A Closer Look at Hedge Fund Beta

Background

In the hedge fund community, "beta" is one of the most commonly used terms, but it often means different things to different people, depending on the context. Before discussing beta in the context of hedge funds, it is helpful to review the definition of beta from the Capital Asset Pricing Model (CAPM). As most readers will recall, CAPM holds that the expected return of an investment should be equal to the risk free rate plus beta times the equity risk premium. Beta is a measure of the correlation of an investment's return to the market (the S&P 500 is often used as a proxy for "the market", although in many cases different benchmarks may be more appropriate) and its volatility relative to the market, as defined below:

$$\beta = \frac{\text{Cov}\,(R_i, R_m)}{\text{Var}\,(R_m)}$$

Where R_i is the return of the investment and R_m is the return of the market.

A less technical way of stating the above equation is:

$$\beta = \text{Correlation} \times \frac{\text{Investment Volatility}}{\text{Market Volatility}}$$

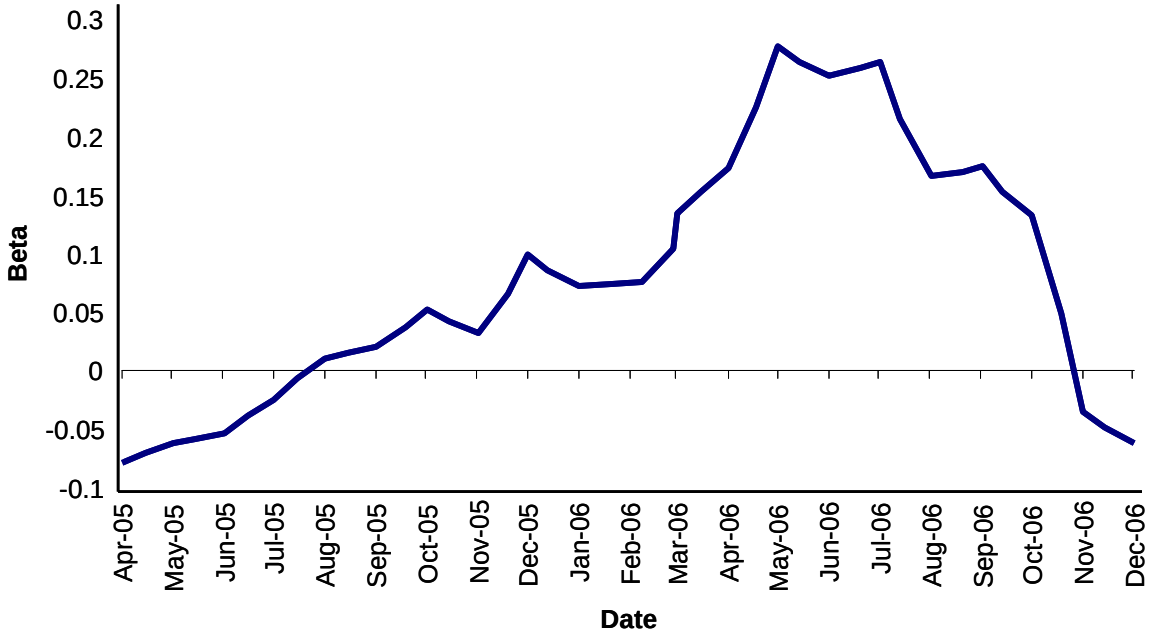
Over the past two years, there has been a significant increase in the beta of most hedge fund indices and fund of hedge fund portfolios. This increase in beta has been a cause for concern among some investors and has led to criticism by commentators who point out that a major justification for including hedge funds in institutional portfolios has been the historically low beta to equities. In this paper, we discuss several reasons why investors should not necessarily be overly concerned about recent increases in hedge fund beta.

Instability of Beta

Unlike the long-only world, where managers typically maintain a consistent beta, hedge fund betas are notoriously erratic. The added flexibility that hedge fund managers have to apply leverage, take both long and short positions and invest across multiple asset classes leads to ever-changing beta measurements. In fact, some commentators argue that the entire CAPM framework is inappropriate for hedge funds. While we believe that

beta can still be a useful measure in certain contexts, we also feel that investors should not put too much emphasis on short term fluctuations in beta. An equity market neutral manager with whom Prisma is invested provides a good example of why it can be a futile exercise to focus on short term beta. This manager employs a highly quantitative portfolio management process to ensure that they remain beta neutral on a daily basis. Yet if we measure this manager's beta on a rolling two-year basis, as shown in Figure One below, the beta fluctuates significantly.

FIGURE ONE
Rolling 2-year Beta to S&P 500
May 2003-Dec 2006



Source: Quantitative equity market neutral manager performance since inception

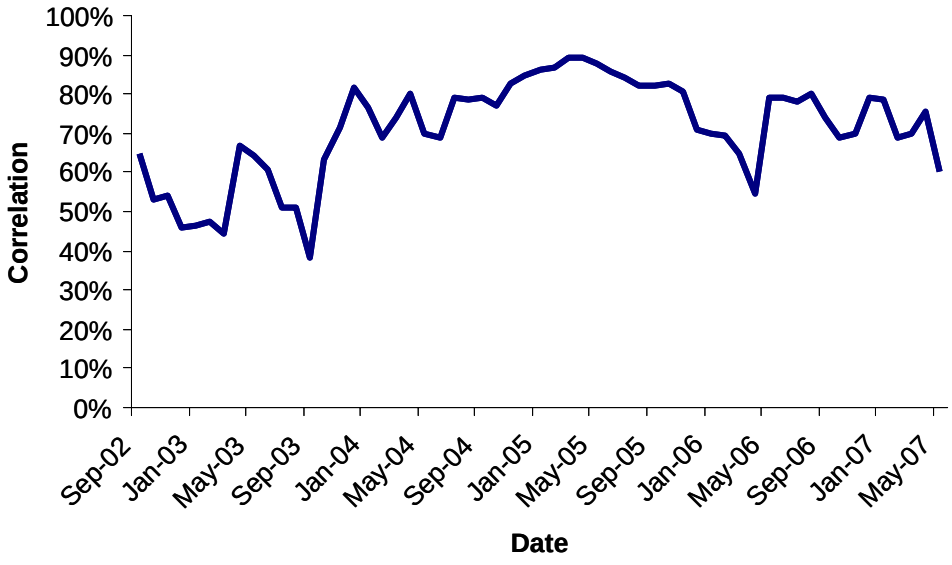
This chart begs the question: if a manager that devotes a significant amount of time and resources to completely neutralize beta exposure on a daily basis exhibits this level of beta volatility, how much credence should investors give to short term beta fluctuations? We believe that, while beta is one important measure, investors should not be overly concerned about inevitable fluctuations over time.

Why Hedge Fund Beta Has Increased

Recently, as the short term beta of our portfolios has risen, we have analyzed both our own portfolio and broad hedge fund indices to determine whether we should take additional steps to control the beta of the portfolio. This analysis has resulted in two interesting findings. The first finding is that the recent industry-wide increase in hedge fund beta has **not** been caused primarily by a rise in correlation between hedge funds and the market. As described above, beta is a measure of both correlation to the market and volatility relative to the market. While the correlation of hedge fund managers to the S&P 500 has risen slightly over the past few years, the more important factor has been the dramatic decrease in equity market volatility. Figure Two below shows the rolling 12-month correlation between the CSFB Long/Short Equity Index and the S&P 500. Long/Short managers tend to have the highest correlation to equities of all major hedge fund strategies. Figure Three shows the implied volatility of the S&P 500 Index (as measured by the VIX index) over the same time period.

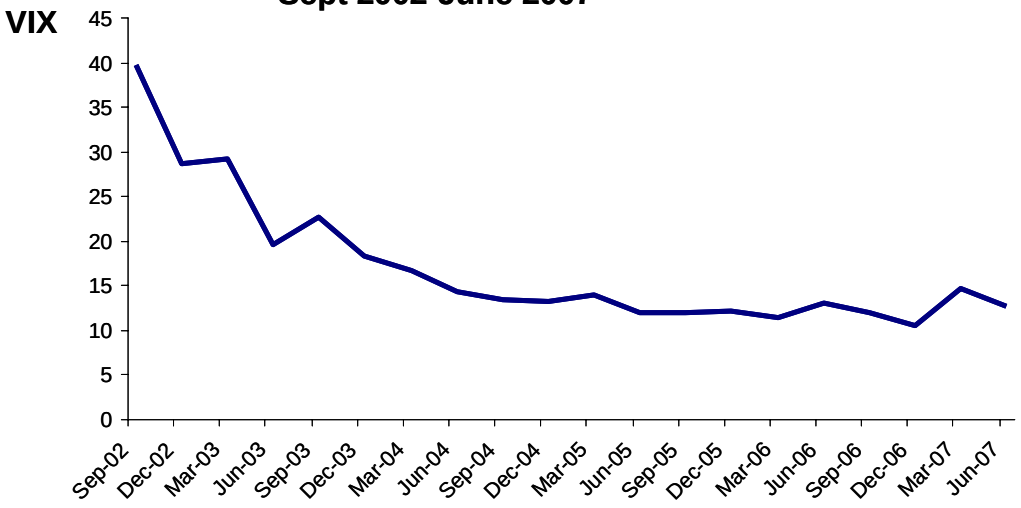
FIGURE TWO

Rolling 12-Month Correlation
CSFB Long/Short Equity Index vs. S&P 500
September 2002-May 2007



Source: Pertrac

FIGURE THREE
Historical Volatility of S&P 500 (VIX index)
Sept 2002-June 2007



Source: CBOE

Figure Two shows that correlation has not changed dramatically, while Figure Three shows a steep decline in market volatility. Although the volatility of the S&P 500 has decreased, in our experience, most hedge fund managers have not decreased their volatility[1]. The net result is that their beta increases without any real change in correlation or risk, simply because market volatility (the denominator in the beta equation) decreased. Many articles have commented upon the rising beta of hedge fund managers without explaining this underlying driver. Most people assume increasing beta means rising correlation, but this is not necessarily the case. If market volatility increases from the historically low level of the past few years (which we expect), the beta of hedge fund managers will decrease.

[1] When we hire a hedge fund manager, we expect them to achieve a certain level of risk, which generally corresponds with a volatility target. If a manager takes too much risk, this is a cause for concern, but the more common problem is actually when a manager does not fully utilize his risk budget, since managers generally cannot perform well without taking on sufficient risk. Investors, including Prisma, do not want to pay significant fees to a manager who takes very little risk.

Correlation Between Alpha and Beta in Hedge Funds

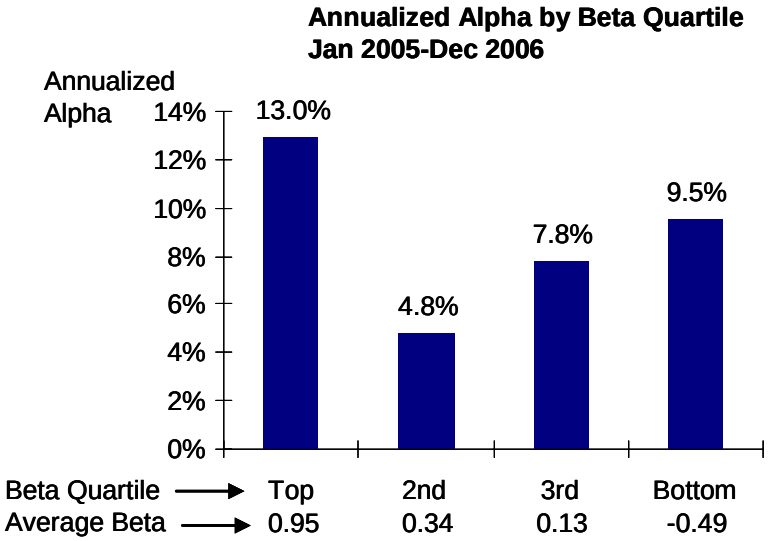
The second finding from our analysis of hedge fund beta is that there often is a correlation between alpha and beta in hedge fund managers. Alpha is another term that is often used without a clear definition of what is meant. For our purposes, we use Jensen's definition of alpha:

$$\alpha = R_i - [R_f + \beta (R_m - R_f)]$$

where R_i is the investment return, R_f is the risk-free rate and R_m is the market return.

Simply put, alpha is the excess return above what is predicted by the CAPM. Arguably, alpha is a measure of skill, since it reflects returns above and beyond what can be earned simply by holding the market portfolio. If we divide the managers with whom Prisma is invested into quartiles based on their beta to the S&P 500, we find that managers in the top and bottom quartiles have demonstrated the highest level of alpha. Figure Four below plots the annualized alpha of all managers in Prisma's flagship portfolio over the past two years against their beta, arranged by quartiles. The managers in the top and bottom quartiles have demonstrated the highest alpha over this period. In other words, managers with the highest absolute beta (positive or negative) have also had the highest alpha.

FIGURE FOUR



Source: Pertrac, Prisma Analysis

This finding has led Prisma to modify its approach to portfolio construction. In the past, our goal of maintaining very low beta to equities led us to focus primarily on managers with very low structural beta (more on structural versus cyclical beta below). More recently, we have taken a "barbell" approach to building our portfolios – including some managers with relatively high beta, and offsetting this beta with short sellers, who have

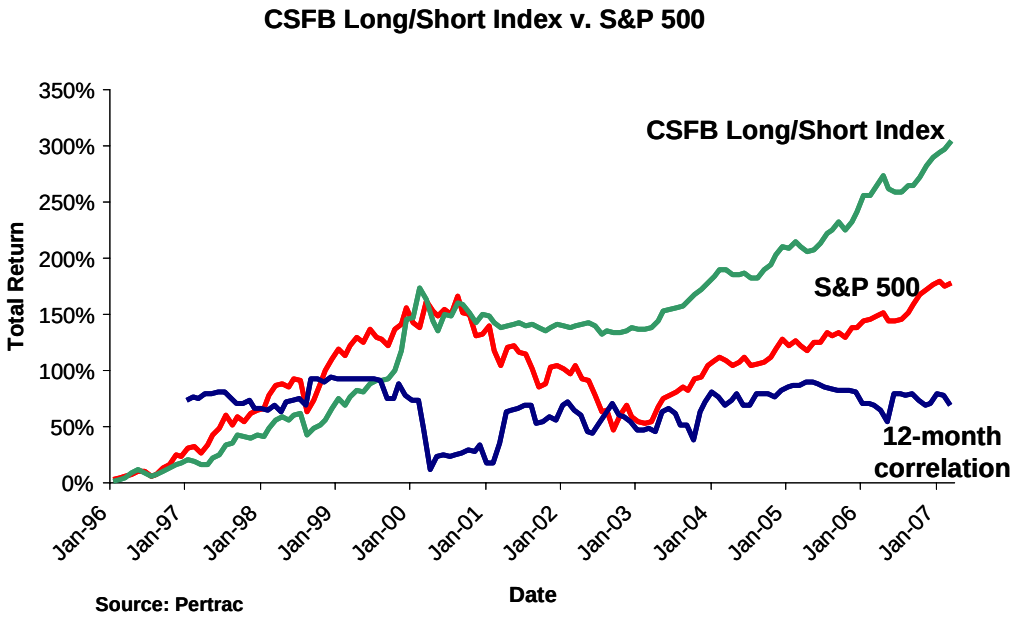
negative beta. We have found that combining high beta managers with negative beta managers (generally short sellers) produces superior performance compared to a portfolio consisting almost exclusively of low beta managers.

Structural Versus Cyclical Beta

Alpha and beta are relatively straightforward concepts and work well for traditional active long-only managers. These managers typically adhere to a well-defined benchmark, so it is reasonable to calculate their beta to that benchmark and measure alpha in the manner described above. If a manager simply tracks the risk and returns of the benchmark, say the S&P 500, it doesn't make sense to pay fees to the manager, when the exposure can be achieved in an extremely low cost manner using index funds, ETFs, or various derivatives. These same concepts of beta and alpha can be applied to hedge fund investments, but the analysis becomes a bit more complicated. Because hedge fund managers invest across a broad range of asset classes, have the ability to use leverage and to take both long and short positions, it can be far more difficult to identify the appropriate benchmark(s) or risk factors against which to measure performance and calculate alpha. This is a topic about which much has been written and is beyond the scope of this paper. However, one aspect of beta is equally applicable to hedge fund managers and traditional long-only managers: investors should not pay fees to managers whose returns are largely attributable to beta to a market index such as the S&P 500. Most institutional investors get plenty of beta exposure elsewhere in their portfolio at a low cost, so it simply does not make sense to duplicate this exposure in their hedge fund investments. For this reason, Prisma's low volatility portfolios specifically target a near zero long-run beta to equity, bond and credit indices. It is important to emphasize the phrase "long run." Over time, the beta of our portfolios will inevitably fluctuate, so our goal is not to achieve a zero beta target during every time period.

We divide the beta of hedge funds into two categories: structural beta and cyclical beta. A number of hedge fund managers, such as long-biased equity long/short managers, intentionally seek to maintain a long-term positive net exposure and beta to equities. We refer to this as structural beta. To the extent that these managers can add significant alpha on top of their beta exposure, they can be valuable additions to a portfolio. Other managers seek to have no long-term correlation or beta to equities, but they may vary their market exposure and beta over time based on the current market environment (cyclical beta). For example, many equity long/short managers increased their net exposure and beta to the market during the late 1990's as it was a favorable environment. As we entered a prolonged bear market in 2000, managers dramatically reduced their net exposure, thus reducing beta. The ability to vary market exposure depending upon the opportunity set is one of the advantages that hedge funds have over traditional long-only managers, and this is part of the reason why investors are willing to pay higher fees to hedge fund managers. Figure Five below compares the return of the S&P 500 Index to the CSFB Long/Short Equity Hedge Fund Index. It also shows the how the rolling 12-month correlation between these two indices varies over time.

FIGURE FIVE



Clearly, long/short managers added value by reducing their market exposure during the bear market and gradually increasing exposure beginning in 2003. Since managers can add significant value by varying their cyclical beta, we do not seek to control this beta. As a result, at the portfolio level, the beta of Prisma's funds will inevitably vary over time and this is generally not a cause for concern. Our focus is on keeping the long-term (structural) beta of the portfolio close to zero.

Conclusion

In this paper, we have discussed three findings. First, the recent increase in beta among hedge fund managers has been driven largely by decreasing market volatility, rather than increasing correlation. Second, we have observed a correlation between alpha and beta among our universe of managers. This has led us to modify our portfolio construction approach. Finally, we find that hedge funds that intentionally change their beta in response to different market environments can actually generate alpha by virtue of the process of varying beta.

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