CFR-Working Paper NO. 07-11

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V. Agarwal • J. R. Kale

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Vikas Agarwal and Jayant R. Kale*

This version: June 14, 2007

Abstract

Recently, there has been explosive growth in two products from the hedge fund industry — multi-strategy (MS) funds and funds of hedge funds (FOFs), both of which offer diversification across different hedge fund strategies. In well-functioning markets, both investment vehicles should offer similar returns. Over the period 1994 – 2004, we find that MS funds outperform FOFs on a risk-adjusted basis by 2.6% to 4.8% per year on gross-of-fee and by 3.0% to 3.6% per year on net-of-fee basis. The superior performance of MS funds continues to hold even when we control for fund characteristics such as size, management and incentive fees, and other conventional control variables. Since FOFs underperform MS funds on both net- and gross-of-fee basis, their underperformance cannot be entirely explained by their double-layered fee structure. The question then is how MS funds and FOFs can co-exist in equilibrium in view of the significant differential in performance? We suggest that investors perceive greater agency risk in the structure of MS funds relative to FOFs and therefore require greater compensation for investing in MS funds. MS funds are able to generate these higher returns because they possess greater investment flexibility and are able to invest in less liquid assets. It is also possible that MS funds generate greater returns because managers with "better" ability self-select into joining MS funds and the competition among MS funds results in the rents from superior ability being passed on to the investors in the form of better returns. Controlling for the differences in agency risk, flexibility, and fee structure between MS funds and FOFs, our results suggest that self-selection by managers with superior ability in MS funds may be the driving force behind their superior performance relative to FOFs.

JEL Classifications: G11, G12
Keywords: Multistrategy hedge funds, funds of hedge funds, performance, fees, agency risk, investment flexibility

* Both Agarwal and Kale are at the Department of Finance, J. Mack Robinson College of Business, Georgia State University, 35 Broad Street, Atlanta GA 30303, USA. Agarwal also holds a Research Fellow position at the Centre for Financial Research (CFR), University of Cologne. Corresponding author is Agarwal: vagarwal@gsu.edu, +1-404-651-2699. Contact details for Kale are: jkale@gsu.edu and Tel: +1-404-651-2798. We thank Owen Brolly, Bill Fung, Gerry Gay, Reza Mahani, Ian Morley, Narayan Naik, Henri Servaes, and an anonymous referee for many helpful comments and suggestions. We are grateful for support from the BNP Paribas Hedge Fund Centre at the London Business School.

On the Relative Performance of Multi-Strategy and Funds of Hedge Funds

The recent near-collapse of the US $9.25 billion multi-strategy (henceforth, MS) hedge fund Amaranth has focused attention of the media and regulators on MS funds. The number of MS funds increased from 27 in 1994 to 124 in 2004, and during this period, the total assets under their management increased by about nine times, from $4 billion to $39 billion. The main attraction of a MS fund is that capital need not always be invested in a single strategy but can be shifted among different strategies according to their profitability. The ability to shift capital among strategies may be valuable since the profitability levels of different hedge fund strategies have varied over time. Another hedge fund industry product, fund of hedge funds (henceforth, FOFs) offers a similar benefit to investors by investing in different single-strategy hedge funds. FOFs have been around for a longer time than MS funds and also have significantly larger numbers. In 1994, there were 230 FOFs with over $8 billion in assets under management, which grew by 2004 to 909 funds with $151 billion under management.

In this paper, we investigate the relative performance of MS funds and FOFs during the period 1994 to 2004. In well-functioning markets, because they are similar investment vehicles, MS funds and FOFs should offer similar returns to investors. We measure the performances of MS funds and FOFs using alphas from both the style-factor model (that is, using the nine-style classification of Lipper TASS) and the seven-factor model of Fung and Hsieh (2004). All our analyses yield a single outcome, namely, that MS funds significantly outperform FOFs. Further, the superior performance of MS funds appears to be reasonably stable over the sample period. We find that the MS funds outperform FOFs on a risk-adjusted basis by 2.6% to 4.8% per year in gross-of-fees alphas and by 3.0% to 3.6% in net-of-fees alphas. These values for the superior performance of MS funds are statistically significant and their magnitudes make them

economically significant as well. Further, these findings from univariate comparisons of alphas continue to hold when we analyze the performances of MS funds and FOFs in a multivariate setting where we control for characteristics such as fund size, management fees, incentive fees, fund flows, lockup periods, notice periods, redemption periods, hurdle rates, and high watermarks.[1]

In our writing, we regularly imply that an MS fund has *one* manager, or that an FOF has *one* manager, or that an FOF manager invests in single strategy funds each of which is managed by a *single* manager. We recognize that a MS fund is likely to be managed by a management team and we use the term manager for expositional ease to refer to a management unit. Further, it is likely that some MS funds, most likely the larger ones, may have one person who is the "orchestra leader" who leads a team of single-strategy managers.[2] Such MS funds are closer in management structure to the FOFs, a fact that could potentially affect the interpretation of our findings. To investigate the impact of similar management structures between large MS funds and FOFs, we analyze large and small MS funds separately and compare their performances with FOFs. While the performance of smaller MS funds is generally better than that of larger MS funds, we find that both large and small MS funds outperform FOFs in a significant manner.

Despite the fact that both MS funds and FOFs offer hedge fund investors the ability to move capital among different investment strategies, the two products differ in dimensions that may potentially explain the differences in their performance. We classify these differences into the

[1] The lockup period is the minimum time for which the investor must commit the capital. At the end of the lockup period, an investor who wishes to withdraw needs to give advance notice (notice period) and then has to wait for some more time to receive the money (redemption period). Following Agarwal, Daniel, and Naik (2006), we add the notice period and redemption periods since they are applied back to back, and refer to the sum as the "restriction period." They show that the longer restriction period is associated with superior performance. Hurdle rate provision implies that the manager does not get paid any incentive fee if the fund returns are below the specified hurdle rate, which is usually a cash return like the London Interbank Offered Rate (LIBOR). High watermark provision means the manager earns incentive fees only on new profits, i.e., after recovering past losses, if any.

[2] We thank the referee for the term "orchestra leader."

following four broad categories: (1) agency risk, (2) flexibility, (3) fee structure, and (4) self-selection by managers.[3] The fund's size, age, and return volatility proxy for agency risk to some extent. Following Agarwal, Daniel, and Naik (2006), lockup and restriction periods proxy for managerial flexibility or discretion because if these periods are longer, they provide the manager to invest from long-term point of view and/or invest in illiquid securities. Controlling for differences in agency risk and flexibility, we find that FOFs underperform on both pre-fee and post-fee basis when we use risk-adjusted performance from several different risk models. This suggests that inefficient fee structure in FOFs, as has been argued by some in the literature, also cannot completely explain the underperformance of FOFs. This leaves us with the single explanation of self-selection of managers with greater ability in MS funds being the driving force behind the superior performance of MS funds relative to FOFs.

There is a large literature on individual (single-strategy) hedge funds that examines risk and return characteristics, performance, and compensation structures.[4] To our knowledge, there are no studies that focus on multi-strategy hedge funds, but there is a strand of literature that focuses on FOFs. Research on FOFs can be broadly partitioned into two sets of papers, one that analyzes their absolute performance as well as performance relative to single-strategy hedge funds and another that analyzes the determinants for the documented underperformance of FOFs. Among the set of papers on the relative performance of FOFs are Ackermann, McEnally, and Ravenscraft (1999), Capocci and Hubner (2004) and Fung and Hsieh (2004) who show that FOFs underperform relative to individual hedge funds. Kat and Palaro (2006) show that FOFs also underperform relative to a passive trading strategy using S&P 500 index, T-bond, and Eurodollar futures. Despite the evidence on the average underperformance of FOFs, Capocci and

[3] We elaborate more on each of these potential explanations later in Section 4 of the paper when we discuss the findings from our multivariate analysis.
[4] See Agarwal and Naik (2005) for a comprehensive survey of this literature.

Hubner (2006) find evidence of persistence in the performance of best-performing FOFs based on Sharpe ratios.[5] Finally, Fung, Hsieh, Naik, and Ramadorai (2007) show that better performing FOFs receive greater capital flows, which adversely affect their ability to generate superior returns in the future.

A second set of papers attributes the underperformance of FOFs to their inefficient double-layered fee structure of (see, e.g., Amin and Kat (2003) and Brown, Goetzmann, and Liang (2004)). However, Ang, Rhodes-Kropf, and Zhao (2005) show that there exist plausible conditions under which this fee structure of FOFs can be justified and that FOFs can be a sensible investment compared to individual single-strategy hedge funds. The growth in MS funds can be partially explained by institutional investors moving to these funds to avoid the double layer of fees in FOFs. Since both MS funds and FOFs provide diversification across different hedge fund strategies, it appears that the former is indeed a cheaper alternative to the latter. However, our finding that MS funds outperform FOFs on both gross- and net-of-fees basis casts some doubt on lower fee structures being the primary reason for institutional interest in MS funds.

None of the papers mentioned above examines the relative performance of FOFs and MS funds and the contribution of our paper lies in examining this issue. To the best of our knowledge, our paper is the first to conduct a detailed examination of the MS funds and compare their performance with FOFs. We believe that the differences between these two apparently homogenous offerings from the hedge fund industry have the potential to explain differences in their risk-adjusted performances.

[5] Fung and Hsieh (2000) show that FOFs studies suffer less from survivorship bias as compared to studies of individual funds.

2. Data

We use data from Lipper TASS for our study for the period from January 1994 to December 2004. Table I presents some descriptive statistics for our sample. We have a total of 1,358 funds in the sample out of which there are 1,185 FOFs and 173 MS funds. In order to mitigate the survivorship bias, we include all the defunct funds that disappear from the sample because of reasons such as liquidations, mergers, being closed for new investment, or stoppage in reporting. In Panel A of Table I, we report the numbers and total assets under management of "live" and "dead" (more appropriately, defunct) MS funds and FOFs for each year of the sample period. In Panel B, we report averages for MS fund and FOF characteristics under two distinct assumptions about their evolution, namely, whether they are time-invariant or they vary over time. Throughout the paper, we use variables winsorized at the 99% level to mitigate outlier effects. In the last column of Table I, Panel B, we report the differences in the averages and indicate whether they are significantly different in a t-test for differences in means. We use the clustered standard errors with clustering over both fund and time for the t-tests. We find that MS funds charge significantly higher incentive fees but similar management fees as FOFs. Note here that FOFs charge the reported incentive fees *in addition* to those charged by the funds in its portfolio. MS funds have significantly longer lockup periods, greater percentage of funds with hurdle rates and high watermark provisions but a lower percentage of offshore status. Finally, MS funds are younger and have higher percentage flows but similar levels of volatility based on both net-of-fee and gross-of-fee returns.

3. Methodology and Results

3.1. Univariate Analysis

We conduct our analysis using both equally-weighted portfolios of MS funds and FOFs (*portfolio approach*) as well as individual funds (*individual fund approach*). In order to estimate the risk-adjusted performance measures (alphas), we use two different multifactor models and estimate alphas over the entire sample period. We also estimate alphas over 36-month rolling windows to allow for variation in alphas and betas over time. This methodology takes into account the dynamic trading strategies of hedge funds (Fung and Hsieh (1997) and Agarwal and Naik (2004)). Finally, we conduct our analysis both on net-of-fee and gross-of-fee basis, where we calculate gross-of-fee performance after accounting for the option-like incentive contract as in Agarwal, Daniel, and Naik (2006).

Our first model is a style-factor model using the nine-style classification of Lipper TASS, namely, convertible arbitrage, short selling, emerging markets, equity market neutral, event driven, fixed income, global macro, long short, and managed futures.[6] Since both MS funds and FOFs diversify across these styles/categories, the idea in using the nine-style-factor model is similar to the returns-based style analysis in Sharpe (1992). The betas from the nine-style factor model can be interpreted as the exposure to the different Lipper TASS styles. Thus, alphas from such a model would represent the style-adjusted excess returns, where style has a connotation of a risk factor here.[7] We do not, however, force the factor loadings to add to one and also do not restrict them to be non-negative. Introducing these constraints can distort the identification of risk exposures of hedge fund strategies for all the analyses (see Agarwal and Naik (2000)). The limitation of this approach is that it is hard to economically justify negative betas since it is not possible to short hedge funds.

[6] See the website: http://www.hedgeindex.com/hedgeindex/en/invxoverview.aspx?cy=USD for definitions of hedge fund styles.
[7] Lhabitant (2001) uses a similar model to estimate the value-at-risk (VaR) of hedge funds.

Our second model is the seven-factor model of Fung and Hsieh (2004), who demonstrate that this model can explain a large proportion of the variation in the returns of FOFs. The seven factors include an equity market (S&P 500 index) factor, a size-spread (Wilshire Small Cap 1750 minus Wilshire Large Cap 750) factor, a bond market (change in the US Federal Reserve 10-year constant maturity yield) factor, a credit spread (change in the difference between Moody's BAA yield and the Federal Reserve's 10-year constant-maturity yield) factor, and three option-based factors for bonds, currencies, and commodities (portfolios of lookback straddles on bond, currency, and commodity futures respectively).[8]

We present our findings using the portfolio approach for the entire sample (without allowing betas to vary over time) in Table II. In Panel A of the table, we report the raw returns for equally-weighted portfolios of MS funds and FOFs. In terms of raw returns, MS fund portfolio outperforms FOF portfolio by 35 basis points per month using net-of-fee returns and by 49 basis points using gross-of-fee returns. These differences in raw returns are statistically significant at the one percent level. We also investigate the evolution the returns of MS funds and FOFs over time. Panel A of Figure 1 plots the growth of $100 invested in November 1993 in portfolios of MS funds and FOFs on both gross- and net-of-fee basis. In November 2004, the $100 investment in MS funds grows to approximately $480 ($355) whereas the same investment in FOFs becomes $253 ($224) on a gross-of-fees (net-of-fees) basis, respectively. The superior performance of MS funds is reasonably stable over the sample period. In Panel B of Figure 1, we plot the differences in gross- and net-of-fee returns between MS funds and FOFs. While there are some periods where FOFs performed better, in general, MS funds outperformed FOFs over the entire sample period.

[8] We thank David Hsieh for providing the returns data on the seven factors.

We next compare the raw returns of portfolios of MS funds and FOFs to that of single-strategy hedge funds. In results not reported, we find that the net-of-fees and gross-of-fees returns on the portfolio of single-strategy funds are 0.94% and 1.14% per month, respectively. These values are significantly greater than the returns of 0.62% and 0.72% on the portfolio of FOFs, which confirms the finding in the literature that FOFs significantly underperfom single-strategy funds. We note that the net-of-fees and gross-of-fees return on the portfolio of MS funds of 0.97% and 1.21% per month are statistically not different from the corresponding values for the portfolio of single-strategy funds.

We then estimate the alphas and betas for equally-weighted portfolios of MS funds and FOFs using the two multifactor models for the entire sample period from 1994-2004. We use Newey and West (1987) standard errors to adjust for any serial correlation in returns while estimating the alphas and betas in the time-series regressions. We report the univariate results for returns, risk-adjusted returns (alphas), betas, and adjusted R-squares for the nine-style-factor model and Fung and Hsieh (2004) seven-factor model in Panels B and C of Table II, respectively. The adjusted R-squares indicate that both the models explain a significant proportion of the variation in the returns of equally-weighted portfolios of MS funds and FOFs. According to the nine-style factor model (Table II, Panel B), MS funds outperform FOFs by 43 basis points per month on net-of-fee and by 58 basis points on gross-of-fee basis. The corresponding figures for outperformance of MS funds in Table II, Panel C using the Fung and Hsieh (2004) seven-factor model are 36 basis points and 48 basis points per month. Table II, Panels B and C also report the betas from the two multifactor models. We observe similar patterns for betas whether we use net-of-fee or gross-of-fee returns. Panel B shows that MS funds have lower exposure to short selling, global macro, long short, and managed futures

strategies compared to FOFs. Panel C reveals that MS funds have lower exposure to the portfolio of lookback straddles on the currency futures. Overall, the univariate results in Table II indicate that FOFs underperform MS funds both on pre-fee and post-fee basis.

Since hedge funds use dynamic trading strategies, we next allow for time-varying alphas and betas by using a 36-month rolling regression of equally-weighted portfolios of MS funds and FOFs, moving the estimation window by 12 months each time. So, our first estimates of alphas and betas are based on the period January 1994 to December 1996, our second estimates correspond to January 1995 to December 1997, and so on. Since this method, because of different estimation windows, produces several estimates of alphas, betas, and adjusted R-squares, we report their averages in Table III. Panel A reports the findings when we use the nine-style factor model and Panel B presents the findings from estimating the seven-factor model. Results in Panel A indicate that MS fund portfolios outperform FOF portfolios by 48 basis points (57 basis points) per month using net-of-fee (gross-of-fee) alphas from nine-style factor model. The results are similar for the seven-factor model in Panel B with MS fund portfolios outperforming FOF portfolios by 43 basis points (46 basis points) using net-of-fee (gross-of-fee) alphas. There are significant differences in the betas from the two models between the MS fund portfolios and FOF portfolios for more number of factors than was the case in Table II. This indicates the importance of allowing for betas to vary over time. The univariate results in Table III further strengthen the inference from Table II findings that MS funds outperform FOFs.

It is possible that investors are more interested in the performance of individual MS funds and FOFs rather than the performance of equally weighted portfolios of these funds. Therefore, we repeat our analysis at individual fund level using the two multifactor models described earlier. Since we estimate the two models for each fund, Table IV reports the averages of alphas,

betas, and adjusted R-squares using the entire sample period, while Table V reports the same statistics for the 36-month rolling windows to allow for variation in alphas and betas over time. For computing the averages, we only consider those alphas and betas that are significant at 5% level or less. The raw return statistics presented in Panel A of Table IV indicate that even when the analysis is at the individual fund level, MS funds significantly outperform FOFs by 32 basis points (39 basis points) per month on the basis of net-of-fee (gross-of-fee) returns. Panels B and C tell a similar story with the underperformance of FOFs compared to MS funds being more severe — 144 basis points (150 basis points) per month for net-of-fee (gross-of-fee) alphas from nine-style factor model, and 53 basis points (60 basis points) per month for net-of-fee (gross-of-fee) alphas from seven-factor model. When we allow for variation in alphas and betas over time in Table 5, we continue to find MS funds significantly outperforming FOFs by 38 basis points (48 basis points) per month using net-of-fee (gross-of-fee) alphas from nine-style factor model, and by 32 basis points (34 basis points) per month for net-of-fee (gross-of-fee) alphas from seven-factor model.

As mentioned earlier, it is possible that larger MS funds may operate more like FOFs where there is an internal "orchestra leader" conducting several different single-strategy managers. We now investigate whether our finding that MS funds outperform FOFs holds for both large and small MS funds. We split the sample of MS funds into BIG and SMALL groups based on the median fund size each year.[9] We then compare the performances of BIG and SMALL MS funds with FOFs using both the portfolio approach (equally-weighted portfolios of MS funds and FOFs) as well as the individual fund approach. As before, we compute the risk-adjusted performance using both the style-factor model and Fung and Hsieh (2004) seven-factor

[9] To compute the fund size, we use the maximum of monthly assets under management (AUM) each year because in many cases, the end-of-the-year AUM is not available for a fund.

model with and without allowing for time-variation in alphas and betas. We report the results from our analysis in Table VI.

In Panel A of Table VI, we observe that although the performance of BIG MS funds is lower than that of SMALL MS funds, the BIG group still significantly outperforms the FOFs by 35 and 46 basis points per month using net-of-fee and gross-of-fee returns, respectively. The results are similar for alphas from the two multifactor models – 38 and 52 basis point for the nine style-factor model and 36 and 48 basis points using the Fung and Hsieh (2004) seven-factor model using net-of-fee and gross-of-fee alphas, respectively. Panel B of the table reports the results when we follow an individual fund approach. Again, we observe that BIG MS funds underperform SMALL MS funds but still outperform FOFs significantly by 29 and 39 basis points per month using net-of-fee and gross-of-fee returns, respectively. Using alphas from the two multifactor models yields similar results. When we allow for time-variation in the alphas and betas by estimating the two multifactor models using a 36-month rolling window, our results remain unchanged (Panels C and D). Overall, these results suggest that if managers of BIG MS funds indeed operate as "orchestra leaders", these funds still outperform FOFs. The caveat here is that we do not observe the exact organizational structure of MS funds and fund size may not be the best indicator of the existence of an "orchestra leader."

3.2. Multivariate Analysis

The univariate results in Tables II to VI provide reasonably consistent evidence that MS funds outperform FOFs both on raw returns and on a risk-adjusted basis. However, these univariate tests do not control for fund characteristics such as fund's standard deviation, size, age, management and incentive fee, and other factors that have been shown to be related to

hedge fund returns (e.g., Agarwal, Daniel, and Naik (2006)). Therefore, we next estimate the following multivariate regression using annual data in which we control for these factors.

$$\begin{aligned} Perf_{i,t} = {} & \lambda_0 + \lambda_1 MS + \lambda_2 \sigma_{i,t-1} + \lambda_3 Size_{i,t-1} + \lambda_4 Age_{i,t-1} + \lambda_5 Mgmtfee_i \\ & + \lambda_6 Incfee_i + \lambda_7 Flow_{i,t-1} + \lambda_8 Lockup_i + \lambda_9 Redpd_i + \lambda_{10} HR_i \\ & + \lambda_{11} HW_i + \sum_{t=1}^{8} \lambda_{12}^{s} I(Year_t) + \xi_{i,t} \end{aligned} \qquad \textbf{(1)}$$

where $Perf_{i,t}$ is the performance measure (alpha from nine-style factor or seven-factor model) of fund *i* in year *t*, MS is an indicator variable that equals 1 if fund is a multi-strategy fund and 0 otherwise, $\sigma_{i,t-1}$ is the standard deviation of the monthly returns of fund *i* during year *t-1*, $Size_{i,t-1}$ is the size of the fund measured as the natural logarithm of the assets under management for fund *i* during year *t-1*, $Age_{i,t-1}$ is the logarithm of age of fund *i* at the end of year *t-1*, $Mgmtfee_i$ is the management fee of fund *i*, $Incfee_i$ is the incentive fee of fund *i*, $Flow_{i,t-1}$ is the percentage money flows in fund *i* in year *t-1*, $Lockup_i$ is the lockup period of fund *i*, $Redpd_i$ is the restriction period (sum of notice period and redemption period) of fund *i*, HR_i (HW_i) is an indicator variable that equals 1 if there is a hurdle rate (high-water mark) provision in fund *i* and 0 otherwise, and $I(Year_t)$ are year dummies that take a value of 1 during a particular year and 0 otherwise, and $\xi_{i,t}$ is the error term.

We compute the alphas using 36 months of returns on a rolling basis, which introduces an overlap in the dependent variable of two years causing the standard errors to be understated. To correct this bias, we adjust the standard errors using White (1980) to account for autocorrelation by clustering them on fund and time.[10] Clustering over fund takes care of the correlation of a

[10] This correction is also known as the Rogers correction. This adjustment can be contrasted with the Newey-West (1987) correction for autocorrelation, which can be specified up to a particular lag length. As Petersen (2006) notes, the Rogers

fund's returns (or alphas) over time, while clustering on time, adjusts for the cross-correlation in fund residuals in the same year. As in the univariate tests earlier, we conduct our analysis using both net-of-fee and gross-of-fee alphas.

We report our findings in Table VII. We find a positive and significant coefficient on the MS indicator variable for both the multifactor models both on a pre-fee and post-fee basis. MS funds outperform FOFs by 40 basis points (34 basis points) per month on a gross-of-fee (net-of-fee) basis using the nine-style factor model. The result is similar for the Fung and Hsieh (2004) seven-factor model with MS outperforming by 22 basis points and 25 basis points per month using gross-of-fee and net-of-fee alphas, respectively. These figures ranging from 2.6% per year to 4.8% per year are large and underscore the economic significance of our results, in addition to their being statistically significant at the 1% level.

We also perform Fama-MacBeth (1973) regressions as a robustness check and report the results in Table VII. Again, we adjust for the serial correlation in the coefficient estimates over time by using Newey-West (1987) correction. The results are similar for the nine-style factor model with FOFs underperforming MS funds by 35 basis points (30 basis points) per month using gross (net) alphas. Using the Fung and Hsieh (2004) seven-factor model, the coefficient on MS indicator variable is positive but not significant. Overall, the results from the multivariate analysis confirm that MS funds outperform FOFs.

4. Discussion of Findings

If MS funds and FOFs are identical in all respects, then we should either observe similar returns for the two investment vehicles or, if the returns are different, a lot more MS funds and a

correction produces unbiased estimates, while the Newey-West (1987) correction will lead to biased estimates (although the longer the lag length, the smaller the bias).

lot fewer FOFs. The findings from our analyses described above lead to a fairly robust conclusion that MS funds outperform FOFs and this superior performance appears to be have been fairly stable over past decade. Further, both investment vehicles have shown considerable growth in demand over the past decade or so. Explaining these two empirical regularities in a rational framework is a challenge. We now discuss a possible scenario in which both investments can exist and still offer differential returns.

Despite the fact that both MS funds and FOFs offer hedge fund investors the ability to move capital among different investment strategies, the two products differ in dimensions that may potentially explain the differences in their performance. We classify these differences into the following four broad categories: (1) agency risk, (2) flexibility, (3) fee structure, and (4) self-selection by managers. The first attribute on which MS funds and FOFs differ is *agency risk*. There are three aspects to this agency risk. First, a FOF manager invests in other hedge funds and it is possible for investors to observe the performance of these hedge funds separately. As a result, FOF investors can determine how successful the FOF manager is in deploying capital into profitable hedge fund strategies. The strategy-switching activities of MS fund managers, on the other hand, are more difficult for investors to determine and evaluate because they are by the very nature of MS funds, more opaque. This lack of observability of managerial actions in MS funds is one source of agency risk.

The second source of agency risk arises because in a MS fund, a single manager must be able to adapt to environmental changes and shift investment to a (possibly completely different) investment strategy. In other words, the MS fund manager is expected to be an expert in several if not all hedge fund investment strategies. It is more difficult for a single manager to be adept at multiple strategies and, therefore, the MS manager is more likely to take on investment tasks at

which he/she is less skilled. This likelihood of an excessive span of control on the part of the MS manager is the second source of agency risk. Finally, investors in MS funds need to conduct their own due diligence whereas FOFs often advertise this as one of the important services that they render. The absence of sufficient due diligence in MS funds is the third source of agency risk, namely that investors face a greater likelihood of misrepresentation and misappropriations.

It appears that investors in MS funds face greater agency risk than those who invest in FOFs. Rational investors can correctly anticipate the additional agency risk attached to MS fund investments. In equilibrium, if MS funds are to exist along with FOFs, MS funds must offer better returns to compensate investors for their exposure to higher levels of agency risk. In our multivariate analysis, we control for agency risk by including fund's size, age, and return volatility. One can argue that bigger and older funds should have lower agency risk and that agency risk should manifest itself in terms of greater fund volatility.

The second feature on which MS funds differ from FOFs is in the *degree of flexibility*. MS funds have greater flexibility because the manager can more easily move money from a poorly performing strategy to a well-performing one. For example, MS funds can "time" across different hedge fund strategies that may be cyclical in nature to enhance their performance. In contrast, FOFs have to first provide notice to the poorly-performing fund before withdrawing their investment and then wait to invest in the fund using the well-performing strategy. The ability to time investments better may enable MS funds to earn higher returns. Even in those cases where the MS fund is so large that there is one manager leading a team of single-strategy managers, it may be easier for MS funds to reallocate funds among internal strategy managers than for an FOF to reallocate among different strategy funds. Further, as we show later, MS funds have longer lockup periods as compared to FOFs. Therefore, MS funds have the ability

invest in less liquid investments, which offer them the potential to earn higher investment returns. In our analysis, to control for flexibility, we follow Agarwal, Daniel, and Naik (2006), and include lockup and restriction periods as proxies for managerial flexibility or discretion. The intuition is that longer lockup and restriction periods should provide managers with more flexibility to invest from long-term point of view and/or invest in relatively illiquid securities.

The third dimension along which the two investment vehicles differ is their fee structure. FOFs charge a fee on top of what the individual hedge funds in their portfolios charge. Thus, ceteris paribus, the higher fees associated with FOFs should lead to net-of-fee returns being lower for FOFs. However, some MS funds charge incentive fees "at the individual book level and not at the fund level." In other words, instead of applying incentive fees on the total net of the portfolio, the manager pays himself incentive fees on each fund that posts a gain and will carry the losses forward. Such an arrangement can lead to a fee structure that is similar in nature to the FOF fee structure. To the extent that only some MS funds may have similar double-layered fee structure as FOFs, it is likely that MS funds, on average, should have better net-of-fee performance compared to FOFs. We find that MS funds outperform FOFs using risk-adjusted performance from several different risk models both on a pre-fee and post-fee basis, which suggests that the inefficient fee structure in FOFs, as has been indicated in the literature, cannot completely explain the underperformance of FOFs.

The fourth element that can explain the difference between MS funds and FOFs is managerial self-selection. The rewards to a successful manager of a hedge fund are large but so are the expected costs of poor performance.[11] A risk-averse manager will place disproportionately more weight on the costs than on the returns. Since managing a MS fund

[11] For example, Brown, Goetzmann, and Park (2001) find that poor relative performance significantly increases the probability of termination with little chances of reemployment.

requires the manager to be adept at several different investment strategies, ceteris paribus, the probability that the manager will fail is likely to be greater. Thus, the expected costs to the MS manager may be substantially greater. Therefore, it is plausible that "better" managers, that is, managers with better ability to manage multiple strategies, self-select into becoming MS fund managers. If there is competition among MS funds, the rents (in the form of superior return performance) from employing better managers will accrue to investors. The argument that MS funds perform better because better managers self-select to become MS fund managers is consistent with the observation that a number of hedge funds that evolved into MS funds were actually poorly performing single-strategy funds, in particular, convertible arbitrage funds.[12] There was likely a significant systematic part to the poor performance of convertible arbitrage funds, since the profitability of hedge fund strategies are known to vary considerably over time.[13] Clearly not all the managers of these "failing" convertible arbitrage hedge funds became MS fund managers, but only those who believed/knew that their abilities were superior or more transferable across strategies. The limited supply of managers who have the belief in their superior ability may explain why, despite their superior performance, MS funds are still relatively few in number.

Since we control for the first three explanations — agency risk, flexibility, and fee structure in our results from multivariate analysis in Table VII — it leaves us with the single explanation of self-selection being the driving force behind the superior performance of the MS funds relative to FOFs. This, in turn, suggests that MS fund managers may possess superior ability

[12] Lipper/Tremont Advisory Shareholder Services (hereafter Lipper TASS) state that "Many Multi-Strategy managers began as convertible arbitrage managers that diversified into other strategies."

[13] Agarwal, Fung, Loon, and Naik (2006) show that a significant proportion of the variation in the returns of convertible arbitrage hedge funds is explained by systematic asset-based style factors constructed by taking a long position in the convertible bonds and hedging equity, interest, and credit risks. In addition, they show that the returns of convertible arbitrage funds are also affected by the discrete market disruption events where liquidity dries up. Neither systematic factors nor liquidity shocks is related to the manager's ability.

compared to FOFs. For example, one can think of MS fund managers having greater timing ability in allocating capital across different hedge fund strategies. Self selection by better ability managers into MS funds is consistent with there being fewer MS funds because there is a likely to be a limited supply of better ability managers.

5. Conclusion

Recently, we have witnessed a rapid growth in two types of investment vehicles in the hedge fund industry — multi-strategy funds and funds of hedge funds, both of which offer diversification across different hedge fund strategies. This ability to diversify across strategies may be valuable to investors as they can help them offset the cyclical nature in the profitability of some of the hedge fund strategies. In well-functioning markets, an equilibrium in which both these products exist simultaneously requires that *ceteris paribus* MS funds and FOFs generate similar returns for investors. In this paper, we investigate the relative performance of these investment vehicles and find that MS funds outperform FOFs significantly.

Using a large sample of 1,185 FOFs and 173 MS funds, we find that MS funds outperform FOFs on a risk-adjusted basis ranging by 22 to 40 basis points per month (or 2.6% to 4.8% per year) on a gross-of-fee basis and 25 to 34 basis points per month (or 3.0% to 3.6% per year) on a net-of-fee basis, after controlling for various fund characteristics. We find that the superior performance of MS funds persists whether returns are computed on net- or gross-of-fees basis. This finding suggests that the higher fees inherent in the FOF organization structure cannot be the complete explanation for the performance differential.

We propose possible explanations for why these return differentials can exist in equilibrium. Our explanations are based on the observed differences in the characteristics of these two investment products. We argue that MS funds are likely to have greater levels of

agency risk because their investments can be more opaque and their managers may be forced to invest in strategies in which they do not have adequate expertise. Rational investors correctly anticipate these additional agency risks in MS funds relative to FOFs and demand higher returns from them. MS funds are able to offer these compensatory higher returns because they enjoy greater investment flexibility and are able to invest in less liquid investments because of longer lockup periods. We also propose the possibility that since the managers of MS funds must have expertise in many hedge fund strategies, they face higher probabilities of making losses. Thus, it is possible that managers of "better" ability self-select into becoming MS fund managers. Better managers make better investments and, since MS funds operate in a competitive environment, the benefits of these better investments accrue to investors in the form of superior returns on net- as well as gross-of-fees basis. Controlling for differences in agency risk, flexibility, and fee structure between MS funds and FOFs, our results suggest that self-selection by managers with superior ability in MS funds may be the driving force behind their superior performance relative to FOFs.

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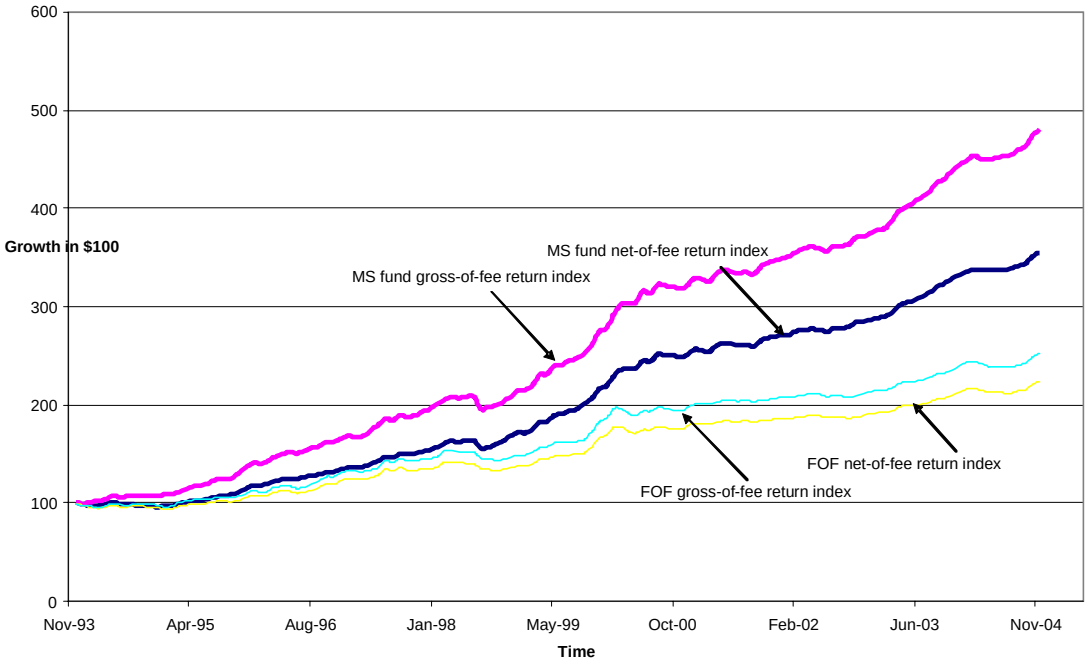
Figure 1: Performance of Multistrategy (MS) Funds and Funds of Hedge Funds (FOFs) over time

Figure in Panel A plots the growth in $100 invested in a portfolio of multistrategy (MS) funds and funds of hedge funds (FOFs) between January 1994 and December 2004. Figure in Panel B plots the differences in the average monthly returns of MS funds and FOFs during the same period.

Panel A



Panel B

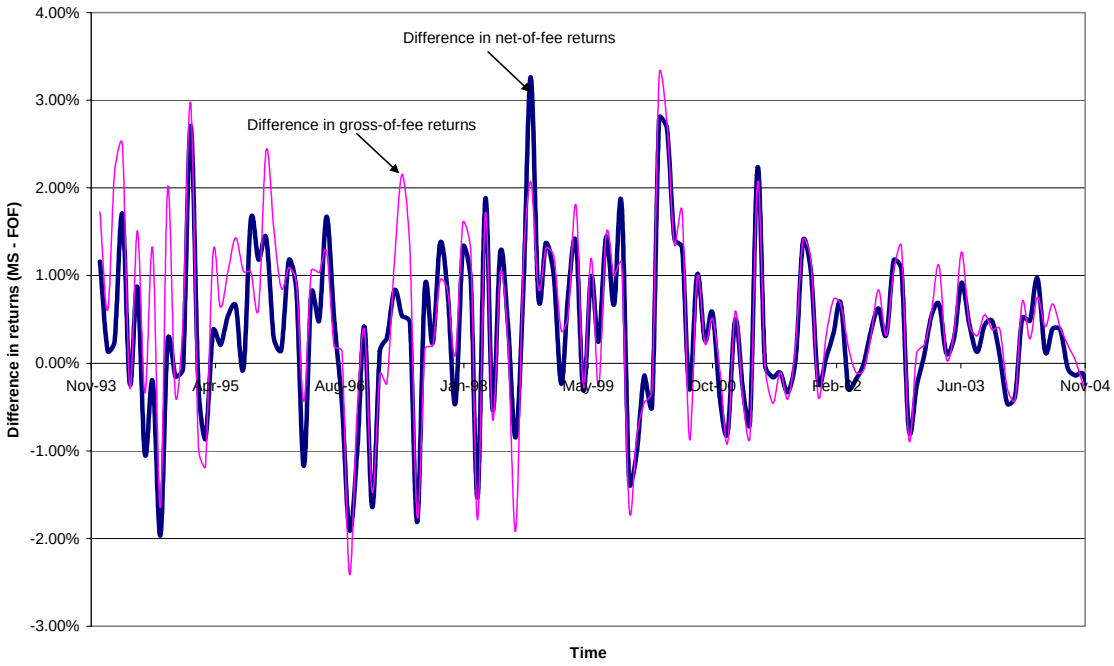


Table I: Summary statistics of multi-strategy funds and funds of hedge funds

Panel A of this table reports the growth in the number and amount of assets under management of multi-strategy (MS) funds and funds of hedge funds (FOFs) during our sample period from 1994 to 2004. Panel B reports the averages of the time-invariant fund characteristics (management fee, incentive fee, lockup period, notice period, redemption period, restriction period (sum of notice and redemption periods)) and percentage of funds with hurdle rate, high watermark, and offshore status. It also reports the averages of the time-variant fund characteristics (age, size (beginning of year assets under management (AUM)), flows (AUM in year t minus AUM in year t-1 less the return between year t and t-1 divided by total assets in year t-1), and standard deviation of the monthly net-of-fee and gross-of-fee returns). All the variables are winsorized at the 99% level. Panel B also reports the differences with the results of a t-test comparing the means of fund characteristics of MS funds with FOFs, using clustered standard errors with clustering both on fund and time.

Panel A: Number of funds and assets under management by year

Year	Number of MS funds			MS total assets under management ($ millions)			Number of FOFs			FOF total assets under management ($ millions)		
	Live	Dead	Total	Live	Dead	Total	Live	Dead	Total	Live	Dead	Total
1994	13	14	27	$4,182	$43	$4,225	94	136	230	$5,785	$2,832	$8,617
1995	17	13	30	$6,131	$86	$6,217	124	166	290	$6,557	$3,295	$9,852
1996	25	13	38	$6,743	$272	$7,015	156	173	329	$8,853	$3,598	$12,451
1997	31	19	50	$9,512	$116	$9,628	189	181	370	$12,578	$5,289	$17,867
1998	38	20	58	$9,517	$112	$9,629	232	186	418	$15,127	$5,314	$20,441
1999	46	18	64	$11,780	$4,084	$15,864	290	164	454	$18,513	$4,736	$23,249
2000	56	21	77	$10,814	$8,783	$19,597	340	160	500	$28,148	$4,273	$32,421
2001	68	22	90	$15,569	$12,520	$28,089	464	138	602	$44,180	$4,925	$49,105
2002	84	24	108	$21,820	$10,508	$32,328	588	111	699	$60,626	$5,014	$65,640
2003	100	26	126	$34,876	$8,226	$43,102	738	88	826	$94,191	$4,991	$99,182
2004	116	8	124	$34,200	$4,574	$38,774	865	44	909	$147,883	$3,153	$151,036

Panel B: Fund characteristics

Fund Characteristic	Mean: MS funds	Mean: FOFs	Difference (MS - FOF)
Time-invariant			
Management fee (%)	1.45	1.45	0.00
Incentive fee (%)	18.59	8.45	10.14***
Lockup (years)	0.29	0.15	0.14***
Notice Period (years)	0.11	0.11	0.00
Redemption Period (years)	0.19	0.22	-0.03
Restriction Period (years)	0.31	0.33	-0.02
Hurdle Rate (% of funds with the provision)	0.73	0.58	0.15***
High Watermark (% of funds with the provision)	0.62	0.42	0.20***
Offshore (%)	0.25	0.50	-0.25***
Time-variant			
Age (years)	3.82	4.39	-0.57*
Assets under management ($ millions)	185.45	80.03	105.42***
Flows (%)	10.65	-10.94	21.59***
Standard deviation of net-of-fee returns (%)	2.47	2.15	0.32
Standard deviation of gross-of-fee returns (%)	2.71	2.21	0.50*

Table II: Performance of Multi-Strategy funds versus Funds of Hedge Funds using portfolio approach

This table reports the results using both net-of-fee and gross-of-fee returns of an equally-weighted portfolio of multi-strategy (MS) funds and funds of hedge funds (FOFs). Panel A reports the results for raw returns. Panel B reports the results for alphas and betas from the nine-style factor model where the nine styles correspond to the nine Lipper TASS hedge fund indices — convertible arbitrage, short selling, emerging markets, equity market neutral, event driven, fixed income, global macro, long short, and managed futures. Panel C reports the results for alphas and betas from the Fung and Hsieh (2004) seven-factor model. The seven factors include S&P 500 index (S&P 500), Wilshire Small Cap 1750 minus Wilshire Large Cap 750 (SCLC), 10-year treasury, credit spread (change in the difference between Moody's BAA yield and the Federal Reserve's 10-year constant maturity yield), portfolio of lookback straddles on bond futures (PTFS bond), portfolio of lookback straddles on currency futures (PTFS currency), and portfolio of lookback straddles on commodity futures (PTFS commodity). Each of the panels also reports the differences between the performance of MS funds and FOFs using a t-test where standard errors are clustered on time. Coefficients marked with ***, **, and * are significant at the 1%, 5%, and 10% levels, respectively.

Panel A: Returns

	MS	FOF	Difference (MS-FOF)
Average Net of fee monthly returns (%)	0.97	0.62	0.35***
Average Gross of fee monthly returns (%)	1.21	0.72	0.49***

Panel B: Nine-style factor model

	Net-of-fee			Gross-of-fee		
	MS	FOF	Difference (MS-FOF)	MS	FOF	Difference (MS-FOF)
Monthly alpha (%)	0.22**	-0.21***	0.43***	0.41***	-0.17**	0.58***
Beta (convertible arbitrage)	0.15*	0.13**	0.02	0.13	0.14*	-0.01
Beta (short selling)	-0.06**	0.01	-0.07**	-0.07**	0.02	-0.09**
Beta (emerging markets)	0.02	0.06***	-0.04	0.02	0.04	-0.02
Beta (equity market neutral)	0.32***	0.24***	0.08	0.26**	0.27***	-0.01
Beta (event driven)	0.11	0.05	0.06	0.18*	0.09	0.09
Beta (fixed income)	-0.06	0.05	-0.11	-0.05	0.01	-0.06
Beta (global macro)	0.03	0.11***	-0.08**	0.06*	0.14***	-0.08*
Beta (long short)	0.14***	0.23***	-0.09*	0.12***	0.25***	-0.13**
Beta (managed futures)	0.01	0.09***	-0.08***	0.04*	0.10***	-0.06**
Adjusted R-square	68.3%	85.2%		62.2%	80.3%	

Panel C: Fung and Hsieh (2004) seven-factor model

	Net-of-fee			Gross-of-fee		
	MS	FOF	Difference (MS-FOF)	MS	FOF	Difference (MS-FOF)
Monthly alpha (%)	0.50***	0.14	0.36**	0.70***	0.22*	0.48***
Beta (S&P 500)	0.21***	0.16***	0.05	0.23***	0.17***	0.06
Beta (SCLC)	0.12***	0.17***	-0.05	0.14***	0.17***	-0.03
Beta (10-year Treasury)	0.06*	0.14***	-0.08	0.07	0.14***	-0.07
Beta (Credit Spread)	0.02	0.19*	-0.17	0.06	0.21*	-0.15
Beta (PTFS bond)	0.00	0.00	0.00	0.00	0.00	0.00
Beta (PTFS currency)	0.00	0.01***	-0.01***	0.00	0.02***	-0.02**
Beta (PTFS commodity)	0.01	0.02*	-0.01	0.01	0.02*	-0.01
Adjusted R-square	51.9%	46.2%		48.8%	43.3%	

Table III: Performance of Multi-Strategy funds versus Funds of Hedge Funds using portfolio approach allowing for time-varying alphas and betas

This table reports the results using both net-of-fee and gross-of-fee returns of an equally-weighted portfolio of multi-strategy (MS) funds and funds of hedge funds (FOFs). Panel A reports the average 36-month alphas and betas from the nine-style factor model where the nine styles correspond to the nine Lipper TASS hedge fund indices — convertible arbitrage, short selling, emerging markets, equity market neutral, event driven, fixed income, global macro, long short, and managed futures. Panel B reports the average 36-month alphas and betas from the Fung and Hsieh (2004) seven-factor model. The seven factors include S&P 500 index (S&P 500), Wilshire Small Cap 1750 minus Wilshire Large Cap 750 (SCLC), 10-year treasury, credit spread (change in the difference between Moody's BAA yield and the Federal Reserve's 10-year constant maturity yield), portfolio of lookback straddles on bond futures (PTFS bond), portfolio of lookback straddles on currency futures (PTFS currency), and portfolio of lookback straddles on commodity futures (PTFS commodity). 36-month alphas and betas are estimated from regressions of monthly net-of-fee and gross-of-fee returns using rolling regressions of 36 months starting from 1994 and ending in 2004. The standard errors for the differences in the raw returns, alphas, and betas have been adjusted for clustering over time. Coefficients marked with ***, **, and * are significant at the 1%, 5%, and 10% levels respectively.

Panel A: Nine-style factor model

	Net-of-fee			Gross-of-fee		
	Mean: MS	Mean: FOF	Difference (MS-FOF)	Mean: MS	Mean: FOF	Difference (MS-FOF)
Monthly alpha (%)	0.22	-0.26	0.48***	0.34	-0.23	0.57***
Beta (convertible arbitrage)	0.16	0.22	-0.06	0.24	0.24	0.00
Beta (short selling)	-0.05	0.02	-0.07***	-0.07	0.02	-0.09***
Beta (emerging markets)	0.05	0.09	-0.04**	0.06	0.08	-0.02
Beta (equity market neutral)	0.22	0.16	0.06	0.15	0.17	-0.02
Beta (event driven)	0.10	0.06	0.04	0.12	0.08	0.04
Beta (fixed income)	0.05	0.09	-0.04	0.07	0.08	-0.01
Beta (global macro)	0.00	0.07	-0.07***	0.02	0.09	-0.07***
Beta (long short)	0.11	0.22	-0.11**	0.12	0.24	-0.12***
Beta (managed futures)	0.03	0.11	-0.08***	0.07	0.13	-0.06***
Adjusted R-square	76.2%	89.6%		73.1%	88.5%	

Panel B: Fung and Hsieh (2004) seven-factor model

	Net-of-fee			Gross-of-fee		
	Mean: MS	Mean: FOF	Difference (MS-FOF)	Mean: MS	Mean: FOF	Difference (MS-FOF)
Monthly alpha (%)	0.54	0.11	0.43***	0.65	0.19	0.46***
Beta (S&P 500)	0.22	0.19	0.03	0.25	0.20	0.05***
Beta (SCLC)	0.11	0.16	-0.05***	0.15	0.17	-0.02
Beta (10-year Treasury)	0.00	0.07	-0.07**	0.05	0.09	-0.04
Beta (Credit Spread)	0.05	0.29	-0.24**	0.15	0.30	-0.15
Beta (PTFS bond)	0.00	0.01	-0.01	0.00	0.01	-0.01
Beta (PTFS currency)	0.00	0.01	-0.01***	-0.01	0.01	-0.02***
Beta (PTFS commodity)	0.01	0.02	-0.01*	0.01	0.02	-0.01
Adjusted R-square	63.2%	58.1%		60.4%	57.1%	

Table IV: Performance of multi-strategy funds versus funds of hedge funds using individual fund approach

This table reports the results using net-of-fee and gross-of-fee returns of individual multi-strategy (MS) funds and funds of hedge funds (FOFs). Panel A reports the results for returns. Panel B reports the average alphas and betas from the nine-style factor model where the nine styles correspond to the nine Lipper TASS hedge fund indices — convertible arbitrage, short selling, emerging markets, equity market neutral, event driven, fixed income, global macro, long short, and managed futures. Panel C reports the average alphas and betas from the Fung and Hsieh (2004) seven-factor model. The seven factors include S&P 500 index (S&P 500), Wilshire Small Cap 1750 minus Wilshire Large Cap 750 (SCLC), 10-year treasury, credit spread (change in the difference between Moody's BAA yield and the Federal Reserve's 10-year constant maturity yield), portfolio of lookback straddles on bond futures (PTFS bond), portfolio of lookback straddles on currency futures (PTFS currency), and portfolio of lookback straddles on commodity futures (PTFS commodity). Alphas and betas are estimated from regressions of monthly net-of-fee and gross-of-fee returns using the entire sample period, 1994-2004. The averages are reported only for those alphas and betas that are significant at less than or equal to 5% level. The standard errors for the differences in the raw returns, alphas, and betas have been adjusted for clustering over fund and time. Coefficients marked with ***, **, and * are significant at the 1%, 5%, and 10% levels, respectively.

Panel A: Returns

	Mean: MS	Mean: FOF	Difference (MS-FOF)
Net of fee monthly returns (%)	0.95	0.63	0.32***
Gross of fee monthly returns (%)	1.09	0.70	0.39***

Panel B: Nine-style factor model

	Net-of-fee			Gross-of-fee		
	Mean: MS	Mean: FOF	Difference (MS-FOF)	Mean: MS	Mean: FOF	Difference (MS-FOF)
Monthly alpha (%)	0.68	-0.76	1.44***	1.10	-0.40	1.50***
Beta (convertible arbitrage)	0.32	0.28	0.04	0.69	0.31	0.38*
Beta (short selling)	-0.23	-0.01	-0.22***	-0.36	0.00	-0.36***
Beta (emerging markets)	0.22	0.19	0.03	0.24	0.20	0.04
Beta (equity market neutral)	0.99	0.50	0.49**	-0.72	0.56	-1.28**
Beta (event driven)	0.06	0.27	-0.21	-0.11	0.33	-0.44*
Beta (fixed income)	0.16	0.28	-0.12	0.45	0.44	0.01
Beta (global macro)	-0.05	0.18	-0.23	-0.17	0.23	-0.40
Beta (long short)	0.59	0.41	0.18	0.54	0.47	0.07
Beta (managed futures)	0.08	0.33	-0.25*	0.31	0.30	0.01
Adjusted R-square	30.7%	52.0%		32.5%	54.2%	

Panel C: Fung and Hsieh (2004) seven-factor model

	Net-of-fee			Gross-of-fee		
	Mean: MS	Mean: FOF	Difference (MS-FOF)	Mean: MS	Mean: FOF	Difference (MS-FOF)
Monthly alpha (%)	0.85	0.32	0.53***	1.08	0.48	0.60***
Beta (S&P 500)	0.42	0.23	0.19***	0.41	0.23	0.18***
Beta (SCLC)	0.24	0.23	0.01	0.34	0.25	0.09
Beta (10-year Treasury)	0.24	0.22	0.02	0.27	0.24	0.03
Beta (Credit Spread)	0.03	0.53	-0.50*	0.75	0.61	0.14
Beta (PTFS bond)	0.03	0.03	0.00	0.04	0.02	0.02
Beta (PTFS currency)	0.02	0.03	-0.01	0.03	0.03	0.00
Beta (PTFS commodity)	-0.02	0.04	0.06**	0.04	0.07	-0.03
Adjusted R-square	18.3%	30.6%		16.7%	32.1%	

Table V: Performance of multi-strategy funds versus funds of hedge funds using individual fund approach allowing for time-varying alphas and betas

This table reports the results using both net-of-fee and gross-of-fee returns of individual multi-strategy funds and funds of hedge funds. Panel A reports the average 36-month alphas and betas from the nine-style factor model where the nine styles correspond to the nine Lipper TASS hedge fund indices — convertible arbitrage, short selling, emerging markets, equity market neutral, event driven, fixed income, global macro, long short, and managed futures. Panel B reports the average 36-month alphas and betas from the Fung and Hsieh (2004) seven-factor model. The seven factors include S&P 500 index (S&P 500), Wilshire Small Cap 1750 minus Wilshire Large Cap 750 (SCLC), 10-year treasury, credit spread (change in the difference between Moody's BAA yield and the Federal Reserve's 10-year constant maturity yield), portfolio of lookback straddles on bond futures (PTFS bond), portfolio of lookback straddles on currency futures (PTFS currency), and portfolio of lookback straddles on commodity futures (PTFS commodity). 36-month alphas and betas are estimated from regressions of monthly net-of-fee and gross-of-fee returns using rolling regressions of 36 months starting from 1994 and ending in 2004. The averages are reported only for those alphas and betas that are significant at less than or equal to 5% level. The standard errors for the differences in the raw returns, alphas, and betas have been adjusted for clustering over fund and time. Coefficients marked with ***, **, and * are significant at the 1%, 5%, and 10% levels, respectively.

Panel A: Nine-style factor model

	Net-of-fee			Gross-of-fee		
	Mean: MS	Mean: FOF	Difference (MS-FOF)	Mean: MS	Mean: FOF	Difference (MS-FOF)
Monthly alpha (%)	0.18	-0.20	0.38***	0.29	-0.19	0.48***
Beta (convertible arbitrage)	0.11	0.20	-0.09	0.10	0.20	-0.10
Beta (short selling)	-0.07	0.01	-0.08***	-0.07	0.01	-0.09***
Beta (emerging markets)	0.05	0.09	-0.04	0.03	0.08	-0.05
Beta (equity market neutral)	0.25	0.14	0.11	0.16	0.16	0.00
Beta (event driven)	0.16	0.10	0.06	0.24	0.12	0.12
Beta (fixed income)	0.04	0.11	-0.07	0.04	0.10	-0.06
Beta (global macro)	0.01	0.07	-0.06*	0.05	0.09	-0.04
Beta (long short)	0.11	0.22	-0.11**	0.13	0.23	-0.10*
Beta (managed futures)	0.04	0.11	-0.07*	0.05	0.11	-0.06
Adjusted R-square	41.6%	57.8%		41.5%	58.5%	

Panel B: Fung and Hsieh (2004) seven-factor model

	Net-of-fee			Gross-of-fee		
	Mean: MS	Mean: FOF	Difference (MS-FOF)	Mean: MS	Mean: FOF	Difference (MS-FOF)
Monthly alpha (%)	0.50	0.18	0.32***	0.58	0.24	0.34***
Beta (S&P 500)	0.21	0.19	0.02	0.23	0.18	0.05
Beta (SCLC)	0.13	0.16	-0.03	0.14	0.16	-0.02
Beta (10-year Treasury)	0.03	0.08	-0.05	0.06	0.10	-0.04
Beta (Credit Spread)	0.10	0.26	-0.16**	0.13	0.25	-0.12
Beta (PTFS bond)	0.00	0.01	-0.01	0.00	0.01	-0.01
Beta (PTFS currency)	0.00	0.01	-0.01***	0.00	0.01	-0.01***
Beta (PTFS commodity)	0.01	0.02	-0.01	0.01	0.02	-0.01
Adjusted R-square	24.6%	36.3%		24.3%	36.8%	

Table VI: Performance of Small and Large Multi-Strategy funds versus Funds of Hedge Funds

This table reports the average performance (using both net-of-fee and gross-of-fee returns as well as risk-adjusted returns) of large and small multi-strategy (MS: BIG and MS: SMALL) funds and funds of hedge funds (FOFs) using portfolios of MS funds and FOFs (*portfolio approach*) and individual MS funds and FOFs (*individual fund approach*). MS: BIG (MS: SMALL) funds are defined as the funds with above-median (below-median) size each year. The risk-adjusted returns are (a) alphas from the nine-style factor model where the nine styles correspond to the nine Lipper TASS hedge fund indices (convertible arbitrage, short selling, emerging markets, equity market neutral, event driven, fixed income, global macro, long short, and managed futures), and (b) alphas from the Fung and Hsieh (2004) seven-factor model, where the seven factors include S&P 500 index (S&P 500), Wilshire Small Cap 1750 minus Wilshire Large Cap 750 (SCLC), 10-year treasury, credit spread (change in the difference between Moody's BAA yield and the Federal Reserve's 10-year constant maturity yield), portfolio of lookback straddles on bond futures (PTFS bond), portfolio of lookback straddles on currency futures (PTFS currency), and portfolio of lookback straddles on commodity futures (PTFS commodity). We allow for alphas and betas to vary over time for the results in Panels C and D using 36-month rolling window for the regressions. Each of the panels also reports the differences between the performance of MS: SMALL and MS: BIG, the differences in the performance of MS: BIG and FOFs, and differences in performance of MS: SMALL and FOFs, using a t-test where standard errors are clustered on time for portfolio approach and clustered on fund and time for individual fund approach. Coefficients marked with ***, **, and * are significant at the 1%, 5%, and 10% levels.

	Net-of-fee						Gross-of-fee					
	MS: BIG	MS: SMALL	Difference (MS: BIG – MS: SMALL)	FOF	Difference (MS: BIG – FOF)	Difference (MS: SMALL – FOF)	MS: BIG	MS: SMALL	Difference (MS: BIG – MS: SMALL)	FOF	Difference (MS: BIG – FOF)	Difference (MS: SMALL – FOF)
Panel A: PORTFOLIO APPROACH (without time-varying alphas and betas)												
Average monthly returns (%)	0.97	0.98	–0.01	0.62	0.35***	0.36***	1.18	1.28	–0.10	0.72	0.46***	0.56***
Average monthly alpha from nine-style factor model (%)	0.17	0.26*	–0.09	–0.21***	0.38***	0.47***	0.35***	0.55***	–0.20	–0.17**	0.52***	0.72***
Average monthly alpha from Fung and Hsieh seven factor model (%)	0.50***	0.49***	0.01	0.14	0.36***	0.35***	0.70***	0.73***	–0.03	0.22*	0.48***	0.51***
Panel B: INDIVIDUAL FUND APPROACH (without time-varying alphas and betas)												
Average monthly returns (%)	0.92	0.98	–0.06	0.63	0.29***	0.35***	1.09	1.09	0.00	0.70	0.39***	0.39***
Average monthly alpha from nine-style factor model (%)	0.47	1.04	–0.57**	–0.36	0.83***	1.40***	0.53	1.37	–0.84**	–0.40	0.93***	1.77***
Average monthly alpha from Fung and Hsieh seven factor model (%)	0.62	0.94	–0.32	0.32	0.30***	0.62***	0.77	1.28	–0.51	0.48	0.29***	0.80**
Panel C: PORTFOLIO APPROACH (with time-varying alphas and betas)												
Average monthly alpha from nine-style factor model (%)	0.15	0.27	–0.12	–0.26	0.41***	0.53***	0.30	0.48	–0.18	–0.23	0.53***	0.71***
Average monthly alpha from Fung and Hsieh seven factor model (%)	0.52	0.57	–0.05	0.11	0.41***	0.46***	0.69	0.58	0.11	0.19	0.50***	0.39***
Panel D: INDIVIDUAL FUND APPROACH (with time-varying alphas and betas)												
Average monthly alpha from nine-style factor model (%)	0.08	0.26	–0.18*	–0.20	0.28***	0.46***	0.14	0.44	–0.30**	–0.19	0.33***	0.63***
Average monthly alpha from Fung and Hsieh seven factor model (%)	0.46	0.51	–0.05	0.18	0.28***	0.33***	0.59	0.57	0.02	0.24	0.35***	0.33**

Table VII: Multivariate analysis of Multi-Strategy funds and Funds of Hedge Funds

This table reports the results from the following pooled OLS regression using annual data for the period 1994 to 2004:
$Perf_{i,t} = \lambda_0 + \lambda_1 MS + \lambda_2 \sigma_{i,t-1} + \lambda_3 Size_{i,t-1} + \lambda_4 Age_{i,t-1} + \lambda_5 Mgmtfee_i + \lambda_6 Incfee_i + \lambda_7 Flow_{i,t-1} + \lambda_8 Lockup_i + \lambda_9 \mathrm{Re}dpd_i + \lambda_{10} HR_i + \lambda_{11} HW_i + \sum_{t=1}^{8} \lambda_{12}^{S} I(Year_t) + \xi_{i,t}$ where $Perf_{i,t}$ is the performance measure of fund *i* in year *t*, *MS* is a dummy that equals 1 if fund is a multi-strategy fund and 0 otherwise, $\sigma_{i,t-1}$ is the standard deviation (SD) of the monthly returns of fund *i* during year *t-1*, $Size_{i,t-1}$, $Age_{i,t-1}$, and $Flow_{i,t-1}$ are fund size, age, and % money flows of fund *i* at the end of year *t-1*, $Mgmtfee_i$, $Incfee_i$, $Lockup_i$, $Redpd_i$, HR_i, and HW_i are the management fee, incentive fee, lockup period, restriction period (sum of notice and redemption periods), hurdle rate, high watermark for fund *i*, $I(Year_t)$ are year dummies that take a value of 1 during a particular year and 0 otherwise, and $\xi_{i,t}$ is the error term. The two performance measures used are alphas from the nine-style-factor and Fung and Hsieh (2004) seven-factor models. To scale the coefficients for the independent variables, we multiply the alphas by 100. t-statistics using adjusted standard errors for autocorrelation within a cluster (with clustering on both fund and time) are shown below the coefficients in parentheses. Coefficients marked with ***, **, and * are significant at the 1%, 5%, and 10% levels.

	POOLED				**FAMA-MacBETH**			
	9-style-factor Alpha		Fung-Hsieh 7-factor Alpha		9-style-factor Alpha		Fung-Hsieh 7-factor Alpha	
	Gross	**Net**	**Gross**	**Net**	**Gross**	**Net**	**Gross**	**Net**
MS indicator	0.40%***	0.34%***	0.22%***	0.25%***	0.35%***	0.30%***	0.11%	0.15%
	(4.92)	*(4.68)*	*(2.69)*	*(3.60)*	*(6.31)*	*(3.98)*	*(1.25)*	*(1.59)*
Control Variables								
SD_{t-1}	-8.02**	-9.94***	-2.20	-4.90**	-9.01**	-10.48***	-2.12	-4.63
	(-2.31)	*(-4.47)*	*(-1.37)*	*(-2.47)*	*(-2.88)*	*(-5.15)*	*(-1.01)*	*(-1.74)*
$Log(fund\ size)_{t-1}$	0.02	0.02	0.04**	0.04**	0.02	0.02*	0.06**	0.05**
	(1.02)	*(0.90)*	*(2.50)*	*(2.50)*	*(1.30)*	*(1.33)*	*(3.14)*	*(2.79)*
$Log(fund\ age)_{t-1}$	-0.05	-0.01	-0.11*	-0.09*	-0.09	-0.03	-0.11**	-0.10*
	(-0.86)	*(-0.32)*	*(-1.89)*	*(-1.69)*	*(-1.30)*	*(-0.78)*	*(-2.60)*	*(-1.99)*
Management fee	-6.75	-3.52	-4.27	-5.59	-4.04	-3.78	-2.53	-4.04
	(-1.31)	*(-0.81)*	*(-0.99)*	*(-1.49)*	*(-1.29)*	*(-1.08)*	*(-0.72)*	*(-1.20)*
Incentive fee	0.37	0.26	-0.09	-0.56	0.62	0.27	0.15	-0.38
	(0.63)	*(0.66)*	*(-0.22)*	*(-1.54)*	*(1.30)*	*(0.88)*	*(0.31)*	*(-0.84)*
$Flow_{t-1}$	0.02	0.02**	0.05**	0.05**	0.03	0.01	0.14**	0.07**
	(1.49)	*(2.03)*	*(2.34)*	*(2.29)*	*(0.73)*	*(0.76)*	*(2.73)*	*(2.91)*
Lockup	-0.08	-0.04	-0.10**	-0.08**	-0.08*	-0.02	-0.07	-0.02
	(-1.22)	*(-0.80)*	*(-2.00)*	*(-2.13)*	*(-2.03)*	*(-1.08)*	*(-1.43)*	*(-0.33)*
Restriction period	0.20***	0.18***	0.26***	0.24***	0.23***	0.20**	0.26***	0.23***
	(2.77)	*(2.85)*	*(3.98)*	*(4.87)*	*(3.67)*	*(3.41)*	*(5.69)*	*(6.09)*
Hurdle Rate	0.05	0.05	0.09	0.09*	0.08	0.06*	0.15	0.12*
	(0.97)	*(1.18)*	*(1.42)*	*(1.76)*	*(1.46)*	*(2.29)*	*(1.75)*	*(2.06)*
High Watermark	0.02	0.02	0.15***	0.13***	0.01	0.01	0.13**	0.12**
	(0.40)	*(0.68)*	*(3.06)*	*(2.90)*	*(0.12)*	*(0.38)*	*(2.84)*	*(3.17)*
Intercept	-0.31***	0.09	0.17***	0.12***	-0.01	-0.03	0.09	0.22
	(-4.39)	*(1.27)*	*(5.84)*	*(3.10)*	*(-0.03)*	*(-0.23)*	*(0.57)*	*(1.30)*
Adjusted R^2	12.66%	14.37%	18.27%	21.24%	12.30%	12.23%	17.94%	20.38%
Year dummies	Yes	Yes	Yes	Yes	No	No	No	No
# fund-years	1,807	2,334	1,807	2,334	1,807	2,334	1,807	2,334

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centre for financial research
cfr/university of cologne
Albertus-Magnus-Platz
D-50923 cologne
Fon +49(0)221-470-6995
Fax +49(0)221-470-3992
kempf@cfr-cologne.de
www.cfr-cologne.de