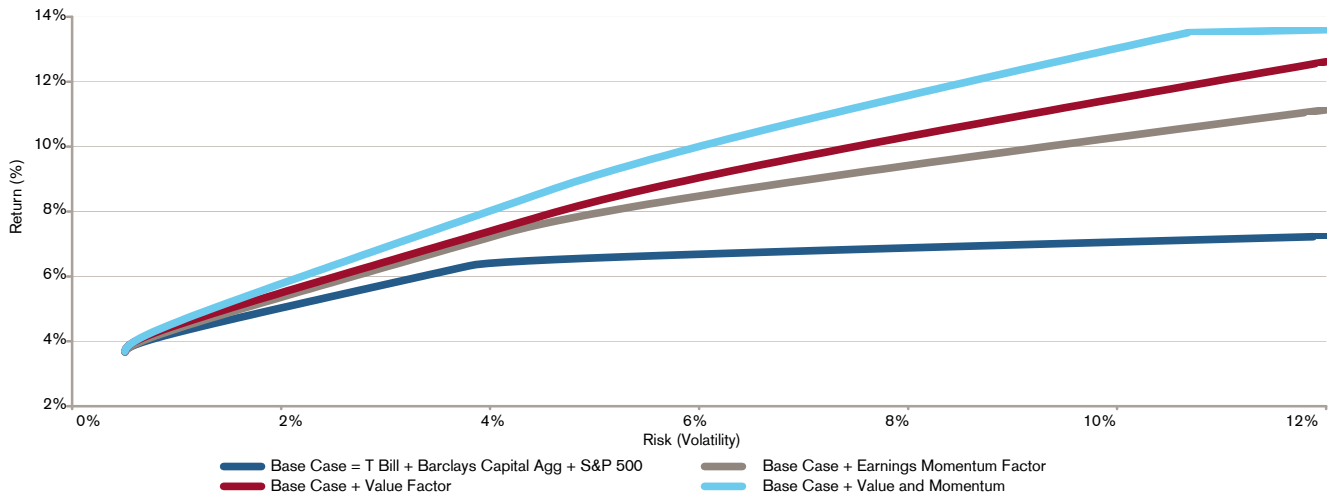
Figure 8 shows the cumulative performance of the two factors independently over time as well as that of the S&P 500 Total Return Index. It is interesting to note the different behaviors of the two factors over time and their relationship to the US equity index. Earnings momentum tends to capture

market beta and “run” with it whereas traditional value often has provided a counterbalance to earnings momentum’s declines.

⁷ The data was compiled by the Credit Suisse Investment Bank’s Quantitative Research team led by Pankaj Patel.

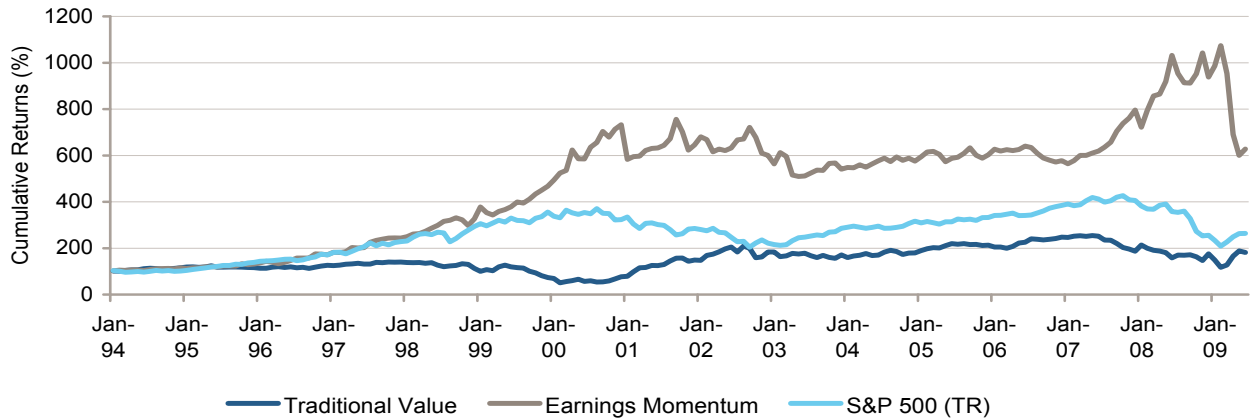
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Figure 7: Example of Efficient Frontier Incorporating Two Factors: Earnings Momentum and Value Factor Performance Jan. 1990 – Jun. 2009



Source: Credit Suisse/Tremont Hedge Fund Index, Credit Suisse Quantitative Research

Figure 8: Cumulative Returns Earnings Momentum and Value Factor Performance Jan. 1990 – Jun. 2009



Source: Credit Suisse/Tremont Hedge Fund Index, Credit Suisse Quantitative Research

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Conclusion

A diversified EMN fund should be an important component of a portfolio which targets reduced correlations to equity markets and to other hedge fund strategies. In order to achieve diversification within the strategy investors should seek managers who work with a range of uncorrelated factors and proprietary models in order to avoid crowded trades.

It should be recognized that the 2008 market dislocation was most probably an outlier in terms of degree of magnitude and global impact, the likes of which had not been seen since 1929. Yet there is likely to be a new appreciation by investors and managers regarding the dynamic nature of correlations between asset classes and hedge fund strategies during periods of market stress. The dynamic convergence of the correlations during and after the 2008 market dislocation essentially over-rode the expected correlations for many asset classes that had been based on historical data from lower volatility periods. The EMN strategy, on the other hand, demonstrated lack of beta to the equity markets to a substantial degree with the EMN 2008 performance of -2.8% (ex Kingate) versus the MSCI World equity benchmark 2008 performance of -42.1%.

Some EMN managers rely primarily on traditional Quant factors such as value, growth and momentum while others rely almost entirely on StatArb models. Managers who can run both StatArb and basic Quant factors in their models are likely to have more options for navigating changes in market cycles. The challenge for those managers who span both styles is the significant outlay of resources needed as well as the depth of the fund's infrastructure and knowledge base. Based on these challenges, many believe that there will be a clearer separation in the current environment among EMN managers who are long beta and those who produce alpha going forward.

EMN managers see the post-Lehman landscape as opportunity-rich for the strategy because there is less capital being deployed (particularly by investment bank proprietary trading desks) as well as less competition in program and high frequency trading. In short, this strategy can provide a tested low-beta portfolio component for investors who wish to garner alpha during periods of market volatility while also producing strong risk-adjusted performance over longer time periods relative to other hedge fund strategies and asset classes.

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CREDIT SUISSE ASSET MANAGEMENT, LLC

Eleven Madison Avenue
New York, New York 10010
www.credit-suisse.com/us

For Additional Information:

New York: +1 212 538-5738
EMEA: +44 20 7888-0296
Japan: +81 3 4550-9232
Asia ex-Japan: +852 2101-6909
Australia: +61 2 8205-4159
Email: ir.betastrategies@credit-suisse.com

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