How are Hedge Fund Manager Characteristics Related to Performance, Volatility, and Survival?

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Abstract

This paper examines the relationship between hedge fund manager characteristics and performance, volatility, and survival. In the initial regression of returns on manager characteristics, two variables – managerial tenure and to a lesser degree, possession of an MBA – are negatively linked to performance. These relationships are robust to, and in fact, grow stronger when controlling for fund characteristics and correlation with a number of market indices. To further investigate these findings, and to test the idea that manager attributes may be more directly related to risk than to returns, the relationship between volatility and these characteristics is considered. Both MBAs and longer-tenured managers have returns with low volatility, resulting in Sharpe ratios similar to those of managers with short tenures and without MBAs. Finally, since managers are motivated by reputational concerns as well as the desire to attain high returns, and because hedge funds tend to fail at fairly high rates, it is of interest to study the association between fund survival and managerial characteristics. The results of this analysis support the negative relationship between volatility and manager tenure: the probability of survival increases greatly with manager tenure and manager age. These findings suggest that, among older and longer-tenured managers, the threat of dismissal has a greater impact on behavior than the increased financial reward from realizing high returns.

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"The most interesting feature of hedge funds is that they are thought of as nearly pure bets on manager skill."[1]

1. Introduction

Hedge funds[2] are rapidly growing in popularity. UBS Warburg estimates the industry size as approximately $1 trillion in assets, with over 6,000 separate funds. (Ineichen, 2000). Recent events, such as CALPERS' announcement in 1999 to invest up to $1 billion in hedge funds and alternative investments and the market downturn beginning in the middle of 2000 have sparked new interest in these investment partnerships. In fact, flows into hedge funds during the second quarter of 2001 – $8.4 billion – exceeded the total inflows for the entire year ended December, 2000,[3] even as flows into mutual funds were relatively flat.[4]

Given the increased awareness of hedge funds by both institutions and individuals and the significant amount of money invested in these funds, a study of the personal and professional qualities of fund managers is warranted. While certain managers, such as George Soros, Julian Robertson, Jeffrey Vinik, and the now infamous Nobel-Prize winning members of Long-Term Capital Management are household names among investors, most other hedge fund managers are not. This paper provides a first look at the "average" characteristics of a sample of hedge fund managers.

Of greater interest is the relationship between performance, risk, survival and manager qualities. Since hedge fund performance data is not widely available, most hedge fund investments are made based upon "recommendations from a reliable source" or on the "reputation" of the fund manager. (Fung and Hsieh, 1999) Thus, it is reasonable to assume that manager characteristics might have an impact on fund performance and volatility. Additionally, hedge funds differ in several ways from other managed investments, which may attract managers with certain skills, abilities, or intelligence. First, unlike mutual fund managers, hedge fund man-

[1]Brown, Goetzmann, and Ibbotson, 1999

[2]Hedge funds are generally defined by the characteristics that distinguish them from other investment vehicles. A comprehensive definition from Crerand(95) follows: Hedge funds are private partnerships where the manager or general partner has a significant personal stake in the fund and is free to operate in a variety of markets and to utilize investments and strategies with variable long-short exposures and degrees of leverage.

[3]as reported by Tremont Advisory Shareholder Services (TASS) on August 6, 2001. (www.tassresearch.com)

[4]see June Fund Flows Uneven at Major Families, June 28, 2001. www.morningstar.com

agers have tremendous flexibility with respect to the use of derivatives, leverage, and lockup periods. Second, they are free from the pressures of regular reporting to the SEC, potentially reducing the incentive to window-dress or mimic stock market indices. However, this flexibility in investment choice and freedom from reporting comes with a cost – hedge fund managers cannot advertise, and their investors must be accredited[5] individuals and institutions. Finally, hedge fund managers stand to make a good deal of money: most funds pay an incentive fee of about 20% of profits plus a fixed fee of 1% of assets under management. The incentive fee is asymmetric; it is paid when managers are profitable, but not refunded when funds lose money.[6]

What types of managers would these fund characteristics – flexibility, opacity, and high profit potential – attract? The flexibility aspect might appeal to managers with special trading skills, sophisticated mathematical modelers, or those with high intelligence, all of whom do not wish to be constrained by the investment restrictions of other managed funds. On the other hand, the opacity and lack of regulation might attract a less desirable crowd – those hoping to escape the scrutiny of the SEC. Finally, the large profit potential and relatively low barriers to entry might attract "slick" salespeople – managers having no special investment skills, but with the ability to convince others that they do. These contrasting motivations might result in a diverse group of managers. If some managers are truly skilled while others are simply starting hedge funds to escape scrutiny or make a "quick buck", then we would expect to find cross-sectional variation in returns, risk, and survival based upon differences in skill or ability. To the extent that education, age, and tenure proxy for these skills, the remainder of the paper examines this relationship.

Of key interest are two results: first, manager tenure has a negative relationship to returns, a negative relationship to risk, and a negative relationship to failure. (All results are highly statistically significant.) That is, longer-tenured managers have worse non-volatility adjusted returns than shorter-tenured managers, but when these returns are adjusted for volatility, they are no longer worse than average. Additionally, since these funds are the most likely to survive,

[5]The majority of hedge fund investors are "accredited", meaning that, if they are individuals, they must have at least $1 million in investible assets, or have earned at least $200,000 in each of the last two years. For a more thorough description of the regulatory environment of hedge funds, see "A Primer on Hedge Funds," (*Journal of Empircal Finance,* Fung and Hsieh, 1999)

[6]In contrast, most mutual fund contracts pay managers only the fixed fee component, with no incentive fees (if mutual funds have incentive fees, SEC regulations require that these fees be symmetric).

they appear to be adding value through active risk management (or alternatively, increased risk-aversion that comes with experience or age.)

Second, manager characteristics do a much better job at explaining volatility than returns. The R-squareds from the volatility regressions are, on average, 20 percentage points higher than the return regressions. It is reasonable to think that managers have more control over the riskiness (volatility) than the returns of their funds and that certain trading strategies will generally result in more volatile returns than others. Thus, these results provide evidence that managers consciously select the volatility level of their funds and that these volatilities vary systematically with manager characteristics.

As a brief overview of the following analysis, I first examine the cross-sectional relationship between manager characteristics and hedge fund performance, with a variety of controls for fund characteristics and systematic market exposure.[7] Manager tenure emerges as an explanatory variable – it is significantly **negatively** related to performance. Additionally, having an MBA is also negatively related to performance (although the result is not significant in every specification of the model.)

Next, to investigate the possibility that managers with lower average returns also have lower average volatility than other managers, as well as to examine the general relationship between volatility and manager attributes, standard deviation and Sharpe ratios are regressed against manager characteristics. Managers with CFAs, MBAs, and other advanced degrees, as well as longer-tenured managers, have significantly **less** volatile returns than the average manager. Additionally, managers from high-quality schools (as measured by average SAT scores), have more volatile returns. As a result of these relationships between manager characteristics and risk, the risk-adjusted performance of those with other advanced degrees is positive and significant, while the risk-adjusted performance of those from high-SAT schools is negative and significant. Perhaps most interesting, the risk-adjusted performance of managers with long tenures and MBAs is not different from that of the average manager. Finally, as noted above,

[7]In the paper, there are two definitions of systematic market exposure. The first definition includes as factors a variety of passive indices as well as size, book-to-market, momentum, and returns from put and call options. The second definition of risk includes hedge fund indices as the factors. The first type of risk may be interpreted as that faced by an investor that wishes to allocate some portion of his portfolio to hedge funds, while the second is best interpreted as that faced by a hedge fund consultant, or fund-of-funds manager, for whom the entire investible universe consists of hedge funds.

manager characteristics explain a good deal more of the volatility of returns than the actual returns.

Finally, the relationship between fund failure and manager characteristics is investigated. Hedge fund managers face competing incentives: the asymmetric (call-option-like) nature of their incentive contracts should induce them to take more risk, while reputational concerns (the possibility of failure) may cause them to take less risk. Therefore, we examine the relationship between manager characteristics and fund failure; are certain types of managers more likely than others to fail? Consistent with the above results on volatility, longer-tenured managers (and older managers) tend to have much lower failure rates than their shorter-tenured counterparts. This result is consistent with the idea that reputational concerns are indeed relevant to certain types of hedge fund managers.

The paper is organized as follows. Section 2 reviews the relevant literature, while Section 3 describes the data. Section 4 begins the first formal analysis of hedge fund returns versus manager characteristics. Section 5 looks at the relationship between manager characteristics, volatility, and risk-adjusted returns. Section 6 studies the relationship between manager characteristics an fund survival, while Section 7 concludes and provides direction for future research.

2. Literature Review

2.1 Mutual Fund Literature

Most closely related to this paper is work by Chevalier and Ellison who ask: "Are some mutual funds better than others?" in their 1999 *Journal of Finance* paper. They examine the relationship between manager characteristics and mutual fund performance, and find that the quality of undergraduate education as measured by average SAT scores (higher is better) and age (younger is better) are significantly related to performance. This paper differs from theirs in two important ways. First, the analysis is applied to hedge funds. Examining the relationship between manager characteristics and hedge fund performance, risk, and survival is interesting, because unlike mutual funds where regulatory restrictions limit managers' flexibility and increase their propensity to index, hedge funds are specifically structured to exploit differential manager skill. It is rational to believe that some hedge fund managers may self-select into the industry, probably due their perception that they have specialized skill that can be exploited in this environment. Second, a detailed analysis of volatility-adjusted performance is performed below, which is not performed by Chevalier and Ellison. This analysis is particularly relevant for hedge funds, as there is a common perception that hedge funds are less volatile than various market indices, and by extension, mutual funds. In fact, many investors use hedge funds as diversification tools – their perceived lower volatility and low correlation with market indices make them valuable in this respect. Additionally, to the extent that high volatility is related to the probability of failure, and the evidence that reputational concerns (fear of failure) are relevant to hedge fund managers,[8] the relationship between manager characteristics, volatility, and survival is studied.

2.2 Hedge Fund Literature

This paper is the first to examine the role of manager characteristics in hedge fund performance, volatility, and survival. However, a number of papers have studied the importance of fund characteristics in explaining hedge fund performance. For example, Ackerman, McEnally, and Ravenscraft (1999)(hereafter, AMR) find that incentive fees are positively related to performance, fixed management fees[9] are negatively related to performance, and that onshore funds[10] perform better than offshore funds. Liang (1999) finds that fund size, lockup period,[11] and incentive fees are positively related to performance and that fund age (which is effectively the same manager tenure as most funds do not make manager changes during the life of a fund) is negatively related to performance.

Turning to the impact of fund style, Fung and Hsieh (1997) use principal components analysis, and find that the first five principal components are highly correlated with five self-described style classifications of hedge funds, which add significant explanatory power to a passive index

[8]See Brown, Goetzmann, and Park, 2001.

[9]Hedge funds typically charge an incentive fee of 20% of annual profits, as well as a management fee (comparable to a hedge fund's expense ratio) of about 1.5% of assets under management.

[10]Onshore hedge funds are headquartered in the country in which they are managed. For tax reasons, a number of hedge funds are headquartered "offshore" (usually in the Bahamas or the Cayman Islands) where they are generally structured as corporations rather than as limited partnerships, and are usually larger than their onshore counterparts. As a result, there is usually a less precise alignment between manager and investor incentives. See "In Search of Alpha," published by UBS Warburg (2000) for a more comprehensive discussion.

[11]A lockup period refers to the amount of time that a fund holds an investor's money without redemption privileges (typical lockup periods for hedge funds range from six months to one year.)

model of hedge fund returns. Their model is similar in spirit to Sharpe's style analysis for mutual funds.[12] Brown and Goetzmann (2001) find that style explains 20% of the cross-sectional variability of hedge fund returns. Agarwal and Naik (1999) also use a modified version of Sharpe's style analysis, and find that style is a significant factor in explaining performance. Finally, Brown, Goetzmann, and Ibbotson (1999), study a sample of offshore funds, and finding little evidence of performance persistence, attribute hedge fund performance to style rather than to manager skill. Due to this apparent relationship between fund characteristics and style and hedge fund performance, the following analysis controls for these characteristics in determining whether manager skill is a relevant factor in hedge fund returns, as well as controlling for market factors that are known to explain the performance of managed funds.

With respect to volatility and survival, Brown, Goetzmann, and Park (2001)(hereafter, BGP) study a manager's propensity to take risk (increase volatility) in the second half of the year when his fund is doing poorly in the first half of the year, and find that, on average, managers do not increase risk in the second half of the year. To better understand this phenomena in terms of the trade-off between explicit incentive contracts which reward risk-taking and implicit incentive contracts (reputational concerns) which punish risk-taking with dismissal, they perform a survival analysis and find that managers with less volatile returns (and longer-tenured managers) are less likely to fail. They conclude that since high volatility is associated with failure, managers would rather keep volatility moderate and survive than increase volatility and fail. These results are broadly consistent with the results of Section 6.

3. Data

Data was provided by Tremont Advisory Shareholders Services (TASS). TASS has been collecting hedge fund data directly from managers since 1989, and currently has over 2,400 funds in their database, both living and dead.[13] The database includes monthly net-of-fee returns, as well as expenses, fees, size, terms, age, and style of the funds. Also included for many of the funds is a biographical sketch of the manager, providing information such as age, schooling, professional designations, and prior work experience.

[12] See Sharpe, *Journal of Portfolio Management*, 1992.

[13] TASS has maintained data on dead funds since 1994.

A number of variables that proxy for manager skill, experience, and training were constructed. They include: manager age (which, if not provided, was estimated assuming that the manager was 21 when he graduated from college)[14], CFA, MBA, PhD, JD, and other advanced degree indicator (0,1) variables, a "number of years experience" variable (calculated based upon prior work history in the manager's biography), and an SAT variable,[15] (representing the average SAT score from the manager's undergraduate institution).

Each fund must have 24 months of consecutive returns and at least $1 million in assets during the period January, 1994 to December, 2000 for inclusion in the sample. Obviously, this represents a trade-off between sample size and ensuring that each fund has a long enough time series for meaningful regression results. Additionally, the sample is adjusted to account for "backfilling" (or "instant history" (see Edwards and Park, 1996)) bias. When TASS adds a new fund to their database, historical returns are backfilled. At the beginning of its existence, a hedge fund undergoes an "incubation" period where the only significant investor is the fund manager. His goal is to compile a good track record before making the fund available to the public. Thus, most funds in the database arrive with a history of strong performance which was never available to outside investors, which biases returns upward. This difference is often large – using the TASS database, Fung and Hsieh (2000) calculated the bias as about 3.6% per year. TASS provides the incubation period for each fund, with the average being about one year; thus, to control for this bias the first twelve months of returns for each fund are dropped. My final sample includes 288 funds with at least 24 months of returns, $1 million in assets, and all of the manager and fund characteristic variables. Table 1 includes summary statistics of these variables.

As a brief summary, the average hedge fund manager in the sample is 47 years old, has 22 years of work experience, manages a fund of about $140 million dollars, and comes from an undergraduate institution with SAT scores of about 300 points over the national average. About half the managers in the sample have MBAs, and 70% of the managers use leverage and have their own money invested in their funds. Clearly, this is an experienced, well-educated group. In comparison, the average mutual fund manager[16] is about 3 years younger, has an

[14]Age is as of the end of the sample (December, 2000). This methodology follows Chevalier and Ellison (1999).

[15]See Appendix C for detail regarding the construction of this variable.

[16]This data is obtained from Chevalier and Ellison, 1999.

SAT score about 200 points lower, and is slightly more likely to have an MBA than the average hedge fund manager.

4. Excess Returns and Manager Characteristics

To examine the relationship between hedge fund returns and manager characteristics, a simple first regression is estimated. Two definitions of "excess return" are used. The first subtracts the 30-day Treasury bill rate from the monthly fund returns, while the second subtracts the average monthly return for that fund's style[17] from the fund's monthly return. The first definition is a measure of "absolute" performance, while the second is one of "relative" performance. Each month, a cross-sectional regression of hedge fund returns against manager characteristics is performed for a total of 84 regressions, as follows:

$$r_t^i = \alpha_t + \sum_{k=1}^{K} b_{k,t} M_{k,t}^i + \varepsilon_t \tag{1}$$

where r_t^i are monthly hedge fund returns in excess of the risk-free rate for fund i, and $M_{k,t}^i$ are k manager characteristics for fund i, including manager age (in months), indicator variables that equal 1 if a manager has a CFA, MBA, Ph.D., other advanced degree, or law degree and zero otherwise, the log of the average SAT score for the manager's undergraduate institution, number of months experience, and manager tenure in months. The resulting coefficients ($b_{k,t}$)'s are averaged over time ($\bar{b_k}$), and t-statistics are calculated as follows:

$$t_k = \frac{\bar{b_k}}{\frac{\sigma_k}{\sqrt{84}}} \tag{2}$$

where σ_k is the standard deviation of the residuals from each regression. Results from this regression are reported in the first column of Table 2.

With respect to the above variables, age, number of years experience, and tenure should capture skills associated with time spent working. We might expect that the more experience the manager has, the better his fund should perform. Additionally, the school and professional

[17] For a description of the 17 styles in the TASS database, see Appendix B.

designation variables attempt to measure the magnitude and quality of training. We would expect managers with better training to perform better.

While some of the above variables are fairly arbitrary in terms of selection, a few of them have a fair amount of theoretical and empirical backing. Specifically, tenure (and manager age) and possession of an MBA have been examined by prior researchers. With respect to the MBA degree, Spence's seminal signaling model (Spence, 1973, 1974) suggests that the possession of an MBA sends a signal to an employer (or an investor, in this case) that the individual is of "higher-quality" than a non-MBA, although the MBA adds **nothing** to the manager's actual productivity. Along these same lines, Pfeffer (1981) argues that an MBA does not have any substantive effect in the long run for either the holder or the company, but serves as a filtering device for matching up individuals and jobs. Finally, Hambrick and Mason (1984) cite research by Collins and Moore (1970) who claim that MBAs are probably not as innovative or risk-prone as more "self-made executives," and conclude that "the analytic techniques learned in an MBA program are geared primarily to avoiding big losses or mistakes." Based on this research, we might expect MBA's to have performance that does not differ from that of other managers, but to have volatility that is significantly lower than that of other managers. By contrast, more technical degrees, such as law, engineering, or a Ph.D. in the sciences may indeed be expected to add to manager skill.

Tenure (along with manager age) has been examined in the management, strategy, as well as the psychology literature. Although tenure and age measure different constructs, both serve a rough proxy for "experience." A variety of researchers (Pfeffer (1983), Wanous (1980), Staw (1982), Katz (1982), Salancik (1977), and Alutto and Hrebiniak (1975)) show both theoretically and empirically that managers with long tenure tend to have less volatile returns, more commitment to the "status quo", desire for conformity, less corporate growth, and resistance to change even if change is warranted. Vancil (1987) and Coffee (1988) argue that longer-tenured (and older) managers have far more to lose by taking on "unnecessary risks." Finally, Finkelstein and Hambrick (1990) perform an empirical study and find that long-tenured managers tend to conform to "central tendencies" with respect to strategy, and had returns close to "industry averages."

Additionally, in the labor economics and finance literature, Prendergast and Stole (1996) argue that young managers will take bold actions to differentiate themselves, while older managers are more committed to their prior actions, with the result that "youngsters" take on too much risk, while "old-timers" are too risk-averse. Finally, Zweibel (1995) argues that, depending on the quality of the manager, long-tenured managers may be more or less likely to innovate (if quality is very high, they will innovate, but otherwise, they will become more conservative.) Thus, given the above literature, we might expect managers with longer tenure to be average or below-average performers, but also to take on below-average risk.

In the first regression (equation (1)), two of the manager characteristics are significant. As noted earlier, manager tenure is negatively correlated with performance (and is significant at the 1% level). This result is consistent with Chevalier and Ellison, who found that manager age was negatively related to performance. Also, having a Ph.D. designation is significant (at the 5% level) and positively related to performance. However, as only eight of the managers in the sample have Ph.D's, this result should be interpreted with caution. It is important to examine the likely cause of these initial results. It may be that market factors (like returns on various indices or risk factors such as size and book-to-market) are able to explain the differences in returns we observe above. Or perhaps there are systematic differences in fund characteristics (such as fees, leverage, and redemption terms) or risk-taking behavior of managers that, when properly controlled for, will explain the above results.

4.1 Fund Characteristics

Below, the fund characteristics that will be used in the regressions in Section 4.3 are discussed. The fund characteristics include: separate indicator variables that equal 1 in the following cases (and zero otherwise): the fund is headquartered onshore, the fund is open to new investment, the fund is open to non-accredited investors, the fund is listed on a stock exchange, the fund uses leverage, the fund includes an investment of the manager's capital, the fund style is US long/short equity, the fund style is relative value, the fund style is event driven, or the fund style is European equity.[18] Although other styles are represented in the sample, the above four styles capture about 70% of the funds in the sample. Other fund characteristic

[18]See Appendix B for a description of the possible fund styles.

variables include incentive fee,[19] management fee, log of fund size, log of minimum investment, and log of redemption frequency.[20]

These variables can be loosely categorized into their expected impact on hedge fund manager behavior. Funds with high incentive fees, funds that are organized onshore (see Footnote 10, above), and manager's personal capital invested align the goals of the manager with those of the investors. As a brief review of relevant literature, with respect to incentive fees, Starks (1987) studies the impact of incentive contracts on investment decisions, and find that bonus plans (which best describe hedge fund incentive plans as they are non-symmetric in nature)[21] enhance managerial effort relative to no incentives. Carpenter (2000) proposes a model showing that increases in incentive fees decrease managerial risk-taking. Finally, BGP study the tendency of hedge fund managers who are down for the first half of the year to take risks in order to earn their incentive fees, and find insignificant changes in risk-taking behavior. They argue that reputation concerns effects outweigh the desire to earn the incentive fee for most managers.

By contrast, high management fees (fixed and charged as a percentage of assets) might encourage a manager to allow the fund to grow too large to effectively implement his strategy. In the same vein, low minimum investments, being open to non-accredited investors, and organizing offshore (See Footnote 10, above) might also be indications that a manager is willing to allow his fund to grow too large. This stated, size itself is a difficult variable to analyze. Funds that attract new money due to strong performance will grow larger, so there is an endogeneity problem here. Funds need to be a certain size to make them worth managing, but how large is too large? This question is hard to answer empirically. Thus, the size variable is not included in the following regressions.

Using leverage and having infrequent redemption periods may imply inappropriate risk-taking; however, positive loadings on these variables may also imply that managers are fully exploiting their proprietary trading strategies, which may be long-term in nature, for the benefit of the investors. Finally, style variables reflect the type of trading that managers engage in, and we might expect certain types of manager (those with specialized training, for example) to

[19] Most funds charge an annual incentive fee which is stated as a percentage of profits. The median incentive fee in the sample is 20%.

[20] This variable measures how many times during the year investors are permitted to withdraw money from the fund. The mean is monthly and the median is quarterly.

[21] Hedge fund incentive fee pay a manager who makes profits, but do not penalize a manager who loses money

gravitate towards certain styles.

4.2 Market Exposure

In addition to fund characteristic variables, market exposure must be controlled for in order to test the significance of the relationship of manager variables with performance. In this examination, two separate measurements of the "market portfolio" have been chosen. The first includes passive indices, other factor portfolios (like size and book-to-market), and option returns, while the second uses hedge fund indices as right-hand side variables. In order to utilize all the data available, two-step, Fama-Macbeth (1973) style regressions are performed. First, I perform time-series regressions where "betas" for each fund for each market are calculated, and then these betas are used in cross-sectional regressions as measures of market exposure. One well-documented problem with this sort of regression is that it introduces error into the cross-sectional regression. If the time-series coefficients are estimated with error, the results from the cross-sectional regression may be over- or under- stated. To control for errors-in-variables, regressions are performed using portfolios of hedge funds. As Fama and Macbeth (also see Fama and French, 1992 and 1993)describe, the formation of portfolios causes the errors to "average out", and thus, to be less problematic in the following regressions. Fama and Macbeth estimate betas over one period (the formation period), and group funds into portfolios based on these betas in order to estimate betas in following periods. However, the hedge fund data available does not allow this luxury – the time-series is simply too short. Therefore, all the data is used in the regressions, which are described as follows. First, the time-series coefficient (beta) for each fund is estimated, using a single-factor model:

$$r_t^i = \alpha_i + \ b_i FOF_t + \varepsilon_i \tag{3}$$

where FOF is the equally-weighted fund-of-funds index. A definition is in order here. A fund-of-funds is a professionally managed hedge fund that consists of a number of individual hedge funds. Fund-of-funds are appealing to investors since the manager selects funds specifically to diversify across hedge fund styles, as well as to reduce the risk associated with investing in hedge funds individually. Also, investing in a well-diversified fund-of-funds saves an investor significant search costs in identifying a "good" hedge fund for investment. Fung and Hsieh

(1999) argue that an index created from fund-of-funds returns is an appropriate benchmark for hedge funds, as it is generally free of survivorship bias and should represent a well-diversified portfolio of hedge funds. Therefore, a fund of funds benchmark is created by equally-weighting the returns of all fund of funds in the database (277 funds). This index is used as the "market" index above. Funds are then sorted first by size and next by "fund-of-funds" beta into quintiles, and 25 portfolios are formed. These portfolios are then used in the time-series regressions to calculate passive and hedge fund index market exposures. The contemporaneous use of the sorting and estimation allows full utilization of all the time-series data and should reduce the errors-in-variables problem significantly.

Once the portfolios are formed, equally-weighted averages of excess returns (returns in excess of the risk-free rate) are calculated. These portfolio returns (r_p's) are then used in a time-series specification, where they are regressed against the passive indices (regression 1) and hedge fund indices (regression 2), as follows:

$$r^i_{pt} = \alpha_i + \sum_{k=1}^{K} e_{k,p} P_{k,t} + \varepsilon_i \tag{4}$$

where r^i_{pt} are monthly portfolio returns in excess of the risk-free rate, and $P_{k,t}$ are k returns on a variety of passive indices, other risk factors, and option returns. Thus, 25 regressions were performed (i=25) and the time-series for each regression was 84 months. As hedge funds invest in a variety of markets, a large number of passive indices were used, as well as other factors shown by various researchers to explain returns of both stocks, bonds, and mutual funds. The market indices used (all obtained from Datastream) include: the US Trade Weighted Dollar index to capture currency risk, gold and commodity indices, the Lehman Brothers Eurobond, 30-year Treasury bond, and US aggregate bond indices, and the S&P 500, Wilshire 5000, and MSCI Eafe stock market indices. Additionally included are the Fama-French (1992,1993) SMB (a zero-investment portfolio constructed by subtracting the returns of large market capitalization firms from the returns of small capitalization firms) and HML (a zero investment portfolio constructed by subtracting the returns of low book to market ratio stocks from the returns of high book to market ratio stocks) factors, as well as Jegadeesh and Titman's (1994) MOM (a zero-investment portfolio constructed as the spread between the performance of stocks which were in the top 30% of returns in the prior twelve months and those which were in the bottom

30%).[22]

Additionally, hedge fund returns are often non-linear in nature, reflecting their frequent use of dynamic trading strategies. Fung and Hsieh (1997, 2001) show that Global/Macro funds deliver "collar"-like payoffs, while trend follows exhibit a "lookback-straddle"-like payoff. Mitchell and Pulvino (2001) demonstrate that risk arbitrage strategy payoffs are similar to the return of writing an uncovered put option on the market. Finally, Agarwal and Naik (2000) show that a few simple option writing/buying strategies are able to explain a significant proportion of variation in hedge fund returns over time. Thus, four option trading strategies are also included as regressors. For each passive index listed above, the returns from investing in call or put options on each index were calculated in three ways (following Agarwal and Naik): in-the-money, out-of-the-money (where the exercise price is half a standard deviation away from that of the at-the-money option), and way out-of-the-money (where the exercise price is one standard deviation away from the at-the-money option.) Option prices were calculated using the Black-Scholes model. Equally-weighted averages of the long call, short call, long put, and short put returns, were then calculated and these averages were used as regressors. Including these variables adds explanatory power to the regression, which is present regardless of whether the options are at-the-money, out-of-the-money, or way out-of-the-money. Thus, the best fit model (which uses the out-of-the-money options) was selected.

The second regression applies the same in methodology as the first, but uses hedge fund indices as the "market" variables. Recently, this approach was used by Lhabitant (2001). Credit Suisse First Boston (CSFB) and TASS jointly publish hedge fund indices on a monthly basis, which represent a variety of hedge fund styles. To be included in the index, CSFB/TASS require that funds have at least $10 million in assets and provide audited financial statements; there are about 300 funds in the indices. Returns are computed on a monthly basis and asset-weighted, and funds are reselected quarterly to be included in the index. In order to minimize survivorship bias, funds are not excluded until they are liquidated or fail to meet the financial reporting requirements. For further detail about the indices used, see Appendix A. Due to the way they are constructed, these indices should be good proxies for the specific risks faced by hedge funds.

[22] These returns were obtained from the website of Kenneth French.

By design, the sample period coincides with the availability of these indices. Coefficients from these regressions are then used as controls for market exposure in the regressions that follow.

4.3 Controls for Fund Characteristics and Market Exposure

The next regression includes controls for fund characteristics as well as market exposures (it is performed for both passive and hedge fund indices), and is performed cross-sectionally and monthly, as follows:

$$r_t^i = a_t + \sum_{k=1}^{K} b_{k,t} M_k^i + \sum_{j=1}^{J} c_{j,t} F_{j,t}^i + \sum_{l=1}^{L} d_{l,t} e_l^i + \varepsilon_t \tag{5}$$

where the M_k^i's are the manager characteristic variables, the F_j^i's are the fund characteristic variables, and the e_l^i's are the coefficients from the time-series regressions on passive (or hedge fund) indices. Results from these regressions are shown in Panel B, columns 2 and 3 of Table 2. Note that in these regressions i=288 and number of regressions (monthly)=84 as each fund (not the portfolio of funds) is used. The coefficient on manager tenure remains negative, and becomes even more significant. Additionally, the coefficient on MBA becomes negative and significant (although marginally so in the regression that controls for hedge fund exposures.) These relationships will be analyzed further in the next section.

Additionally, it is worthwhile to summarize the relationship of fund characteristics and performance, while controlling for manager characteristics and market exposure, in order to compare the results with other research. Consistent with Liang and AMR, incentive fees are positively related to performance, suggesting that the incentive contracts in these funds are properly aligning manager and investor goals. Also, funds that are still open and funds that are listed on exchanges perform worse than average. Being open to new investment implies that the fund has not grown as fast as other, more successful funds. Being listed on an exchange implies that these managers are more willing to disclose proprietary information about their funds to the public, perhaps limiting their ability to use arbitrage strategies as effectively as funds that are not listed. Onshore funds perform better than offshore funds, in contrast to Liang's finding, and during this time frame, US Long/Short Equity and Event Driven styles outperformed other styles.

Finally, the relationship between fund and manager characteristics is examined to attempt to shed some light upon the negative coefficients on tenure and MBA. A number of cross-sectional regressions are performed (as follows):

$$F^i = \alpha + \sum_{k=1}^{K} b_k M_k^i + \varepsilon \tag{6}$$

where(F^i)is each of the fund characteristics described above, and (M_k^i)are the manager characteristics. For the discrete variables, a probit regression is used. Results are reported in Table 3. Panel A shows the results for the probit regressions, with significance tests (following a chi-squared distribution) shown in parentheses. Panel B reports the results from the continuous regressions, with t-statistics shown in parentheses.

With respect to tenure, longer-tenured managers are more likely to have onshore funds, larger funds, and to have their own personal capital invested in their funds. Additionally, their style of choice is event-driven, being very unlikely to have U.S. long/short equity style funds. MBAs are less likely to have funds that are open to the public, are likely to have event-driven style funds, and have less frequent redemption and entrance terms than average. While these results are significant, they do not shed much light on why MBAs and longer-tenured managers have lower returns, on average. To examine this result further, a volatility analysis is performed in Section 5.

5. Volatility and Manager Characteristics

In this section, the relationship between volatility and volatility-adjusted returns of hedge funds and manager characteristics is studied. Modern Portfolio Theory (pioneered by Markowitz, 1952) assumes that for a given level of return, risk-averse investors wish to select the portfolio that provides the minimum variance. A commonly-used measure of risk-adjusted return is the Sharpe ratio (Sharpe, 1966), which is calculated by dividing excess returns (over the risk-free rate or over an index) by the standard deviation of the excess returns. A positive Sharpe ratio implies positive risk-adjusted returns, so the higher the Sharpe ratio, the more performance per unit of risk the fund is attaining.

Calculating volatility-adjusted returns is commonplace in the managed fund industry. With respect to hedge funds, anecdotal evidence implies that this calculation is indeed relevant, as many investors add hedge funds to their portfolios in order to diversify their overall risk. Comparing funds based on volatility-adjusted returns may well yield different results than above, particularly with respect to manager characteristics. Additionally, as shown by BGP, volatility is related to fund survival. To the extent that fund managers are aware of this, and are concerned about survival, it is possible that funds actively "manage" volatility in order to preserve their reputations and increase their probability of survival. This relationship is examined in detail in Section 6.

In this section, two measures of volatility are calculated: standard deviation and downside deviation. Correspondingly, two measures of volatility-adjusted return are calculated: the Sharpe ratio (described above), and the downside risk ratio.[23] In the hedge fund community, the measures of downside deviation and downside risk are often calculated by managers, consultants, and analysts. They are based on the concept that most investors would prefer to limit downside volatility. A fund that has mostly upside surprises will be valued more highly than one with mostly downside surprises, but the traditional measure of standard deviation does not allow differentiation between these two types of movements. Downside deviation is calculated by first defining a "minimum acceptable return" below which returns are considered to be "low". Using zero as the minimum acceptable return[24] the downside deviation is calculated as follows:

Let R_{mar} = Minimal Acceptable Return

Let R_I = Return in month I

Let L_I =Min(0,R_I-R_{mar})

Let N= Number of periods when$L_I < 0$

$$DownsideDeviation(DD) = \sqrt{\sum_{n=1}^{N} {L_I}^2/N} \tag{7}$$

[23] This ratio is also known as the Sortino Ratio.

[24] I also calculate these measures using the risk-free rate as the minimum acceptable return, and the results are qualitatively similar.

In this paper, the minimal acceptable return is set to zero. The Downside Risk Ratio measures returns per unit of downside risk. It is measured as:

$$DownsideRiskRatio = \frac{R_I - Rmar}{DD} \tag{8}$$

For this analysis, annual measures of standard deviation, downside deviation, Sharpe ratio, and downside risk ratio are calculated. Using the manager, fund, and market risk measures from the prior section, annual cross sectional regressions are estimated as follows:

$$MeasureofVol.orVol.Adj.Ret._t^i = a_t + \sum_{k=1}^{K} b_{k,t} M_k^i + \sum_{j=1}^{J} c_{j,t} F_j^i + \sum_{l=1}^{L} d_{l,t} e_l^i + \varepsilon_t \tag{9}$$

where the M_k^i's are the manager characteristic variables, the F_j^i's are the fund characteristic variables, and the e_l^i's are the coefficients from the time-series regressions on passive (or hedge fund) indices.

Four separate sets of annual regressions are estimated (t=7; i=288), using the standard deviation, Sharpe ratio, downside deviation, and downside risk ratio as the dependent variables. Results are reported in Table 4. Panel A contains the regressions using the volatility measures (standard and downside deviation), while Panel B contains the results using the volatility-adjusted return measures.[25]

Focusing on Panel A (the volatility measures) we observe the increased explanatory power of the regressions. The R-squareds from the return regressions in Table 2 are about 21%, while the R-squareds from the volatility regressions are between 42% and 52%. Manager and fund characteristics (as well as funds' market exposures) have significantly more explanatory power with respect to volatility than to returns. This can be interpreted as managers having much more control over the risk levels of their portfolios (and exercising this control) than the ultimate returns realized.

The tenure variable has a large, negative and significant relationship to both standard deviation and downside deviation – managers with longer tenures have less volatile returns.

[25] The standard deviation, downside deviation, Sharpe ratio, and downside risk ratio are also calculated using industry-adjusted returns. Results from regressions using these measures are similar to the results reported in Table 4, so they are not reported here.

Additionally, MBAs have significantly lower standard deviation as well, and marginally significantly lower downside deviation. It appears that the lower raw and market-risk adjusted returns of longer tenured managers and managers with MBAs may be warranted – these managers take on less risk to achieve these returns. Other interesting patterns in the data show that CFAs and those with other advanced degrees take on less risk as well – while managers from high-SAT schools tend to take on more risk (although when the hedge fund indices are used as the "market", these results become less significant.) One interpretation may be that managers with either more experience or additional finance-related education beyond an undergraduate degree have learned better risk-management techniques than their bright, but less well-educated counterparts. An alternative explanation is that MBAs are "playing it safe" (as discussed by Hambrick and Mason (1984)), and high-SAT managers are actually taking on potentially value-adding, and perhaps appropriate, risk.

With respect to fund characteristics, funds that are open to the public tend to have higher volatility, while funds listed on exchanges have lower volatility. Consistent with the discussion in Section 4.3 above, funds that are open to the public are still trying to raise additional funds, and may be taking on risky strategies to try to achieve high returns and attract new money. Funds listed on exchanges are more heavily regulated, and thus, may be engaging in less risky strategies since these strategies are probably more apparent to the public than their non-listed counterparts. Managers with personal capital invested also have low standard deviation of returns – with their own money at stake, managers are likely more conservative. This result is not surprising, as it is consistent with the finding in Table 3 that longer-tenured managers are significantly likely to have their own money invested in their funds (and longer-tenured managers have lower volatility). The event-driven style (which had high non-volatility adjusted returns) also has very low volatility. Finally, the US equity style (which also has high non-volatility adjusted returns) has high standard deviation, but insignificant downside deviation, implying that these managers are taking on "good" risk but avoiding bad risk. The same is true for funds with high incentive fees – these managers appear to be avoiding downside risk as well.

Moving to Panel B (volatility-adjusted returns), the results are as expected. Due to their very low standard deviation and downside deviation, managers with longer tenures have insignificantly different than average volatility-adjusted returns. The same is true for MBAs – they take on less risk than average, making their volatility-adjusted returns about average. Additionally, due to their relatively high volatility, high-SAT managers have worse than average downside risk ratios, while their Sharpe ratios are marginally negative.

With respect to fund characteristics, as expected, both open and exchange-listed funds have worse than average volatility-adjusted returns. Managers with personal capital invested, due to their low standard and downside deviations, have better than average volatility-adjusted returns, as do European equity and event driven styles.

In summary, while manager characteristics are somewhat relevant in explaining hedge fund performance, they are very relevant in explaining hedge fund volatility. Certain types of managers systematically choose certain volatility levels, which should be a factor in their evaluation. Most important, the initial results regarding tenure and MBA designation disappear when volatility is considered in evaluating performance. Additionally, high-SAT managers take on significant volatility, such that while their non-volatility adjusted returns are insignificantly different than average, their volatility-adjusted returns are negative and significant.

6. Manager Characteristics and Survival

Given the above results, and the findings of BGP regarding fund survival, volatility, and manager tenure, an analysis of hedge fund survival and manager characteristics (as well as risk characteristics and returns) is performed below.

To perform this analysis, a time-varying proportional hazards model is utilized.[26] This model allows for complete use of the time-series variation in the sample of hedge fund data. Additionally, time-varying proportional hazards models (which are a category of the more general hazard functions) have several advantages over the more traditionally-used probit and logit models. First, they put fewer distributional assumptions on the data; second, they calculate the conditional rather than the absolute probability of failure (conditional upon not having failed in a prior period); and finally, they do not introduce sample-selection bias into the data by grouping it into one-year periods and estimating probit or logit models. Thus, instead of using

[26]Much of the following description closely follows Helwege, 1996.

annual failure rates, the more flexible proportional-hazards model allows for monthly failure times which reduces bias and adds precision to the estimates.

Proportional-hazards models are used fairly infrequently in the finance literature. Examples include Helwege (1996), who uses a proportional hazards model to examine the determinants of Savings and Loan failures in the 1980's, Lunde, Timmerman, and Blake (1999), who use the model to examine the determinants of mutual fund failures, and BGP who use this model to examine some of the determinants of hedge fund failure, notably volatility and manager tenure.

6.1 Description of Proportional Hazards Model

The time-varying proportional hazard model estimates the relationship between the hazard rate, $\lambda(t)$, and a number of explanatory variables, *z(t)*, that are permitted to vary over time. The proportional hazard function is specified so that the explanatory variables shift an underlying baseline hazard function up or down. The baseline hazard function, $\lambda_0(t)$, can follow any distribution for which proportionality holds. The time-varying proportional hazard function is described by the following equation:

$$\lambda(t; z(t)) = \lambda_0(t)e^{\beta z(t)} \tag{10}$$

where β is the set of coefficients to be estimated. The goal of this section is to estimate the coefficients on a set of manager, fund, risk, return, and "market" characteristics to determine whether they are significantly related to fund survival or failure.

Cox (1972) describes how β can be estimated by maximizing the partial likelihood function of the probability of failure observed in the sample. β is estimated from inferences on the conditional probability of failing in a given time period. Because of proportionality, the baseline hazard function is ignored in the estimation, which makes specifying a functional form for the baseline unnecessary.

Assume that there is a sample of n hedge funds, k of which fail during the sample period with failure times $t_1 < t_2 < ... < t_k$. The assumption of this model is that each failure occurs in a different time period, and the failures are ordered from 1 to k chronologically.[27] The

[27] This methodology assumes no ties (that is, no funds failed in the same period). In the sample of interest, there are several tied failure times, which will be addressed later. For simplicity, the case with no ties is described here.

remaining n-k funds are censored and have no failure times. Assign δ_i equal to 1 if a fund in period i fails and zero if it does not fail. Let $z_i(t)$ be $z(t)$ for the fund with failure time $t(i)$ and let $z_j(t)$ be $z(t)$ each fund at rims at time $t(i)$. R_i is the set of funds at risk of failure in period i. The partial likelihood function to be maximized is:

$$Ł(\beta) = \prod_{i=1}^{n} \left[\frac{e^{\beta z_i(t_i)}}{\sum_{\in R_i} e^{\beta z_j(t_i)}} \right]^{\delta_i} \tag{11}$$

Intuitively, equation (11) examines each hedge fund that fails (one per time period) and compares its explanatory variables to the explanatory variables on the set of hedge funds that could have failed during the period, but did not. If the values of the explanatory variables for those that failed differ from the values of the explanatory variables for those that survived, the coefficients will be significantly different from zero. Maximum likelihood estimation is used to estimate the partial likelihood function. Since this process is computationally demanding, an approximation (see Breslow (1974)) is usually used to save time and computer resources. However, the Breslow approximation can be less accurate when there are many tied failure times (as is the case in the hedge fund data.) Thus, the exact method (see Kalbfleisch and Prentice, 1980) is used for the following estimation.

6.2 Estimation of Proportional Hazards Model

In this section, the time-varying proportional hazards model is estimated, using the month that a fund drops out of the sample as the failure time for that fund. Because hedge funds voluntarily report data to the TASS database, there may be a number of reasons why funds stop reporting, including failure, merger, or a more arbitrary decision to stop, such as the fund manager felt that being included in the database was not helping him raise additional funds. While some of these reasons are associated with poor performance (e.g., failure), others are less clear-cut. In many cases, the reason for leaving the database is included in the fund's description.

Of the 288 funds in the sample, 57 funds are categorized by TASS as "dead" (no longer reporting to the database.) An investigation of the reasons for leaving was performed, with the results as follows: 5 funds left due to mergers, 31 left because "the manager requested the fund be removed", and the remaining 21 left due to "liquidation." The merged funds are considered to be alive up until the point of merger, and then excluded from further analysis. The model was estimated first by including only the "liquidated" funds as being "dead," and next by including all the funds that were removed as being dead. The results are comparable, suggesting that regardless of the manager's stated rationale for leaving the database, these funds were underperforming, and perhaps in danger of failure. Since the results are the same whether or not the 31 "manager requested" funds are included, results are including those funds are reported.

The set of manager and fund characteristics, as well as market indices to be modeled are the same as in previous sections. Additionally, since poor performance (as well as volatilty) is linked to fund failure by a variety of studies (notably Chevalier and Ellision, 1998, and BGP), these variables are included as well. Return variables include measures of the prior four quarters of returns (returns are measured in excess of the risk-free rate). Volatility measures include prior year's downside and standard deviation (the high correlation between these variables warrants separate estimation).

Using the exact method of estimation, the proportional hazards model is estimated. The results are in Table 5. A negative coefficient indicates a negative likelihood of failure, while a positive coefficient indicates a positive likelihood of failure. As expected, good returns are negatively related to failure, while high volatility (either total standard deviation or downside deviation only) is positively related to failure. With respect to manager and fund characteristics, two specifications are analyzed. The first, in column 4, includes fund, manager, style, and passive and hedge fund indices as explanatory variables. Manager age, manager tenure, and high SAT scores are negatively related to failure. While the tenure results (and to some degree, the age results) are not surprising given prior findings that longer-tenured managers take on less risk, the SAT result is unexpected. Although managers from high SAT schools take on more risk (see Table 4), they also have a greater chance of survival. Furthermore, both their raw and volatility-adjusted returns are insignificantly different from average. It appears that the additional volatility of these managers is not causing them to have a higher likelihood of failure.

The final model specification includes all the variables in column 4, with the additional controls for returns and standard deviation. The results with respect to tenure, age, and SAT still hold, so these results are not caused by spurious relationships between the variables and performance and volatility measures. Also of interest is that the MBA variable, although lower in average return and also in volatility, does not have a significant relationship to survival. That is, even though MBAs reduce risk, and as a result, have lower returns, they are not benefitting in any significant way from these actions – they are equally as likely to fail as their non-MBA counterparts. This relationship is consistent with the signaling model of Spence (see Section 4, above) and the argument of Pfeffer that perhaps having an MBA is simply a "signal" used by employers and investors to screen managers.

The tenure results are also consistent with a number of the arguments posed in Section 4 that longer-tenured managers are more risk-averse, are concerned with maintaining the "status quo" and keeping their jobs. These managers achieve their goals, as evidenced by their very high survival rates. It is difficult to place a value judgement on the upside of investing with these managers, but the data suggests that long-tenured managers would be "safer bets" for risk-averse investors than shorter-tenured managers. The returns are not stellar, but the probability that the fund will fail is much lower. The goals of the investor (risk-reduction versus profit-maximization), and how the fund fits into his overall portfolio (is it just to provide diversification, or is it the majority of his assets) will dictate whether a longer-tenured fund is a good choice.

Finally, a quick review of the fund characteristics as related to survival probability indicates that funds open to new investment have a higher probability of failure, which is consistent with the discussion in Section 4.3. Funds that are still open have not yet reached their target size, and are more willing to take risks to do so, resulting in a higher failure rate. The results on fees are inconclusive, while very high entrance frequencies are strongly related to failure. This argument is slightly different from that applied to open funds – if funds are willing to accept money very often, it may be more difficult to invest according to the fund's strategy every time new money is contributed. Thus, the manager will either have too much money in cash at any given time, or will have to select less than ideal investments to keep the cash fully invested. Either of these options is undesirable, and leads to higher potential for failure. Finally, over the time frame studied, event driven and relative value style funds were more likely to survive.

In summary, a time-varying proportional hazards model indicates that the above results on tenure (that tenure is negatively related to performance and volatility) are consistent with a "reputational concerns" story – that is, longer-tenured managers take on less risk than their shorter-tenured counterparts in order to survive, even at the cost of lower returns.

7. Conclusion

The most striking result of this analysis is that while there is some relationship between hedge fund manager characteristics and hedge fund "market-adjusted" performance, there is a much more significant relationship between hedge fund manager characteristics and volatility. Assuming that volatility is important to investors, this result has important implications – non-volatility adjusted returns imply that longer-tenured managers and, to a lesser degree, managers with MBAs are inferior. However, using volatility-adjusted measures, these managers are no longer inferior – they are not better, but they are no different from average. Additionally, the relationship between these factors and fund survival cannot be ignored. While longer-tenured managers appear to get a "payoff" (as defined by a higher survival rate) than shorter-tenured managers, MBAs do not get a similar payoff – their funds are just as likely, on average, to fail as funds managed by non-MBAs.

Further research into these results is warranted, with the most promising avenue being a thorough analysis of the tenure results. As discussed in Section 4, there is a great deal of labor, finance, management, and psychology theoretical literature regarding the relationship between manager tenure and risk-taking propensity. Many of the studies indicate that longer-tenured managers tend to take on less risk over time due to reputational concerns as well as increased conservatism (or even entrenchment), and the preliminary results from this paper support this view. However, a more systematic approach comparing risk-taking behavior across funds with different tenures, and within funds as they evolve is warranted. There are a number of ways to think about risk – with respect to return volatility, return deviation from industry averages, "boldness" in investment decisions, "herding" with other managers, and correlations with passive and other indices, to name just a few. Investigating these relationships both across funds at a given time and within funds across time is the subject of current research.

Appendix A
Description of Hedge Fund Indices
(Source: www.hedgeindex.com)

The methodology utilized in the CSFB/Tremont Hedge Fund Index starts by defining the universe it is measuring. Credit Suisse First Boston Tremont Index LLC) uses the TASS database, which tracks over 2,600 funds. The universe consists only of funds with a minimum of US \$10 million under management and a current audited financial statement. Funds are separated into primary sub-categories based on their investment style. The Index in all cases represents at least 85% of the assets under management in the universe. CSFB/Tremont analyzes the percentage of assets invested in each sub-category and selects funds for the Index based on those percentages, matching the shape of the Index to the shape of the universe. The Index is re-balanced monthly. Funds are re-selected on a quarterly basis as necessary. Only funds with audited financials are included. Funds must meet the Credit Suisse First Boston Tremont Index LLC reporting requirements. Funds are not removed from the Index until they are liquidated or fail to meet the financial reporting requirements. The objective is to minimize survivorship bias.

CONVERTIBLE ARBITRAGE
This strategy is identified by hedge investing in the convertible securities of a company. A typical investment is to be long the convertible bond and short the common stock of the same company. Positions are designed to generate profits from the fixed income security as well as the short sale of stock, while protecting principal from market moves.

DEDICATED SHORT BIAS Dedicated short sellers were once a robust category of hedge funds before the long bull market rendered the strategy difficult to implement. A new category, short biased, has emerged. The strategy is to maintain net short as opposed to pure short exposure. Short biased managers take short positions in mostly equities and derivatives. The short bias of a manager's portfolio must be constantly greater than zero to be classified in this category.

EMERGING MARKETS
This strategy involves equity or fixed income investing in emerging markets around the world. Because many emerging markets do not allow short selling, nor offer viable futures or other derivative products with which to hedge, emerging market investing often employs a long-only strategy.

EQUITY MARKET NEUTRAL
This investment strategy is designed to exploit equity market inefficiencies and usually involves being simultaneously long and short matched equity portfolios of the same size within a country. Market neutral portfolios are designed to be either beta or currency neutral, or both. Well-designed portfolios typically control for industry, sector, market capitalization, and other exposures. Leverage is often applied to enhance returns.

EVENT DRIVEN
This strategy is defined as 'special situations' investing designed to capture price movement generated by a significant pending corporate event such as a merger, corporate restructuring, liquidation, bankruptcy or reorganization. There are three popular sub-categories in event-driven strategies: risk (merger) arbitrage, distressed/high yield securities, and Regulation D.

FIXED INCOME ARBITRAGE
The fixed income arbitrageur aims to profit from price anomalies between related interest rate securities. Most managers trade globally with a goal of category includes interest rate swap arbitrage, US and non-US government bond arbitrage, forward yield curve arbitrage, and mortgage-backed securities arbitrage. The mortgage-backed market is primarily US-based, over-the-counter and particularly complex.

GLOBAL MACRO
Global macro managers carry long and short positions in any of the world's major capital or derivative markets. These positions reflect their views on overall market direction as influenced by major economic trends and or events. The portfolios of these funds can include stocks, bonds, currencies, and commodities in the form of cash or derivatives instruments. Most funds invest globally in both developed and emerging markets.

LONG-SHORT EQUITY
This directional strategy involves equity-oriented investing on both the long and short sides of the market. The objective is not to be market neutral. Managers have the ability to shift from value to growth, from small to medium to large capitalization stocks, and from a net long position to a net short position. Managers may use futures and options to hedge. The focus may be regional, such as long/short US or European equity, or sector specific, such as long and short technology or healthcare stocks. Long/short equity funds tend to build and hold portfolios that are substantially more concentrated than those of traditional stock funds.

MANAGED FUTURES
This strategy invests in listed financial and commodity futures markets and currency markets around the world. The managers are usually referred to as Commodity Trading Advisors, or CTAs. Trading disciplines are generally systematic or discretionary. Systematic traders tend to use price and market specific information (often technical) to make trading decisions, while discretionary managers use a judgmental approach.

Appendix B
Investment Style Categories
(Source: TASS)

US Long/Short Equity: The investment manager takes long and short positions in US equities.

European Equity Hedge: Same as above, with the European equities as the major focus.

Global/International Equity Hedge: Same as above with an international focus

Event Driven: The investment manager typically takes long or short positions in equities or debt instruments in anticipation of an event (i.e. corporate restructuring, planned joint venture etc) expected to cause substantial price movement.

Distressed Securities: The investment manager invests in the securities of bankrupt companies in 'Chapter 11 Status' in the US.

Risk Arbitrage/Deal Arbitrage: Strategy involves the simultaneous purchase of stock in a company being acquired and sale of stock in the acquiring company. Also called takeover arbitrage and merger arbitrage.

Special Situations: The investment focus is on take-over situations, as well as distressed/financially troubled securities. The manager looks for events that characteristically happen very rarely in the case of a company/issuer.

Relative Value: The manager looks to establish offsetting long and short positions in related primary or derivative markets based on the belief that one instrument or security is undervalued in terms of risk, liquidity and/or return relative to another.

Market Neutral: Strategies that, in theory, do not depend on directional movement in markets traded. Investment managers take offsetting long and short positions in related primary and derivative markets with the intention of capturing pricing inequities. While resulting profits can be impacted by market direction, positions should generate positive returns in either up or down markets.

Convertible Arbitrage: The investment manager simultaneously establishes long and short positions in different forms of convertible securities from the same corporate issuer, and in so doing, captures pricing inefficiencies between the different securities.

Statistical Arbitrage: The investment manager establishes long and short positions in related securities based on quantitative models that identify pricing inequities.

Fixed Income Arbitrage: The investment manager establishes long and short positions in related debt securities or derivative instruments.

Global Macro Discretionary: The investment manager utilizes fundamental and/or technical analysis to establish directional positions in any publicly traded market around the world. Typically, managers follow a "top down" analysis that attempts to identify the largest economic forces within the global economy and position accordingly through the debt, equity, currency or commodity markets.

Global Macro Systematic: The investment manager uses technical systems to establish directional positions in major primary and derivative markets around the world. Typically, investment decisions are generated by proprietary computer programs that dictate the specific buy and sell strategies.

Dedicated Short Seller: The investment manager attempts to identify securities that are over priced or which it is believed will decrease in value in the near future and establishes short positions.

Pure Currency Fund: The strategy is dedicated to trading currencies only. Different currency funds will employ various investment approaches, either fundamental/discretionary or technical/systematic. The strategy can be directional or arbitrage or both.

Pure Futures Fund: The strategy is implemented primarily in futures markets, though many managers will carry foreign exchange positions in the interbank market.

Pure Emerging Markets: The fund invests exclusively in the emerging market debt or equity markets. Emerging Market funds are the only "long only" funds listed on the TASS Database.

Appendix C
Construction of SAT Variable

In constructing the SAT variable, the source was Peterson's online.
(http://iiswinprd03.petersons.com/ugchannel/code/searches/srchCrit1.asp?sponsor=1)
This website allows searching by college, and reports average SAT scores for their incoming freshman classes. Most of the universities listed included ranges of scores for both verbal and math; in these cases, the midpoint was used as the average score. For some schools, only ACT scores were reported. Here, I converted the ACT scores to their SAT counterparts, and reported the median scores. Finally, some of the managers attended foreign universities. These managers were dropped from the sample, as these universities were not included in the database.

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Table 1: Summary Statistics

Number of funds = 288	Mean	Median	Max	Min	Std Dev	Skewness	Kurtosis
Monthly Return - Risk Free Rate	0.94%	0.74%	116.07%	-77.94%	5.04%	-0.354	4.428
CFA*	0.10						
CPA*	0.02						
MBA*	0.49						
Ph.D*	0.03						
Other Advanced Degree*	0.08						
Law Degree*	0.10						
Average SAT Score of Undergraduation Institution	1323	1361	1475	958			
Number of Years Experience	22	20	47	6			
Manager Age	47	44	72	31			
Size (as of 12/31/00) in millions	$141	$46	$1,617	$0.309			
Tenure (in years)	6.37	5.51	17.01	2.92			
Onshore*	0.53						
Open to New Investment*	0.85						
Open to Non-Accredited Investors*	0.10						
Listed on Exchange*	0.13						
Uses Leverage*	0.73						
Personal Capital Invested*	0.70						
Management Fee	1.20%	1.00%	3.00%	0.00%			
Incentive Fee	18.78%	20.00%	33.00%	0.00%			
Lockup Redemption Period (in months)	12	4	260	1			
Time Between Entrance Periods (in months)	18	12	260	1			
Minimum Investment (in thousands)	$913	$500	$25,000	$2			

*CFA, CPA, MBA, Ph.D.,Other Advanced Degree, Law Degree, Onshore, Open to New Investment, Open to Non-Accredited Investors, Listed on Exchange, Uses Leverage, and Personal Capital Invested are (0,1) indicator variables set to one if the value is "yes" and zero if the value is "no."

Table 2: Summary of Return Regressions

Description	Panel A: Ret. In Excess of Style Average 1	2	Panel B: Returns in Excess of Risk-Free Rate 1	3	4
	Estimate *t-value*	Estimate *t-value*	Estimate *t-value*	Estimate *t-value*	Estimate *t-value*
Intercept	0.0131	-0.0111	0.0166	-0.0026	-0.0052
	0.50	*-0.43*	*0.65*	*-0.08*	*-0.15*
CFA*	0.0004	0.0011	0.0017	-0.0011	-0.0005
	0.47	*1.25*	*1.60*	*-0.99*	*-0.44*
MBA*	-0.0007	-0.0010	-0.0008	**-0.0020**	-0.0015
	-0.62	*-0.92*	*-0.67*	***-2.04***	*-1.61*
Ph.D*	**0.0044**	**0.0045**	0.0009	0.0024	0.0007
	2.19	***2.03***	*0.31*	*1.06*	*0.30*
Other Advanced Degree*	-0.0002	0.0002	-0.0019	-0.0005	0.0000
	-0.11	*0.10*	*-1.02*	*-0.25*	*-0.01*
Law Degree*	0.0004	0.0006	-0.0007	-0.0017	-0.0014
	0.37	*0.51*	*-0.58*	*-1.26*	*-1.08*
SAT	-0.0005	0.0026	-0.0002	0.0026	0.0027
	-0.15	*0.74*	*-0.04*	*0.57*	*0.58*
Number of Years Experience	0.0000	0.0000	0.0001	0.0000	0.0000
	0.28	*0.54*	*0.36*	*1.06*	*0.76*
Manager Age	0.0000	0.0000	0.0000	0.0000	0.0000
	-1.21	*-1.42*	*-0.63*	*-1.52*	*-1.40*
Tenure (in years)	**0.0000**	**-0.0001**	**-0.0001**	**-0.0001**	**-0.0001**
	-3.54	***-6.00***	***-3.34***	***-5.87***	***-5.67***
Onshore*		**0.0028**		**0.0025**	**0.0025**
		3.11		***2.34***	***2.46***
Open to New Investment*		-0.0003		-0.0017	**-0.0023**
		-0.26		*-1.52*	***-2.15***
Open to Non-Accredited Investors*		-0.0009		-0.0006	-0.0002
		-0.59		*-0.28*	*-0.10*
Listed on Exchange*		-0.0002		-0.0003	-0.0002
		-0.69		*-0.83*	*-0.69*
Uses Leverage*		-0.0024		-0.0027	-0.0022
		-1.91		*-1.86*	*-1.64*
Personal Capital Invested*		0.0000		-0.0004	-0.0002
		0.02		*-0.44*	*-0.18*
Management Fee		**-0.0017**		-0.0005	-0.0008
		-2.05		*-0.53*	*-0.91*
Incentive Fee		0.0716		0.0797	0.0786
		0.78		*0.86*	*0.83*
Lockup Redemption Period (in months)		**0.0248**		0.0125	**0.0189**
		3.55		*1.43*	***2.03***
Time Between Ent. Periods (in months)		-0.0003		-0.0002	-0.0003
		-0.50		*-0.33*	*-0.59*
Minimum Investment (in thousands)		0.0003		-0.0005	0.0002
		0.55		*-0.92*	*0.34*
US Long/Short Equity Style				**0.0078**	**0.0076**
				3.82	***3.90***
European Equity Style				0.0021	0.0028
				0.73	*0.98*
Relative Value Style				0.0023	0.0025
				1.28	*1.33*
Event Driven Style				**0.0031**	**0.0032**
R-squared	0.028	0.032	0.034	0.223	0.206

Description: 1: Regressors include manager variables only
2: Regressors include manager and fund variables only
3: Regressors include manager, fund, and style variables, and passive index coefficients from time-series regressions (coefficients not shown to conserve space)
4: Regressors include manager, fund, and style variables, and hedge fund index coefficients from time-series regressions (coefficients not shown to conserve space)

Items in bold are significant at the 5% level

Table 3

Regression of Fund Characteristics and Tenure on Manager Characteristics

Panel A: Probit Regressions (Chi-Squared Values Shown Below Estimates)
N=288

Parameter	Onshore	Open to New Inv.	Open to Public	Listed on Exchange	Uses Leverage	Pers Cap Invested	US Equity Style	Rel. Value Style	Ev. Driven Style	Europe Eq. Style
Intercept	4.1056	*-10.2537*	**-15.0982**	-4.3741	8.6585	**-8.887**	6.9712	**20.0877**	**-19.1995**	**-114.238**
	0.74	*3.92*	**4.36**	0.51	2.93	**3.37**	2.07	**11.34**	**9.27**	**5.51**
Mgr. Age	0.0002	0.0009	-0.0001	0.0001	0.0009	0.0003	**0.0022**	-0.0011	*-0.0014*	0.0009
	0.08	1.59	0.03	0	1.92	0.23	**11.6**	1.46	*3.15*	0.35
Has CFA?	0.3786	0.141	0.1878	-0.415	-0.0623	-0.1374	**0.4875**	-0.5784	-0.1809	-5.9695
	2.65	0.29	0.36	1.34	0.07	0.36	**4.67**	2.45	0.4	0
Tenure	**0.0081**	0.0006	0.0018	-0.001	-0.0027	**0.0052**	**-0.006**	0	**0.0084**	-0.0061
	16.66	0.09	0.53	0.15	1.95	**6.18**	**9.11**	0	**15.06**	1.31
Other Adv. Degree	-0.3468	-0.1022	0.1115	-0.4991	0.29	-0.1193	-0.3003	0.2711	**-1.0259**	0.4919
	1.93	0.14	0.14	1.8	1.28	0.23	1.22	0.82	**5.6**	1.17
Law Degree	0.2142	-0.321	0.3649	*0.4204*	0.2339	0.1074	-0.3484	-0.1747	**0.8302**	-6.54
	0.85	1.74	1.82	*2.61*	0.92	0.2	1.94	0.3	**11.58**	0
Ph.D.	0.4469	-0.199	-5.7893	-0.3197	0.0754	-0.1455	**-0.8365**	**0.8418**	-0.4516	-5.5404
	1.35	0.24	0	0.37	0.04	0.16	**3.99**	**4.3**	0.57	0
Log SAT	-0.6656	**1.4727**	**1.9372**	0.4654	-1.2006	*1.2145*	-1.1109	**-2.8701**	**2.5284**	**15.5217**
	1	**4.16**	**3.72**	0.3	2.9	*3.25*	2.7	**12.03**	**8.29**	**5.33**
MBA	-0.0042	-0.1002	**-0.399**	-0.0957	0.1497	0.1022	-0.2222	-0.162	**0.4853**	-0.386
	0	0.43	**4.59**	0.31	1.13	0.52	2.47	0.79	**8.88**	0.88

Panel B: OLS Regressions (t-values Shown Below Estimates)

Parameter	Log size	Log Red. Frequency	Log Ent. Frequency	Log Min. Investment	Mgmt Fee	Incentive Fee	Tenure
Intercept	*12.7663*	1.5612	-4.8559	**-0.0510**	0.3002	**15.0899**	-179.5820
	1.82	0.36	-1.5	**-2.67**	1.35	**3.73**	-1.56
Mgr. Age	-0.0011	0.0006	0.0007	0.0000	0.0000	0.0002	**0.1000**
	-1.34	0.94	1.47	0.11	0.43	0.32	**5.04**
Has CFA?	0.3421	0.2027	-0.0292	**-0.0024**	-0.0200	0.2393	0.0322
	1.09	0.71	-0.12	**-3.42**	-1.43	1.15	0.01
Tenure	**0.0065**	0.0007	-0.0011	0.0000	-0.0001	-0.0018	
	2.62	0.38	-0.7	-1.34	-0.55	-0.65	
Other Adv. Degree	-0.3718	0.2563	0.0957	-0.0006	-0.0105	*-0.5732*	-0.6132
	-0.92	1.37	0.63	-0.48	-0.84	*-1.65*	-0.08
Law Degree	**0.8568**	-0.2265	-0.1157	**-0.0016**	0.0076	0.2691	-3.4525
	2.68	-1.08	-0.9	**-2.06**	1.06	1.16	-0.53
Ph.D.	0.3616	0.3017	0.3055	0.0024	-0.0126	-0.2300	-9.7866
	0.61	0.74	0.97	1.33	-0.61	-0.44	-0.96
Log SAT	0.6716	-0.0288	**0.9648**	**0.0090**	-0.0161	-0.2885	*28.8923*
	0.69	-0.05	**2.16**	**3.44**	-0.52	-0.51	*1.82*
MBA	0.1412	**-0.4108**	**-0.2396**	-0.0002	0.0029	0.1874	**-8.3641**
	0.71	**-3.07**	**-2.26**	-0.41	0.42	1.4	**-2.09**
Adj. R-Sq	**0.03**	**0.03**	**0.03**	**0.04**	**0.00**	**0.01**	**0.08**

Table 4: Volatility and Volatility-Adjusted Returns as Dependent Variables

Panel A: Volatility Measures

	Standard Deviation			Downside Deviation		
Description	**1**	**2**	**3**	**1**	**2**	**3**
	Estimate *t-value*	Estimate *t-value*	Estimate *t-value*	Estimate *t-value*	Estimate *t-value*	Estimate *t-value*
Intercept	**-0.1122**	-0.0530	-0.0438	**-0.1506**	-0.08067	-0.049275
	-2.01	*-0.94*	*-0.57*	***-2.10***	*-1.17*	*-0.58*
CFA*	**-0.0038**	**-0.0055**	**-0.0059**	**-0.0066**	**-0.00671**	**-0.00715**
	-2.50	***-2.43***	***-4.85***	***-2.58***	***-2.59***	***-3.35***
MBA*	**-0.0047**	**-0.0043**	**-0.0039**	**-0.00433**	-0.00455	**-0.004796**
	-5.70	***-3.12***	***-3.32***	***-2.54***	*-1.48*	***-1.96***
Ph.D*	**-0.0142**	0.0009	-0.0012	-0.00866	0.00465	0.00244
	-5.08	*0.19*	*-0.33*	*-1.92*	*0.84*	*0.47*
Other Advanced Degree*	0.0079	**-0.0097**	**-0.0080**	0.00645	**-0.00958**	-0.008352
	1.81	***-3.08***	***-2.84***	*1.38*	***-1.97***	*-1.46*
Law Degree*	**-0.0193**	-0.0085	-0.0056	**-0.01541**	-0.00676	-0.004651
	-5.29	*-1.70*	*-1.63*	***-3.07***	*-0.87*	*-0.92*
SAT	**0.0174**	**0.0164**	0.0153	**0.02163**	**0.02091**	0.017498
	2.56	***2.46***	*1.51*	***2.52***	***2.49***	*1.48*
Number of Years Experience	**-0.0002**	0.0000	0.0000	**-0.00016**	-0.00001	-0.000023
	-5.78	*0.12*	*-0.28*	***-4.51***	*-0.18*	*-0.56*
Manager Age	**0.0002**	0.0000	0.0000	**0.00016**	0	0.000007
	4.49	*-0.45*	*-0.18*	***4.20***	*-0.03*	*0.18*
Tenure (in years)	**-0.0002**	**-0.0002**	**-0.0002**	**-0.00013**	**-0.00015**	**-0.000136**
	-4.97	***-8.11***	***-6.83***	***-3.49***	***-2.54***	***-3.44***
Onshore*		0.0006	0.0014		-0.00086	0.000806
		0.27	*0.72*		*-0.43*	*0.44*
Open to New Investment*		0.0057	**0.0072**		0.0061	0.008327
		1.89	***2.48***		*1.24*	*1.76*
Open to Non-Acc. Investors*		**0.0073**	**0.0093**		0.00909	**0.01083**
		2.20	***5.18***		*1.59*	***2.34***
Listed on Exchange*		-0.0021	**-0.0016**		-0.00233	**-0.002497**
		-1.95	***-2.45***		*-1.75*	***-3.94***
Uses Leverage*		**-0.0144**	**-0.0100**		**-0.01384**	**-0.009271**
		-9.48	***-10.05***		***-5.18***	***-4.54***
Personal Capital Invested*		0.0031	**0.0027**		**0.00402**	**0.004128**
		1.81	***2.26***		***3.63***	***2.92***
Management Fee		**-0.0034**	**-0.0038**		-0.00034	0.000166
		-2.22	***-3.16***		*-0.14*	*0.09*
Incentive Fee		0.2653	0.1958		0.1904	0.08878
		1.80	*1.72*		*1.36*	*0.44*
Lockup Red. Period (in mos.)		**0.0600**	**0.0631**		0.01105	0.016499
		3.43	***3.30***		*0.51*	*0.83*
Time Betw. Ent. Pds. (in mos.)		0.0002	0.0000		**-0.00197**	**-0.00212**
		0.11	*-0.02*		***-2.01***	***-2.25***
Min. Investment (in thousands)		-0.0011	-0.0010		-0.00038	-0.001108
		-0.61	*-0.44*		*-0.27*	*-0.69*
US Long/Short Equity Style		**0.0077**	**0.0066**		0.00447	0.003826
		1.97	***2.80***		*0.87*	*1.00*
European Equity Style		**-0.0142**	**-0.0149**		**-0.01796**	**-0.018761**
		-6.48	***-5.05***		***-2.86***	***-5.58***
Relative Value Style		**-0.0153**	**-0.0160**		-0.00703	-0.01109
		-3.04	***-3.72***		*-0.78*	*-1.61*
Event Driven Style		**-0.0133**	**-0.0149**		**-0.01241**	**-0.015801**
		-6.83	***-10.54***		***-3.68***	***-10.28***
R-squared	0.037	0.527	0.520	0.043	0.436	0.426

Description: 1: Regressors include manager variables only

2: Regressors include manager, fund, and style variables, and passive index coefficients from time-series regressions (coefficients not shown to conserve space)

3: Regressors include manager, fund, and style variables, and hedge fund index coefficients from time-series regressions (coefficients not shown to conserve space)

Items in bold are significant at the 5% level

Table 4 (continued): Volatility and Volatility-Adjusted Returns as Dependent Variables

Panel B: Volatility-Adjusted Returns

Description	Sharpe Ratio			Downside Risk Ratio		
	1	2	3	1	2	3
	Estimate *t-value*	Estimate *t-value*	Estimate *t-value*	Estimate *t-value*	Estimate *t-value*	Estimate *t-value*
Intercept	**12.6166**	11.2980	11.1896	**89.8130**	**83.0300**	**78.5218**
	2.55	*1.94*	*1.74*	***4.25***	***3.94***	***3.12***
CFA*	-0.1521	0.0470	0.0443	-1.6829	-0.7000	-1.0960
	-1.04	*0.37*	*0.33*	*-1.83*	*-1.17*	*-1.52*
MBA*	0.0560	-0.1050	-0.0996	**1.3347**	0.4800	0.5726
	0.59	*-0.55*	*-0.72*	***3.29***	*0.53*	*1.25*
Ph.D*	-0.1349	-0.5190	-0.6846	0.2950	-5.0700	**-5.3911**
	-0.47	*-0.95*	*-1.49*	*0.23*	*-1.67*	***-2.50***
Other Advanced Degree*	-0.3021	0.6010	0.5234	-1.1895	3.9700	**3.4421**
	-1.43	*1.19*	*1.37*	*-1.28*	*1.48*	***2.13***
Law Degree*	**1.1387**	**0.7250**	**0.6912**	**6.7603**	**4.2200**	**3.9990**
	4.72	***2.32***	***2.50***	***4.75***	***2.39***	***2.62***
SAT	**-1.4228**	-1.4390	-1.5394	**-10.5905**	**-11.6400**	**-11.5083**
	-2.10	*-1.70*	*-1.65*	***-3.73***	***-4.07***	***-3.67***
Number of Years Experience	**0.0017**	0.0000	-0.0003	**0.0158**	0.0000	0.0004
	2.25	*0.00*	*-0.20*	***4.48***	*-0.03*	*0.07*
Manager Age	**-0.0029**	0.0000	-0.0001	**-0.0219**	0.0000	-0.0020
	-3.88	*-0.32*	*-0.08*	***-5.04***	*-0.20*	*-0.34*
Tenure (in years)	-0.0011	-0.0040	-0.0042	-0.0026	-0.0100	-0.0139
	-0.25	*-0.69*	*-0.86*	*-0.16*	*-0.29*	*-0.80*
Onshore*		0.2130	0.1850		1.2600	1.1097
		1.17	*1.16*		*1.46*	*1.72*
Open to New Investment*		**-0.9520**	**-0.9594**		**-4.3100**	**-4.3225**
		-4.70	***-5.25***		***-2.77***	***-3.04***
Open to Non-Acc. Investors*		**-0.7170**	**-0.6984**		-3.9800	**-3.6093**
		-2.08	***-2.52***		*-1.77*	***-2.24***
Listed on Exchange*		0.0280	0.0557		0.5500	0.6279
		0.48	*0.97*		*1.59*	*1.71*
Uses Leverage*		0.5590	0.4686		4.0600	3.0326
		1.42	*1.49*		*1.68*	*1.73*
Personal Capital Invested*		0.0490	0.1007		0.4500	0.6777
		0.23	*0.56*		*0.40*	*0.66*
Management Fee		**0.3490**	**0.3796**		**2.1800**	**2.4172**
		2.76	***2.60***		***2.18***	***2.49***
Incentive Fee		16.6490	14.8959		35.1800	18.7728
		1.82	*1.08*		*1.02*	*0.45*
Lockup Red. Period (in mos.)		1.7950	1.7786		4.5400	1.2362
		1.42	*1.46*		*0.63*	*0.24*
Time Betw. Ent. Pds. (in mos.)		-0.0400	-0.0938		0.4600	0.2137
		-0.43	*-1.01*		*0.80*	*0.37*
Min. Investment (in thousands)		0.1120	**0.1751**		**1.1200**	**1.3128**
		1.26	***2.06***		***3.63***	***4.28***
US Long/Short Equity Style		**0.4350**	**0.2942**		0.8900	0.2621
		3.36	***2.79***		*1.01*	*0.38*
European Equity Style		**0.8720**	**0.8763**		**3.6200**	**3.1426**
		2.01	***2.73***		***2.82***	***4.21***
Relative Value Style		0.8910	0.8367		4.3300	**4.7487**
		1.37	*1.36*		*1.86*	***2.28***
Event Driven Style		**0.9150**	**0.9045**		5.7300	**6.0882**
		3.21	***3.97***		*4.39*	***5.43***
R-squared	0.058	0.200	0.216	0.058	0.249	0.245

Description: 1: Regressors include manager variables only
2: Regressors include manager, fund, and style variables, and passive index coefficients from time-series regressions (coefficients not shown to conserve space)
3: Regressors include manager, fund, and style variables, and hedge fund index coefficients from time-series regressions (coefficients not shown to conserve space)

Items in bold are significant at the 5% level

Table 5: Survival Analysis -- Time-Varying Proportional Hazard Model

Model Specification*	1	2	3	4	5
	Estimate	**Estimate**	**Estimate**	**Estimate**	**Estimate**
	xsq-val	***xsq-val***	***xsq-val***	***xsq-val***	***xsq-val***
Return 1 Quarter Ago	**-2.1668**				**-3.4868**
	57.88				***6.45***
Return 2 Quarters Ago	**-2.1399**				-1.8458
	72.27				*2.08*
Return 3 Quarters Ago	**-2.0366**				-0.0684
	63.58				*0.00*
Return 4 Quarters Ago	**-1.9860**				**-3.2934**
	57.79				***8.17***
Annual Standard Deviation		**3.9994**			-11.9403
		11.97			*2.96*
Annual Downside Deviation			**8.1889**		
			89.66		
CFA				-0.4878	-1.1751
				0.52	*1.69*
MBA				-0.4431	0.2416
				2.55	*0.46*
Manager Age				**-0.0109**	**-0.0122**
				11.06	***9.36***
Ph.D.				0.0783	-0.7243
				0.01	*0.39*
Other Advanced Degree				-0.0409	0.3993
				0.01	*0.56*
Law Degree				0.1493	0.0024
				0.06	*0.00*
log SAT				**-2.6324**	**-4.0419**
				3.93	***4.00***
Manager Tenure				**-0.0640**	**-0.0426**
				37.39	***10.80***
Onshore				-0.2724	-0.3739
				0.83	*1.06*
Open to New Inv.				**2.0458**	**3.1810**
				9.15	***7.54***
Open to Non-Accr. Inv				-0.5517	**-2.6825**
				0.67	***4.56***
Min. Investment				**-0.2835**	0.1604
				6.23	*1.06*
Listed on Exchange				**-1.8964**	-0.6120
				9.51	*0.66*
Uses Leverage				0.2027	0.4399
				0.35	*0.83*
Pers. Cap. Invested				-0.4646	0.0986
				1.61	*0.04*
log Management Fee				-31.0831	**-68.1920**
				1.55	***5.09***
log Incentive Fee				**10.6939**	6.5449
				9.19	*2.42*
Lockup Pd (in mos.)				-0.0280	0.2407
				0.02	*1.13*
Entrance Freq (in mos.)				**1.0874**	**1.1001**
				25.27	***20.68***
US Long/Short Eqity				0.2685	0.0815
				0.69	*0.00*
Eur. Equity Style				-14.5139	**-12.9124**
				0.00	***9.39***
Event Driven Style				**-2.1105**	**-2.4173**
				11.14	***4.09***
Relative Value Style				-0.6582	**-1.1194**
				2.27	***4.09***

*Description:
1: Regressors include prior return variables only
2: Regressor includes standard deviation variable only
3: Regressor includes downside deviation variable only
4: Regressors include manager, fund, and style variables, and passive and hedge fund index returns (coefficients not shown to conserve space)
5: Regressors include return, risk, manager, fund, and style variables, and passive index and hedge fund index returns (coefficients not shown to conserve space)

Items in bold are significant at the 5% level