

Offshore Hedge Funds: Survival & Performance 1989 - 1995

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Abstract

We examine the performance of the off-shore hedge fund industry over the period 1989 through 1995 using a database that includes both defunct and currently operating funds. The industry is characterized by high attrition rates of funds, low covariance with the U.S. stock market, evidence consistent with positive risk-adjusted returns over the time, but little evidence of differential manager skill.

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I. Introduction

A few highly successful managers over the past two decades have brought attention to the small but interesting class of investment vehicles known as hedge funds. The largest of these, the multibillion dollar Quantum Fund managed by George Soros, boasts compounded annual returns exceeding 30% for more than two decades. These superior returns have attracted both institutional and private investors. Hedge funds are similar to mutual funds in that they are actively managed investment portfolios holding positions in publically traded securities. Unlike mutual funds, they have broad flexibility in the types of securities they hold and the types of positions they take. In addition, they can invest in international and domestic equities and debt, and the entire array of traded derivative securities. They may take undiversified positions, sell short and lever up the portfolio. A recent study of hedge funds by Fung and Hsieh (1997) shows how dramatically hedge fund strategies differ from those of open-end equity mutual fund managers. Their application of Sharpe's (1992) style analysis to a sample of monthly hedge fund returns reveals that hedge funds actively shift their factor exposures, and this dynamic activity makes performance measurement difficult.

Despite the problems of performance measurement, the most interesting feature of hedge funds is that they are thought of as nearly pure "bets" on manager skill. These funds were conceived as market-neutral investment vehicles that pursued strategies akin to "arbitrage in expectations."¹ Hedge fund managers seek out and exploit mis-pricing of securities using a variety of financial instruments. They produce superior performance, and they are not judged by their ability to track a passive benchmark. As a result, the compensation structure within the industry is based largely on performance. Compensation terms typically include a minimum investment, an annual fee of 1% -

2%, and an incentive fee of 5% to 25% of annual profits. The incentive fee is usually benchmarked at 0% return each year, or against an index such as the U.S. or U.K. treasury rate. This compensation structure usually includes a “high water mark” provision that adds past unmet thresholds to current ones. This asymmetric payoff to the manager has obvious implications for manager incentives: he or she is rewarded when the fund does well, and receives a baseline compensation when it does poorly. This compensation is effectively an at-the-money call option on up to a quarter of the portfolio every year, plus a fixed fee to cover operating expenses. Clearly, hedge fund operators are paid to take risks, and the further implication is that investors believe that the manager has the skill to offset the high cost of the option. The downside to managing hedge funds is that they frequently disappear. The rate of attrition of hedge funds is relatively high. Few funds -- or fund managers -- survive more than three years.

In this paper we examine the performance of the universe of offshore hedge funds over the period 1989 through 1995. To address the crucial problem of survival, we develop a database of annual offshore fund returns that includes both defunct funds and funds currently in operation. We use the data to investigate hedge fund performance, and the question of performance persistence among hedge fund managers. Our data differ from that used in Fung and Hsieh (1997) in three important respects. First, it is annual data after fees, while the Fung and Hsieh (1997) use monthly data.² This is a potential drawback, since it limits the ability to draw reliable statistical inferences from the time series of annual returns. On the other hand, the monthly data does not correspond to the normal reporting period for hedge funds and does not represent the month end holding period return to investors. Typically, manager fees are calculated at the end of the year, and high water mark thresholds are set according to end of the year asset values. In addition, our database includes defunct

funds. This allows us to estimate the rate of attrition in the hedge fund universe and the effect of this attrition on measured returns. Finally, it is a sample of off-shore funds gathered by a major data source. It does not include commodity trading advisors (CTAs) but it does include “Funds-of-Funds” which presumably themselves invest in funds in the sample. These differences are useful, because they make our sample complementary to Fung and Hsieh’s (1997) database and allow us to examine the role that survivorship plays in ex post fund performance evaluation. Our samples are different and our goals in this study differ as well. Fung and Hsieh are more interested in the conduct of hedge fund managers and study returns-based style attribution in this context. We are more interested in the performance of hedge funds in the period since 1989 and investigate whether returns to hedge fund investors are predictable from past reported returns.

1.2 Background and History of the Hedge Fund Industry

The development of the hedge fund is commonly attributed to Alfred Winslow Jones, a sociologist turned journalist turned fund manager. On assignment to *Fortune* magazine in 1949, Jones investigated technical methods of market analysis. His article “Fashions in Forecasting” reported on the new, post-depression class of stock-market timers and the strange schemes — statistical and otherwise — they employed to call the market. These ranged from volume/price ratios to odd-lot statistics to the outcome of the Yale-Harvard football game. Apparently a quick study, Jones went from novice to master overnight. Two months before the *Fortune* article went to press, Jones had established an investment fund as a general partnership, with several characteristics which now distinguish hedge funds.³ Jones developed the notion of a hedge fund as a market neutral strategy, by which long positions in undervalued securities would be offset and partially funded by

short positions in others. This “hedged” position effectively leveraged investment capital, and allowed large bets with limited resources. Jones’ other innovation was an incentive fee. According to Ted Calwell’s (1995) account of Jones’ original investment fund, the compensation was 20% of realized profit — no high water marks and no fixed fee. Over the next decade, Alfred Winslow Jones produced a handful of imitators, some of whom he had trained.

Another *Fortune* article, this one in 1966 about Alfred Winslow Jones, actually coined the term “hedge fund” to describe his market neutral strategy. Carol Loomis’ *Fortune* article, “The Jones Nobody Keeps Up With,” described the structure of the fund, and the incentive compensation arrangements in detail.⁴ The next few years produced a flurry of imitators, and the development of a hedge fund industry. Many funds begun in this era borrowed the fee structure, but not necessarily the “hedge” philosophy.

The hedge fund industry has grown dramatically since the 1960's. The current form of most U.S. hedge funds is now a limited partnership, or a limited liability company established to invest in public securities. There is no common definition of a hedge fund. Hedge funds are defined by their freedom from regulatory controls stipulated by the Investment Company Act of 1940. These controls limit fund leverage, short selling, holding shares of other investment companies, and holding more than 10% of the shares of any single company. For regulatory purposes before 1996, hedge funds had to limit the number of investors to 99 to qualify for exclusion from regulations governing public issuance of securities, including restrictions on public advertising and solicitation of investors. In 1996, the National Securities Markets Improvement Act modified the Investment Company Act by raising the ceiling on the number of U.S. investors allowed in unregulated funds to 500. In addition, recent rules by the SEC have further broadened the ability of hedge funds to attract individual and

institutional money. Hedge funds can accept money from "qualified investors," who have \$5 million in capital to invest, and a sophisticated understanding of the financial markets. In addition, they can accept money from institutions such as pension funds who have at least \$25 million in capital. Taken together, these changes can only serve to increase the size and importance of this class of investment. However, the absence of regulatory oversight means that reliable data on hedge funds is hard to come by, and a careful analysis of the conduct and performance of this sector of the market is difficult.

Because hedge funds are limited in their ability and motivation to make themselves and their performance known due to SEC regulations, estimating the size of the hedge fund universe is difficult. Van Hedge Fund Advisors, a Nashville-based investment advisor estimates that 3,000 hedge funds were operating in 1994 with a total asset value of \$140 billion. Simultaneously, 1,100 off-shore funds were in operation with assets of \$96 billion.⁵ *Managed Account Reports*, [MAR] a major source of data on hedge fund performance, estimates the industry size in 1996 at \$100 billion managed by 2,000 funds, of which 44% are offshore.⁶ In each case, the estimates come from industry participants. Collecting reliable data on these funds is a challenge. Fung and Hsieh (1997), for example, compiled data through 1995 on 309 hedge funds, after excluding funds of funds, funds with less than three years of history and funds with less than \$10 million in assets. Before these exclusions, the hedge fund universe included 701 funds, representing more than \$72 billion in 1995. The 399 funds extant in our database in 1995 represent more than \$40 billion. Thus, we have a somewhat smaller universe of current funds than might be obtained by including on-shore funds. However, both Fung and Hsieh and our own samples appear to capture a substantial portion of the hedge fund universe claimed by industry participants.

With an industry size in the tens to hundreds of billions, hedge funds might appear to be an insignificant portion of the investment business. A single mutual fund company such as Fidelity, for example, might have more money under management than the entire hedge fund industry. However, the size of the industry is a poor measure of its importance in the capital markets. For many funds, investment dollars placed in margin accounts lever their position many times. The actions of a single hedge fund manager using custom derivative equity investments have been thought to move the Dow by as much as ten points. The increased volatility of the world's debt markets in the 1990's has been rightly or wrongly attributed to the participation of "global macro" funds in the currency and international fixed income markets.⁷

1.3 Offshore Hedge Funds

Offshore hedge funds differ from domestic vehicles, in that they are typically corporations registered in a tax-haven such as the British Virgin Islands, the Bahamas, Bermuda, the Cayman Islands, Dublin and Luxembourg, where tax liabilities to non-U.S. citizens are minimal. Most major hedge funds in the United States commonly have an offshore vehicle set up to invest alongside U.S. based limited partnerships, *pari passu*. The reason for this is straightforward. U.S. hedge funds must limit the number of accounts. Thus, the off-shore vehicle is a means to raise additional capital from non-U.S. investors. Tax implications for investors in off-shore funds also differ. Such funds provide non-U.S. investors the opportunity to avoid taxation.

While the offshore hedge fund universe is smaller than the entire universe of U.S. hedge funds, it contains most of the major hedge funds and managers, and thus we believe it represents the industry. Investor demand for shares in the most important funds insures that the top managers are

represented in the off-shore universe. If there were skill in this arena, we would expect to capture the most skillful. Of the \$68 Billion managed by hedge funds followed by MAR in November 1996, \$31.7 Billion was invested in off-shore entities. This suggests that off-shore funds represent a substantial portion of the hedge fund industry as a whole. When “funds of funds” (i.e., funds set up to invest in the shares of other funds exclusively) are subtracted from the universe, off-shore funds managed nearly twice the assets of on-shore funds.

1.4 Hedge Fund Styles

A fundamental challenge in the evaluation of hedge fund performance is to identify a meaningful benchmark for the funds. By design, they are not intended to track broad indices -- the classic hedge fund is in fact, market neutral. This lack of a natural index motivates Fung and Hsieh (1997) to develop stylistic classifications based on dynamic exposures to passive indices. They find evidence that hedge funds styles are based on common, active strategies. This corresponds with the evidence that Brown and Goetzmann (1997) report of dynamic strategies among equity mutual funds. The stylistic classifications used in the hedge fund industry reveal that the portfolio weights are likely to change a lot through time. While there is no broad consensus, the investment industry classifies hedge fund managers into groups such as “Opportunistic,” “Event-Driven,” “Futures & Currency Arbitrage,” “Market-Timing,” “Market-Neutral,” and “Global” styles. These labels suggest that managers actively rebalance their portfolios. Brown and Goetzmann (1997) and Fung and Hsieh (1997) both address the question of dynamic benchmarks for performance measurement through econometric ‘styles analysis’ procedure. While the procedures used by the two papers are different, both use monthly return data. Fung and Hsieh (1997) apply Sharpe’s (1992) style analysis,

while Brown and Goetzmann (1997) use a classification algorithm that groups managers into broadly similar styles according to their realized performance, rather than what they claimed to do. Analysis of styles is inherently difficult in the case of hedge funds. Unlike open-end mutual funds that must calculate share prices each day, or closed-end funds that have market prices quoted on exchanges, hedge fund after-fee performance is based on quarterly or annual evaluations. While some funds report monthly returns, monthly after fee returns are difficult to compute when fees are calculated on a quarterly or annual basis. The offshore hedge fund data used in this paper is annual — allowing total return calculation, but limiting the reliability of benchmarks based on stylistic analysis. Because the issue of annual performance fees is so important, we address it in the next section.

1.4 Incentive Fees and High Water Marks

Most hedge fund managers charge a fixed annual fee of 1% and an incentive fee of 20%, calculated on the return over a year, or less commonly, over a quarter.⁸ The incentive fee is a percentage of profit above a base, typically, the asset value at the beginning of the year. This incentive fee is generally subject to a high water mark provision. If the fund loses money, then the manager must make up the loss in the next year before the incentive fee becomes applicable. When investors enter and exit the fund in midyear, the calculation of the high water mark and attribution of the incentive fee is a challenge. Do investors use the previous year's high water mark if they enter at midyear after a loss for the first half? In common practice, yes, although this benefits the midyear investor at the expense of the current investors. Other methods have been used to correct this imbalance, including such things as “equalizing shares” to offset the advantage of later money. None of these methods are perfect. The simple high water mark provision is the most common method

because of its ease of calculation. However, the practical effect of the simple high water mark incentive structure is to discourage managers from taking new money when they are below the high water mark.⁹ This is likely to be mitigated by the reluctance of investors to invest new money following poor performance.

Clearly, the typical hedge fund compensation structure has implications for fund survival. Managers using the simple high water mark calculation may not accept new money, and may rationally adjust their strategy depending on how far they are from the high water mark. The more the manager is “out of the money,” the more he or she may increase volatility. In addition, the more the manager is out of the money, the less the incentive to accept new funds, and the less the willingness of new investors to invest. This suggests that funds with a year or two of poor performance may have a high probability of going out of business, or at least decreasing in size sufficiently to no longer be included in hedge fund data bases.

1.5 Focus of Current Research

Other money management vehicles have been studied extensively. Much is known about mutual funds, pension funds, investment managers in the pension arena and managed futures accounts. In contrast, little is known about hedge funds. Because data are so difficult to obtain, few comprehensive studies exist. Although claims of superior performance by a few managers are cited in the financial press, the question of whether the industry as a whole performs well is still open. Our goal in this paper is to examine hedge fund performance from 1989 through 1995, using a database that includes both defunct and surviving funds. Within the limitations of the annual data at our disposal, we estimate basic risk and return characteristics of hedge funds. We use the data to develop

some broad stylistic classifications, and we compare these with self-reported stylistic descriptions. Finally, we examine evidence for performance persistence in the hedge fund universe. Our findings are interesting in light of what we know about other investment vehicles.

The popular perception is that offshore hedge funds experience high returns at considerable risk. By contrast, we find that the average annual offshore hedge fund return was 13.26 % from 1989 through 1995, compared with the S&P 500 return of 16.47% over the same period. In addition, the average offshore hedge fund experienced a lower annual standard deviation of return (9.07 % compared to the S&P's 16.32%) and lower systematic risk with respect to the U.S. stock market. The equally-weighted offshore fund index had a S&P beta of .36 over the seven years -- reflecting the fact that, on average, hedge fund managers at least partially live up to their reputation as market-neutral risk-takers.

A key question, given the intent of Alfred Winslow Jones to create a vehicle to leverage manager skill, is whether there is any evidence of relative skill. One class of hedge funds has developed explicitly to exploit supposed skill differentials. Vehicles termed "Fund-of-Funds" seek to allocate investor dollars into winning hedge funds, presumably by picking winners based on past track records. We explore the profitability of picking winners via tests of relative and absolute performance persistence. We find no evidence of performance persistence in raw returns or risk-adjusted returns, even when we break funds down according to their returns-based style classifications. One possibility is that a few major managers have skill and the rest do not. To test for this we break performance into finer categories, explore whether fund size forecasts superior returns, and consider pre-fee performance. None of these yield evidence of performance persistence.¹⁰ It would be difficult to expect a fund selector, commonly called a "Fund-of-Funds,"

to produce superior returns.

II. Data and Performance

I.1 Annual Hedge Fund Database with Defunct Funds

The *U.S. Offshore Funds Directory* is an annual guide to offshore hedge funds published since 1990. It provides information on most of the offshore funds operating at the beginning of the year of publication. Sometimes, the publisher, Antoine Bernheim, has chosen to drop funds from the directory due to lack of data, or quality of data, and sometimes funds have asked to be removed from the directory. We hand-collected data from each volume of the directory for the 1990 through 1996 editions. We obtained the fund name, the date the fund started, the net asset value of the fund, the net asset value per share, the dividends paid in the year, the computed total return (after fees),¹¹ the annual fee, the incentive fee, the name of the investment advisor(s) and the name of the principal(s). Use of annual data involves drawbacks and benefits. The drawbacks are that covariances with benchmarks are poorly estimated, and thus risk-adjusted returns are estimated with a low degree of statistical precision. In addition, we are unable to observe funds that disappear within the year, and thus survival biases are greater than would be expected with more frequently observed data. The benefit of annual returns is that calculating monthly after-fee return is usually impossible. Most funds have an incentive fee structure that is annual, and thus net returns are only valid on an annual, or at best, a quarterly basis. Finally, the *U.S. Offshore Funds Directory*, published annually, is one of the few sources of hedge fund data that contains defunct fund data. As we will show, this makes an enormous difference in *ex post* observed performance.

A key question regarding the *U.S. Offshore Funds Directory* is whether the funds it reports represent the hedge fund universe. To address this question, we compared the list of hedge funds reported by Managed Account Reports [MAR94] in November 1994 made available to us by the SEC with the *Offshore Hedge Fund Directory* list of December 1994 [OHFD94]. Of the 358 hedge funds in the MAR94 list, 97 were in OHFD94 list. Since these 97 funds comprise 60.3% of the \$38 Billion in MAR94 assets, most of the big funds are represented. The OHFD94 list is slightly smaller. Of the 313 funds reported in OHFD94, the 97 funds overlapping the two data sets represent only 51.6% of the reported total assets of \$35.4 Billion at the end of 1994. This analysis suggests that the database we have collected may not be a comprehensive sample of the world's hedge funds. However, it does represent a substantial portion of the number of funds followed by MAR, one of the major industry data vendors. In fact, our database includes more than 200 funds not included in MAR.

Table 1 reports the annual summary statistics about the data. The number of funds grew from 78 in 1989 to 399 by the end of 1995. The capitalization grew from \$4.7 Billion to \$40.3 Billion over the same period. The equal-weighted mean return of 13.36% lagged the S&P 500 returns of 16.47% over the period. On the other hand, the value-weighted return of 24.71% since 1990 beat the market. The value-weighted return largely represents the results of the biggest fund in the sample, Quantum Fund. Note that the rate of attrition for funds is about 20% per year.¹² If funds disappear due to poor returns, then the average annual returns each year are upwardly biased. In other words, the returns we report each year are conditional on surviving the entire year.¹³ On average, hedge funds appear to have maintained a positive exposure to the stock market: up years for the S&P were also up years for the equal-weighted hedge fund index. Of course, averaging across fund managers masks a range

of potential manager strategies, from high-leverage market bets to investment in zero-beta assets such as exchange rate instruments, to pure hedged bets on security mispricing.

II.2 Raw and Risk-Adjusted Performance

Table 2 reports the arithmetic and geometric mean returns for equal-weighted and value-weighted portfolios of offshore hedge funds, and for equal-weighted portfolios subject to the selection conditions described above. The equal-weighted portfolio underperformed the S&P index in raw returns, while the value-weighted portfolio (dominated by the Quantum fund) outperformed the S&P index in raw returns. This performance differential was matched by a risk differential: the equal-weighted index was less volatile than the S&P 500, while the value-weighted index was more volatile. As a result, both equal-weighted and value-weighted indices had Sharpe ratios exceeding that of the S&P 500. The S&P 500 betas for the value-weighted and the equal-weighted indices are .43 and .33 respectively, and Jensen's [1963] alpha using arithmetic annual returns are 16.6% and 5.7% respectively. Both are consistent with positive risk-adjusted performance of offshore hedge fund portfolios over the 1989-1995 period.

We should be careful about the inference that the funds, on average, added value. Survivorship may still be a biasing factor, given that so many funds disappear from the sample each year. Although we have data on defunct funds, we cannot follow the investment performance of dollars in funds that disappeared within each year. Thus, in effect, we are throwing out the fund returns in the year that the fund died. Presumably, such funds were terminated because it was perceived that it would be unlikely that they would reach the high water mark performance objective. As a result, we are cutting off the lower tail of the distribution of returns, and imparting a positive

bias to observed returns. Unlike mutual funds, if hedge funds are merged into other funds, we know neither the date nor the terms of the mergers, and given their unregulated status there is in principle no way to find this information. This is a particular problem as we shall see for both industry and academic studies that take a sample of funds at a point in time, and draw inferences from the prior history of returns. Using our sample, we can obtain a lower bound on the magnitude of the resulting “look-ahead” bias.

Survival conditioning is a particularly important issue in the evaluation of past performance of hedge funds. Table 2 reports statistics for funds subject to two types of conditioning. The first type of conditioning requires that a fund survive the entire seven-year history. Notice that very few funds that meet this criterion. Although the first hedge funds began in the 1950's, only 25 survive of the original 108 offshore funds listed in 1990.¹⁴ The second type of conditioning is the requirement that a fund be extant in the last period of the sample. This is the typical conditioning one would find in a commercially available database that is only designed to offer information about existing funds. These conditioning effects are very strong. The sample of funds extant in 1995 dominates the full sample, *ex post*, for each year of analysis. On average, the conditioning on existence at the end of the period imparts a bias in raw returns of almost 3% per year. We calculate the bias as simply the average over all funds in the index, but it is more severe for individual funds in the sample. Brown, Goetzmann and Ross [1995] show that bias due to survival conditioning is positively related to variance. Thus, the higher the fund volatility, the greater is the difference between *ex post* observed mean and *ex ante* expected return.

Notice the time-series of minimum returns for the survived sample in Table 2 and the whole sample in Table 1. In each case, the set that includes defunct funds has much lower minimum

returns. Poor performers fall out of the sample. When their data is unavailable at year end, we do not have a record of their poor performance in the final year of their life. This may present problems in the interpretation of returns and Sharpe ratios in Table 2. The performance reported in the table is probably an upper bound on the performance realized by an investor in offshore hedge funds during the period. An accurate estimate of performance requires intra-year data or an estimate of unconditional returns. Figure 1 compares the performance of the three different indices: an equal-weighted index using the full sample, an equal-weighted index using those that were extant in the last sample year, and an equal-weighted index of those funds that survived the entire seven years. The S&P 500 is provided as a benchmark.

In sum, the analysis of a database that includes both defunct and surviving funds suggests that survival conditioning may have important effects on the *ex post* observed historical performance. Investors using past track records should anticipate that historical returns probably exceed *ex ante* expected future returns. In addition, investors who buy past performance are also likely to be buying future volatility. High water mark provisions imply a strong correlation between poor intra-year performance and fund closure. This in turn is likely to increase the survival bias in *ex-post* observed data.

III. Performance by Fund Style

Due to the nature of hedge fund market-neutral positions, the S&P 500 is not necessarily the appropriate benchmark for fund performance. To address the problem of benchmarking fund performance we use text descriptions of fund styles reported in *The U.S. Offshore Funds Directory* to classify funds into ten groups corresponding to industry classifications.¹⁵ We read the paragraphs describing fund activity for each fund for each year in the sample. Each year, we classify the funds

into one of ten groups: Event-Driven, Market Neutral, Market Trend/Timing, U.S. Opportunity, Sector Fund, Global Fund, Fund-of-Fund, Short Seller, Commodities/Derivatives and Multi-Strategy. In the process, we found that the description of fund activity differed little from year to year, suggesting that the funds did not change their strategy, at least ostensibly. Table 3 reports the performance by sector. Performance is weighted by the estimated fund value at the beginning of each year to provide a value-weighted return for the style. The “Global” style is dominated by the Soros funds and is the top performer. Not surprisingly, given the U.S. stock market’s success over the past six years, the worst performers were short-sellers. Despite the short time series, we estimated CAPM betas on the series’ and calculated alphas and Sharpe ratios. Alphas were positive for all categories except short sellers and statistically significant in four cases¹⁶. Funds-of-Funds, despite being designed to select superior managers, had below average returns compared with the broad sample. The classic “hedge fund” category, represented by the market-neutral style, returned more than 9% per year with effectively zero market exposure, and low volatility. In summary, the individual style categories appeared to provide positive value-weighted risk-adjusted performance.

How do hedge fund styles correlate to other asset classes? Table 4 reports correlations between returns on self-reported fund styles and asset class returns commonly used as performance benchmarks. Most have negative correlation to the GS commodity index and the Refco CTA index¹⁷. The notable exception is the Commodities/ Futures and Options style that may be related to the CTA’s. The modest correlation of certain categories to the U.S. stock and bond markets suggest some possibility that some hedge fund styles provided diversification over the 1990’s for portfolio investors. This may be why institutional interest in hedge funds has increased in recent years. One should be cautious about drawing inferences from correlations based on such a short time period.

Nevertheless, it is of potential interest to note that Event-Driven funds have a high correlation to the S&P/BARRA Value index and a low correlation to the Growth index. Given that “Value” stocks are characterized by low price to earnings and price to book ratios, this suggests that Event-Driven managers may invest more frequently in distressed firms.

IV. Performance Persistence

The hedge fund arena seems to be the ideal place to look for evidence of manager skill. Unlike mutual funds¹⁸ and other investment trusts, hedge fund managers do not seek to track a benchmark, but rather seek to exploit mispricing. Thus, it is striking to find absolutely no evidence of differential skill among offshore hedge fund managers. In the following sections, we show the various forms of tests applied to examine performance persistence.

IV.1 Persistence in Raw Fund Returns

The simplest persistence test is a year-by-year cross-sectional regression of past returns on current returns. Figure 2 shows six scatter plots with OLS regression lines showing the regression slopes for each of these tests. Three years have positive slopes and three years have negative slopes. Slopes for the last four years in the sample are significant at standard confidence levels, suggesting persistence in year to year returns¹⁹. Results reported in Table 5 show that winners follow winners in 1991-92 and 1992-93. However, the pattern reverses in 1993-94 and 1994-95. Winners lose. This suggests that an unidentified factor, such as a “styles effect” may be driving the systematic positive, then negative dependence. The figures are useful to examine, because they show no evidence of a few consistently outstanding funds.

Perhaps a few large funds, like Soros’ Quantum fund, are consistently successful. In fact, we

might expect the largest funds to outperform the smaller funds if investors were able to choose superior funds, *ex ante*.²⁰ To test this proposition, we examined the relationship between fund size and future return. Table 6 suggests that size measured by log NAV may be a poor predictor of future returns. Apparently size is unrelated to superior relative performance, except possibly for the period 1991-92²¹. This result follows whether we examine regressions of subsequent period performance against size, or whether we look at the performance of large funds over that of small funds where “large” and “small” are relative to median NAV. Big funds do no better than small funds in the current sample. Perhaps managers repeat, rather than funds. Creating manager returns by equal-weighting all funds for which they were named as advisor yields results almost identical to those reported earlier. There is no evidence that managers, rather than funds, repeat.

We also considered the possibility that performance persists on a pre-fee basis and that managers can extract their full value-added through fees. To test this proposition, we estimated pre-fee returns to funds. These results are reported in Table 7. The results are not at all sensitive to the exclusion of fees from the performance comparison. This suggests that performance fees are unrelated to future performance. High performance fees are characteristic of hedge funds. Yet, results reported in Table 8 suggest that higher-fee funds perform no better than lower-fee funds.

IV.2 Persistence in Style-Adjusted Returns

Because hedge fund managers pursue such disparate, and possibly dynamic strategies, it makes sense to consider how the evidence on persistence is affected by bench-marking returns by style means. Does a group of market neutral managers consistently beat their cohort? Table 9 reports the results of persistence tests with the self-reported style benchmarks subtracted each year. Style bench-marking affects the results very little. Indeed, it does not even remove the evidence of cross-

sectional correlation manifested by the presence of large positive and large negative t-statistics across years. The use of the appraisal ratio (Jensen's alpha measured in units of residual standard deviation) does affect this pattern to some extent. This is consistent with results of Brown, Goetzmann Ibbotson and Ross [1992] which suggest that cross-section regressions of sequential alphas are highly sensitive to performance-based attrition in the sample. However, this effect is almost eliminated by using appraisal ratios instead of alphas in the cross-section regression.

The scatter plots of Figure 2 display the pattern of repeat performance. Funds marked "0" that were in the database for less than three years congregate in the Loser-Loser (lower left quadrant) and Winner-Loser (lower right quadrant) in each of the figures. Poor performance is predictive of failure (or at least to non-reporting of results in our data source). However, there does appear to be some congregation of particular styles in each of the other quadrants. This observation is consistent with the view that manager skill is style-specific. As a particular example, the Soros funds (marked by an "S" in the scatter plots) appear predominantly in the upper right quadrants associated with the Winner-Winner category.

Figure 3 appears to support this position. Shortsellers did poorly in this bull market period, and in fact given their losses, rarely persist in our sample more than two years. On the other hand, Sector funds did quite well relative to the median hedge fund manager in each year. However, we obtain a quite different picture in Figure 4. After subtracting a style benchmark, there is little evidence of persistent winners, with only the "Event Driven" classification showing even marginal evidence of persistent success. Fund of Funds managers, who claim success in selecting outstanding managers, lost repeatedly whether we consider the performance relative to the median manager, or relative to their own style benchmark²²

V. Conclusion

We examine the performance of the off-shore hedge fund industry over the period 1989 through 1995 using a database that includes both defunct and currently operating funds. The industry is characterized by high attrition rates of funds, a problem that hampers the calculation of true investor performance. Nevertheless, the annual data at our disposal reveal some interesting results. Offshore funds as a group have positive risk-adjusted performance when measured by Sharpe ratios and by Jensen's alpha. Little public information is available about the investment strategies and specialization of these managers. We use the self-reported managers' activity to group the *U.S. Offshore Funds Directory* universes into 11 basic styles. All but one of these styles provide positive risk-adjusted returns. Neither raw returns nor style adjusted benchmarks provide much evidence of differential manager skill. While some managers such as George Soros appear to have had a strong history of performance²³, they do not necessarily beat the pack each year.

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Table 1: Annual Summary Statistics for Offshore Hedge Funds

Year	Number of Funds	Number of Advisors	Number of dropped or defunct funds	Number of new funds	Total Capitalization in U.S. Dollars	Arithmetic Equal-weighted Mean Return	Arithmetic Value-weighted Mean Return	Median Return	Maximum Return	Minimum Return	Average Annual Fee	Average Incentive Fee
1988-89	78	98			4,721,256,000	18.08	NA	20.30	57.3	-33.6	1.744	19.755
1989-90	108	137	17	47	6,153,900,000	4.36	16.37	3.80	85.9	-30.7	1.647	19.519
1990-91	142	155	19	53	11,466,358,100	17.13	36.95	15.90	94.6	-53.4	1.786	19.548
1991-92	176	210	27	61	18,876,303,000	11.98	36.99	10.70	92.4	-24.4	1.809	19.344
1992-93	265	316	23	112	39,064,117,965	24.59	41.94	22.15	155.6	-30.3	1.621	19.096
1993-94	313	363	58	108	35,419,454,000	-1.60	-7.03	-2.00	105.1	-49.8	1.644	18.753
1994-95	399	450	65	152	40,345,412,365	18.32	23.05	14.70	296.9	-40.3	1.551	18.497

Notes: Fund returns are reported after fee in percent. Average annual incentive fee is typically paid as percentage of positive returns each year, although in some instances it is paid as a percentage of returns in excess of the treasury rate. Some funds have multiple advisors.

Table 2: Survival Conditioning Effects

Summary statistics for funds that survived the whole period						
Year	N	MEAN	MED	STDERR	MAX	MIN
1989	19	23.68	22.2	2.62	49.5	5.6
1990	25	2.04	2.7	3.031	29.2	-26.5
1991	27	24.13	22.7	3.791	56.8	-16.2
1992	29	13.00	9.8	2.877	68.4	-15.7
1993	29	18.14	17.9	3.578	61.9	-30.3
1994	29	-0.92	0.4	2.082	31.2	-24.5
1995	28	18.06	19.25	2.847	40.5	-22.7

Summary statistics for funds that existed at the last period						
Year	N	MEAN	MED	STDERR	MAX	MIN
1989	19	23.681	22.2	2.623	49.5	5.6
1990	37	5.963	3.9	2.833	47.5	-26.5
1991	55	21.905	18.8	2.876	75.4	-36.1
1992	104	16.083	13.9	1.592	92.4	-15.7
1993	159	26.467	23.6	2.012	155.6	-30.3
1994	231	-0.293	-0.8	1.031	105.1	-49.8
1995	368	18.323	14.7	1.429	296.9	-40.3

Survival Effects on Estimates of Mean Returns						
	Mean Return For Value- Weighted Index	Mean Return For Equal- Weighted Index	Mean Return For Funds Surviving Entire Period	Mean Return For Funds Extant at Last Period	Mean Return for the S&P 500 Index	
Arithmetic	24.71	13.27	14.02	16.02	16.47	
Geometric	23.48	12.94	13.63	15.65	15	
Std. dev.	16.72	8.40	9.23	9.06	15.11	
Sharpe Ratio	1.19	0.94	0.94	1.17	0.73	

Table 3: Return on Self-Reported Investment Styles

Value Weighted Return Benchmarks:

	Multi	Event Driven	Mkt. Neutral	Mkt.Trend/Timing	U.S. Oppty	Sector	Global	Fund of Funds	Short Sellers	Commodities Futures/ Options
1989	23.22%	9.80%	7.10%	24.29%	25.20%	25.30%	29.69%	16.11%	N/A	15.95%
1990	-0.17%	-9.55%	4.39%	6.70%	8.91%	11.78%	26.33%	5.77%	N/A	5.73%
1991	27.00%	16.44%	27.77%	19.60%	31.60%	59.44%	51.94%	19.16%	-38.12%	17.76%
1992	21.23%	44.26%	13.86%	52.01%	11.87%	19.29%	52.58%	25.97%	-12.61%	14.14%
1993	52.10%	39.76%	20.14%	17.53%	18.22%	23.01%	54.13%	32.44%	-9.86%	23.79%
1994	-9.14%	-14.08%	3.81%	1.33%	-5.98%	-5.14%	-5.84%	-9.00%	16.68%	9.77%
1995	15.12%	14.27%	-7.99%	33.06%	25.54%	46.45%	22.42%	28.19%	-11.50%	20.36%
Average	18.48%	14.41%	9.87%	22.07%	16.48%	25.73%	33.04%	16.95%	-11.08%	15.36%
Geometric	17.07%	12.56%	9.32%	21.10%	15.85%	24.17%	31.36%	16.13%	-12.83%	15.22%
Std. Dev	19.81%	22.15%	11.80%	16.91%	12.73%	21.46%	21.85%	14.44%	19.41%	6.16%
Beta	0.471	0.364	-0.035	0.413	0.644	1.092	0.285	0.464	-0.960	0.249
Jensen's α	7.9%	5.0%	4.9%	12.1%	4.0%	8.2%	24.5%	6.4%	-2.8%	7.2%
t-value of α	1.09	0.76	0.89	1.96	2.12	1.39	3.08	1.49	-1.64	3.69
Sharpe Ratio	0.637	0.387	0.356	0.956	0.907	0.958	1.236	0.766	-0.767	1.376

Table 4: Correlations with Other Benchmarks

	Multi	Event Driven	Mkt. Neutral	Mkt.Trend/Timing	U.S. Oppty	Sector	Global	Fund of Funds	Short Sellers	Commodities/Futures/Options
S&P500 Total Return	0.36	0.25	-0.04	0.38	0.83	0.82	0.20	0.49	-0.70	0.54
U.S. LT Gvt TR	0.63	0.51	0.00	0.47	0.89	0.83	0.50	0.82	-0.64	0.69
Gold Total Return	0.60	0.45	0.15	-0.01	-0.04	-0.17	0.23	0.46	0.36	0.63
Refco CTA	0.13	-0.03	-0.10	-0.11	0.30	0.27	0.31	0.26	-0.70	-0.15
MSCI EAFE TR	0.68	0.39	0.36	-0.02	0.40	0.33	0.22	0.44	0.00	0.86
S&P/BARRA Growth	0.16	0.03	-0.08	0.24	0.77	0.79	0.08	0.27	-0.70	0.31
S&P/BARRA Value	0.57	0.49	0.01	0.51	0.81	0.76	0.33	0.70	-0.59	0.77
MAR Advisor	0.38	0.25	0.23	-0.02	0.31	0.32	0.54	0.44	-0.66	0.12
MAR Fund/Pool	0.45	0.12	0.16	-0.23	0.38	0.28	0.44	0.38	-0.51	0.15
SB Non-US\$ Bnd	0.46	0.39	0.27	0.10	0.36	0.50	0.43	0.57	-0.52	0.58
GS Commodity	-0.57	-0.37	-0.88	0.02	-0.54	-0.58	-0.71	-0.34	0.78	-0.34
MSCI Europe TR	0.69	0.33	0.11	0.04	0.61	0.42	0.23	0.53	-0.20	0.75
MSCI Pacific TR	0.61	0.35	0.43	-0.09	0.26	0.22	0.17	0.33	0.12	0.80
MSCI World TR	0.64	0.39	0.25	0.14	0.61	0.56	0.23	0.52	-0.32	0.86

Table 5: Repeat-Winner Test Results

Year	Coefficient	t-stat	R²	WW	LW	WL	LL	log-odds	Z
1989-90	0.158	1.01	0.024	10	10	11	12	0.087	0.142
1990-91	-0.206	-1.4	0.028	13	21	21	14	-0.885	-1.793
1991-92	0.223	3.21	0.113	25	16	16	26	0.932	2.066
1992-93	0.422	3.62	0.085	45	24	25	50	1.322	3.755
1993-94	-0.121	-2.88	0.043	29	65	65	30	-1.58	-5.033
1994-95	-0.603	-5.91	0.133	49	66	65	51	-0.54	-2.034
Total				171	202	203	183	-0.27	-1.857

Notes: Winners and Losers are defined relative to the median manager return in each comparison year. WW denotes successive winners, LW denotes Losers in the first year and Winners in the second comparison year, WL reverses this order, and LL denotes successive Losers. Log-odds are defined as $\ln((WW*LL)/(LW*WL))$ which is asymptotically distributed as Normal, with mean zero and standard error given as the square root of the sum of the reciprocals of these cell counts. The Z score refers to the log-odds expressed relative to this measure of standard error. The Coefficient, t-stat and R² columns refer to the regression coefficient, t-value and R² regressing manager returns in one year against manager returns in the previous year where returns are reported for the manager in both years.

Table 6: Size and Relative Performance

Year	Coefficient	t-stat	R ²	Large Winners	Small Winners	Large Losers	Small Losers	log-odds	Z
1989-90	-2.2	-1.53	0.04	12	13	17	15	-0.205	-0.384
1990-91	1.57	0.83	0.01	23	20	20	22	0.235	0.541
1991-92	2.89	3.21	0.09	32	26	27	28	0.244	0.646
1992-93	2.71	2.53	0.04	52	27	31	43	0.983	2.939
1993-94	-1.3	-2.27	0.02	40	50	66	48	-0.542	-1.903
1994-95	-0.9	-0.9	0	68	65	65	46	-0.301	-1.16
Total				227	201	226	202	0.009	0.068

Notes: Winners and Losers are defined relative to the median manager return in each comparison year. Defining large funds as funds with NAV at or greater than the median fund size, and small funds as those that had NAV less than that of the median fund, large funds in one year that won in the second year are denoted Large Winners. Small funds that subsequently won are denoted Small Winners. Large Losers and Small Losers are defined similarly. Log-odds and Z scores are defined as in the previous Table, and the Coefficient, t-stat and R² columns refer to the regression coefficient, t-value and R² regressing manager returns in one year against ln(NAV) recorded in the previous year.

Table 7: Pre-fee Fund Persistence

Year	Coefficient	t-stat	R²	WW	LW	WL	LL	log-odds	Z
1989-90	0.22	0.89	0.033	9	5	4	7	1.147	1.368
1990-91	-0.27	-1.667	0.059	13	12	15	6	-0.836	-1.333
1991-92	0.21	2.509	0.094	21	11	13	18	0.972	1.867
1992-93	0.48	3.627	0.118	36	14	17	33	1.608	3.705
1993-94	-0.1	-2.061	0.03	24	45	49	21	-1.476	-4.064
1994-95	-0.56	-5.324	0.116	61	60	58	40	-0.355	-1.294
Total				164	147	156	125	-0.112	-0.678

Notes: Numbers in this Table correspond to numbers reported in Table 5, except that returns are measured on a pre-fee basis

Table 8: Fees and Relative Performance

Year	Coefficient	t-stat	R ²	High Fee Winners	Low Fee Winners	High Fee Losers	Low Fee Losers	log-odds	Z
1989-90	2.31	1.932	0.09	4	15	1	19	1.623	1.387
1990-91	-6.48	-0.617	0.01	3	26	5	24	-0.591	-0.754
1991-92	-1.25	-1.874	0.04	4	40	10	34	-1.079	-1.696
1992-93	0.19	0.224	0	8	45	9	44	-0.14	-0.265
1993-94	-0.02	-0.051	0	8	70	12	67	-0.449	-0.922
1994-95	-0.39	-0.683	0	8	90	18	83	-0.892	-1.976
Total				35	286	55	271	-0.506	-2.178

Notes: Winners and Losers are defined relative to the median manager return in each comparison year. Defining high fee funds as funds with base fees at or greater than the median fee, and low fee funds as those that had fees less than that of the median fund, high fee funds in one year that won in the second year are denoted High Fee Winners. Low fee funds that subsequently won are denoted Low Fee Winners. High Fee Losers and Low Fee Losers are defined similarly. Log-odds and Z scores are defined as in the previous Table, and the Coefficient, t-stat and R² columns refer to the regression coefficient, t-value and R² regressing manager returns in one year against fees recorded in the previous year.

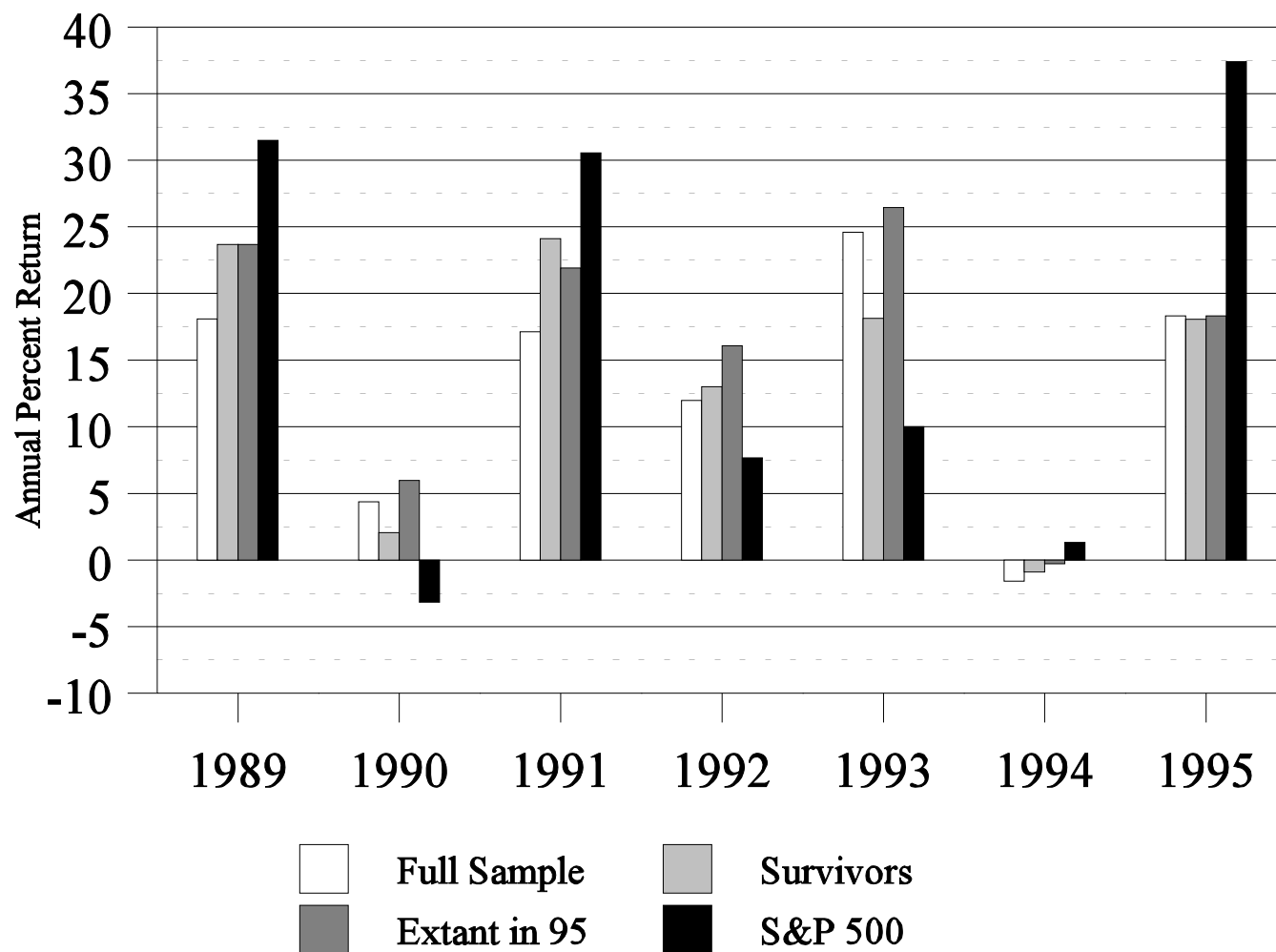
**Table 9: Winner Repeat Results: Alpha and Appraisal Ratio
Constructed Using Stated Style Benchmarks**

Alpha									
Year	Coef	t-stat	R-sq	WW	LW	WL	LL	log odds	Z
1989-90	0.2272	1.08	0.0292	6	8	13	14	-0.214	-0.322
1990-91	0.0681	0.60	0.0054	33	35	40	41	-0.034	-0.104
1991-92	0.2851	2.66	0.0806	48	50	55	56	-0.023	-0.082
1992-93	0.3494	3.56	0.0828	107	109	114	115	-0.01	-0.052
1993-94	-0.1214	-2.71	0.0385	151	153	158	159	-0.007	-0.043
1994-95	-0.5549	-5.43	0.1144	195	197	202	203	-0.005	-0.037
Appraisal Ratio									
Year	Coef	t-stat	R-sq	WW	LW	WL	LL	log odds	Z
1989-90	-0.0063	-0.03	0.0000	6	6	10	2	-1.609	-1.666
1990-91	-0.1133	-0.67	0.0143	15	15	19	11	-0.547	-1.039
1991-92	-0.0849	-0.46	0.0064	17	17	21	13	-0.48	-0.974
1992-93	0.4920	4.49	0.2720	38	38	42	34	-0.211	-0.649
1993-94	-0.1142	-1.33	0.0184	79	79	83	75	-0.101	-0.45
1994-95	0.0462	0.37	0.0014	82	82	86	78	-0.098	-0.442

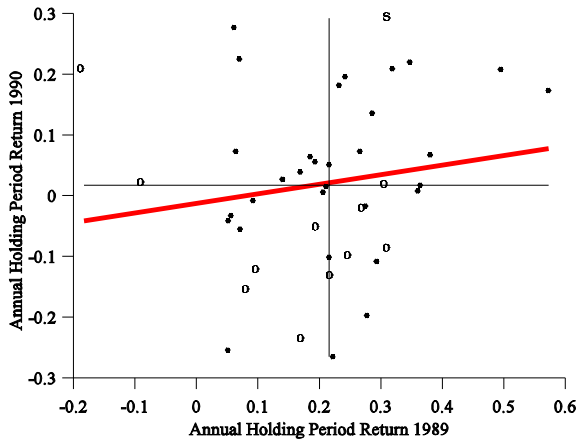
Alpha for a given year was constructed as the annual reported fund return less the weighted style benchmark returns given in Table 3 for the self-reported style classification in each annual issue of *The U.S. Offshore Funds Directory*. Results using Jensen's alpha were similar, with t-statistics for each comparison period of 0.85, -1.14, 2.69, 3.39, -2.75 and -5.66 respectively. The appraisal ratio is constructed by standardizing each alpha by the standard deviation of fund alphas, and is necessarily limited to funds with three or more years of reported returns.

Figure 1: Average Hedge Fund Returns

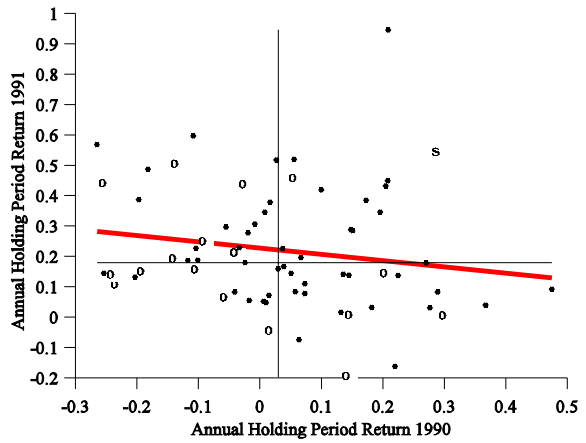
full sample and survivors



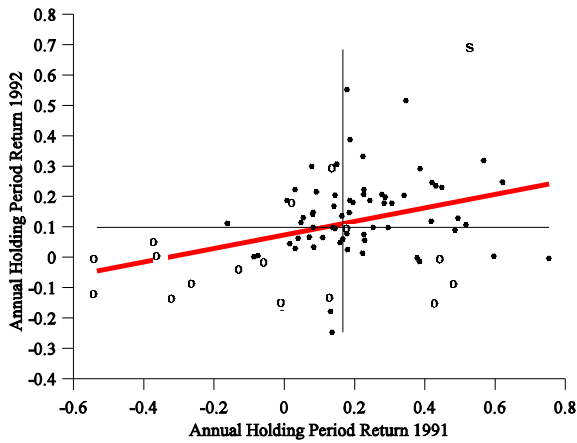
Performance of Funds 1989-90



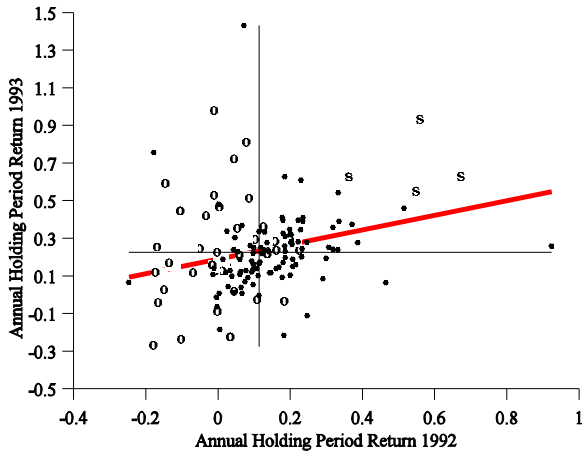
Performance of Funds 1990-91



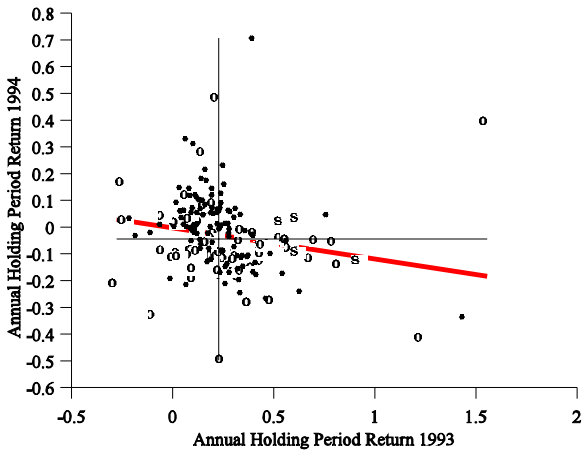
Performance of Funds 1991-92



Performance of Funds 1992-93



Performance of Funds 1993-94



Performance of Funds 1994-95

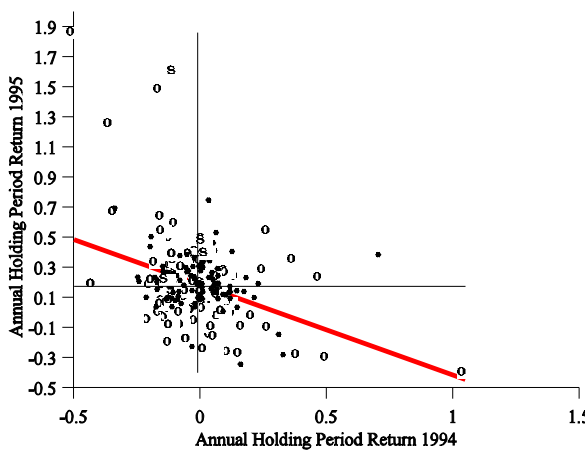


Figure 2: Year by Year Performance Persistence

Figure 3: Performance Persistence In Total Returns by Styles
Sequential Annual Return 1989-95

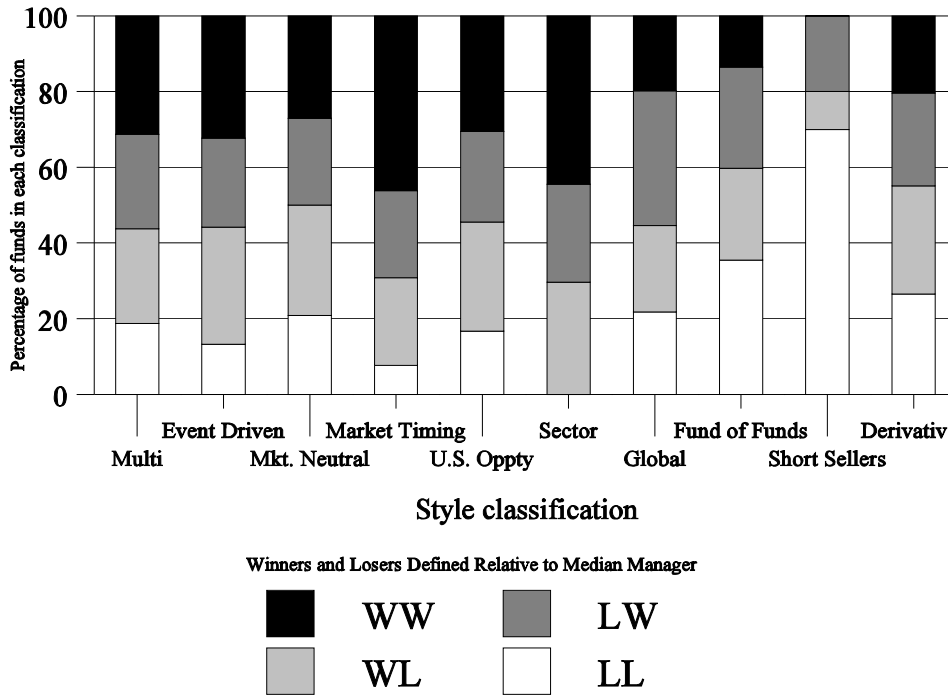
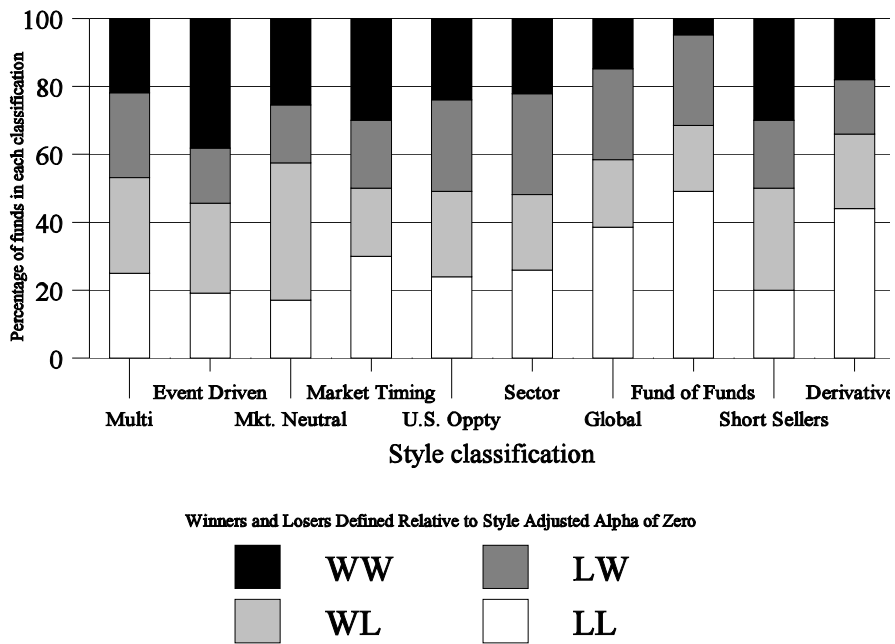


Figure 4: Performance Persistence In Style Alphas by Styles
Sequential Style Adjusted Alphas 1989-95



Notes

1. Caldwell, Ted, 1995, "Introduction: The Model of Superior Performance," in Lederman, Jess and Klein, eds. *Hedge Funds*, New York, Irwin Professional Publishing.
2. The Fung and Hsieh (1997) data are monthly returns. These returns are not necessarily realized by investors because most hedge funds calculate manager fees annual or at best quarterly based on performance. Thus, the fee is unknown until the end of the reporting period. Nevertheless, it has become common to accrue the annual performance fee on a monthly basis. This is presumably the basis on which monthly returns are calculated.
3. Much of this account is taken from Caldwell, who based his account of Jones' career on interview with those who knew him.
4. Loomis, Carol, 1966, "The Jones Nobody Keeps Up With," *Fortune* April, 237-247.
5. World Equity, 1995, "Hedge Fund Performance: the Facts and Fiction," *World Equity*, 20, 1995.
6. Managed Account Reports, Inc., 1996, "The Hedge Fund Universe," MAR/HEDGE, November, http://www.marhedge.com/mar/faq_hgrw.html.
7. Willoughby, Jack, 1997, "Saving the World with Paul Tudor Jones," *Institutional Investor*, July, 61-70.
8. Managers registered under the Investment Advisors Act are prevented from receiving an incentive fee for a performance period of less than a year, according to Anthony Stocks, in his , 1994 article, "The Ins and Outs of Incentive Fees," *Hedge Fund News*, August 1994, p.6.
9. Ibid. Stocks, 1994.
10. For evidence of performance persistence in mutual funds, see Grinblatt and Titman, 1988 and 1992, Hendricks, Patel and Zeckhauser, 1993, Goetzmann and Ibbotson, 1994, Brown and Goetzmann, 1995, Malkiel, 1995, Carhart, 1996, and Elton, Gruber, Das and Blake, 1996.
11. Including dividends assuming re-investment on the date of payment.
12. The attrition rate of hedge funds appears slightly higher than the rate for equity mutual funds we found for the period 1976 through 1992 in Brown and Goetzmann 1995. This may be due to differing time periods, or may be due to the inherent riskiness of hedge funds. We thank David Chapman for pointing out the relevance of this comparison.
13. We are currently working on methods for estimating the unconditional mean returns each year.
14. Funds and returns for 1989 are taken from the 1990 volume. Thus we have only limited information about fund returns, since this group includes funds that began within the year 1989.

This explains the number of funds, 19, for which we have return data in the first year. Funds without return data are not included in the return calculation. This is, of course, another possible source of conditioning for return calculations. Funds occasionally fail to report annual results to the Offshore Funds Directory. It is unlikely that strong positive returns would go unreported. An exception is the decision by some major fund managers to conceal their success from public scrutiny.

15. Although not reported here, we also used a statistical method developed in Brown and Goetzmann [1997] for style classification and obtained similar results. The Generalized Stylistic Classification [GSC] algorithm is a generalization of a class of widely-used clustering algorithms that sort multi-variate observations into discrete classes, conditional on a given number of classes. This approach differs from the style analysis used by Sharpe (1995), Ibbotson (1996) and Fung and Hsieh (1997) to control for style effects in repeat-winner analysis. The GSC algorithm applied to annual data uses fund return histories as multi-variate observations: for each fund, the return each year is a variable. Thus, the GSC algorithm groups funds according to their proximity in past return space. The appealing intuition of this method is that funds that moved together in the past are identified as a group.

16. This result is of course subject to the caveat mentioned above relating to survivorship. Since we do not record returns of funds that fail in midyear, the reported returns are upward biased by this left-tail truncation.

17. The positive correlation of the Multi Objective category with all benchmarks except Commodities would suggest that this classification is not very useful.

18. Differential skill would imply, among other things, persistence of performance. This issue has been studied in the context of US mutual funds by Grinblatt and Titman, 1988 and 1992, Hendricks, Patel and Zeckhauser, 1993, Goetzmann and Ibbotson, 1994, Brown and Goetzmann, 1995, Malkiel, 1995, Carhart, 1996, and Elton, Gruber, Das and Blake, 1996, Edwards and Park, 1995

19. In Table 5 and succeeding Tables, we report both t-statistics from cross-sectional regressions and z scores from log-odds ratio tests (see Brown and Goetzmann [1995]). The pattern of t-statistic sign changes suggests the presence of an unaccounted for factor which would lead to an overstatement of the magnitude of these statistics. Figures 3 and 4 provide some evidence that correlated style exposures may account for this factor.

20. Gruber (1996) and Zheng (1996) find evidence that new money flows into mutual funds forecast positive relative performance. Neither Brown and Goetzmann (1995) nor Zheng (1996) find evidence that capital-weighted indices of funds outperform equal-weighted indices of funds or a risk-adjusted benchmark. Thus, while “hot money” may be smart in mutual funds, money alone is not.

21. Regressions of returns on previous period logged and unlogged fund NAV yielded similar results

22. There is no evidence of statistically significant positive persistence after subtraction of style benchmarks, based on p-values of log-odds ratios. Using a Chi-square test for a random distribution across the four categories of Winner-Winner, Winner-Loser, Loser-Winner and Loser-Loser, the positive persistence evident in the “Event Driven” category is marginally significant, with a Chi-square value of 7.88 (3 d.f.). The Chi-square for “Fund of Funds” was 19.98 (3 d.f.) relative to the median manager, and 83.82 (3 d.f.) relative to the style benchmark. In addition, the log-odds ratio for “Fund of Funds” relative to the style benchmark had a p-value of .023, again supporting the conclusion that the pattern of repeated losses for this category is statistically significant.

23. There are four Soros funds in the database, Quantum Emerging Growth Fund N.V., Quantum Fund N.V., Quasar International Fund N.V. and Quota Fund N.V. Quantum Fund is in the database for the entire period of the sample, whereas the other funds are present in only the last four years. Relative to their self described style benchmark they all report positive returns except for the year 1994. In that year, the Quantum Emerging Growth Fund earned a return of -16%, and the Quota Fund earned a return of -12.3%.