Hedge funds for retail investors?
An examination of hedged mutual funds

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Abstract

Recently a number of mutual fund companies have begun offering mutual funds that emulate hedge fund strategies, with assets tripling since 2002. In this paper, we compare these mutual funds – "hedged mutual funds" with "non-hedge" (traditional) mutual funds as well as with hedge funds. Impressively, despite higher expenses and turnover, hedged mutual funds outperform traditional mutual funds by about 3% per year net of fees. This suggests that using hedge fund strategies, even within the constraints of the mutual fund environment, can significantly improve performance. Further, this outperformance is strongly related to skill: the subset of hedged mutual fund managers with actual hedge fund experience outperforms those without by about 4.5% per year net of fees. However, hedged mutual fund managers fail to outperform hedge funds, suggesting that lighter regulation and better incentives for hedge fund managers are important determinants of hedge funds' superior performance.

JEL Classifications: G11, G12
Keywords: Hedge funds, mutual funds, hedged mutual funds, hybrid mutual funds

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Hedge funds for retail investors?
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Recently, a number of mutual fund companies have begun offering funds that use hedge-fund-like trading strategies designed to benefit from mispricing on the long as well as the short side. Recognizing that these funds can offer the so-called "double alpha" strategy, Morningstar and Lipper have created new style categories like "Long/Short Equity" and "Market Neutral" to classify these funds. Despite their use of hedge fund strategies, these "hedged" mutual funds are regulated by the Securities and Exchange Commission (SEC) in exactly the same way as "traditional" mutual funds. While hedge funds are only available to accredited investors, hedged mutual funds are available to retail investors, with an average required minimum investment of only $5,000.

These funds represent an important asset class since they combine the strategies of hedge funds with the fee structure, liquidity, and regulatory requirements of mutual funds. Recognizing their appeal, a recent study by Cerulli Associates found that over half of the Registered Investment Advisers who do not currently use hedge funds for their clients would add hedged mutual funds to their portfolios.[1] In addition, these funds are attractive to retirement plan administrators. Lake Partners, Inc., a Greenwich, Connecticut, investment adviser offers a fund of hedged mutual funds, called LASSO, which is only available to entities with 401(k) or 403(b) plans.[2] Finally, the introduction of these products is not only a U.S.-based phenomenon. In the European Union, for example, UCITS III regulations have recently been enacted, which permit regulated funds to invest in derivative securities.[3] Concurrently, EU pension funds are beginning

[1] See O'Hara, Neil. "Funds of Funds," http://www.onwallstreet.com/article.cfm?articleid=3217, 2/1/2006.
[2] See Wiles, Russ. "Hedged Mutual Funds Offer Defensive Strategy," http://www.findarticles.com/p/articles/mi_qn4155/is_20050214/ai_n9728927, 2/14/2005.
[3] See "UCITS III Legislation Opens the Door to a Wider Variety of Funds," http://www.trustnet.com/general/news/display-story.asp?id=80270&db=educational#top, 9/15/2006.

to allocate more assets to alternative investment strategies.[4] These changes suggest that hedged mutual funds are going to play a very important role in the field of investment management in the years to come.

This paper provides a rigorous analysis of this unique mutual fund category. Our first hypothesis – the *Strategy Hypothesis* – predicts that due to significant differences in *strategy* (like the ability to capture alpha on the long as well as the short side and the ability to manage risk better), hedged mutual funds will outperform "non-hedge" (traditional) mutual funds. We find strong support for the strategy hypothesis. In particular, we find that despite higher fees and turnover, hedged mutual funds outperform traditional mutual funds by about 3% per year, on a fee- and risk- adjusted basis. These results are robust to controls for fund characteristics, past risk, and performance. Further, they hold for several different risk models and time periods, and are even stronger for gross-of-fee risk-adjusted performance. Finally, they are generally robust to alternate econometric methodologies controlling for fund- and management-company-specific fixed- and random-effects.

Next, we investigate whether manager skill explains this strong performance (the *Skill Hypothesis*). Within the sample of hedged mutual funds, about half the managers concurrently manage one or more hedge funds along with their hedged mutual fund(s). We hypothesize that hedged mutual managers with actual hedge fund experience should be more adept at following the double alpha strategies and therefore should outperform those without such experience.[5] Our results provide strong support to this hypothesis. We show that hedged mutual fund managers with hedge fund experience significantly outperform those without by a risk- and fee- adjusted

[4] See, for example, "Philips, Boots Use Derivatives to Boost Pension Funds," http://quote.bloomberg.com/apps/news?pid=nifea&&sid=a4poGNLbK9IM, 3/30/2004.

[5] It is plausible that funds run by the same management company have similar positive externalities such as reduction in transaction costs due to economies of scale. We are implicitly grouping these externalities together as "skill/experience" in this hypothesis.

4.5% per year. By contrast, hedged mutual fund managers without hedge fund experience generate performance that is statistically insignificant from zero and fail to outperform traditional mutual funds. Thus, the superior performance of hedged mutual funds over traditional mutual funds is driven by the hedged mutual funds with hedge fund managers.

Our final hypothesis is the *Regulation and Incentives Hypothesis*. Although hedged mutual funds use hedge-fund-like trading strategies, they are regulated by the SEC. As a result, they face certain restrictions such as covering short positions and limiting borrowing to only one-third of total assets. They also have to provide daily liquidity and audited semi-annual reports. In contrast, hedge funds do not face such constraints.[6] Also, hedge funds charge performance-based incentive fees, while hedged mutual funds typically do not.[7] For these reasons, we hypothesize that hedged mutual fund managers will not outperform hedge funds. In support of this hypothesis, we find that on a gross-of-fee basis, hedged mutual funds significantly underperform hedge funds by 5% per year. On a net-of-fee basis as well, hedged mutual funds seem to underperform hedge funds, although the difference is not statistically significant.

While ours is the first paper to study hedged mutual funds as a unique style category, three recent studies have examined the motivation for mutual managers to allow "flexibility" in investment strategies. This flexibility relates to a manager's ability to use derivative contracts, invest in restricted securities, sell securities short, and borrow money to create leverage. These studies include Koski and Pontiff (1999), Deli and Varma (2002), and Almazan, Brown, Carlson, and Chapman (2004). In general, the authors find evidence that providing flexibility to managers does *not* improve mutual fund performance. Rather, this flexibility enables managers to better

[6] This mandatory disclosure by mutual funds can result in leakage of funds' private information to outsiders, who can trade on it and move security prices against them (see, e.g., Wermers (2001), Frank et al (2004)).

[7] If a mutual fund wishes to charge a performance-based incentive fee, the fee must be symmetrical such that the fee will increase with good performance and decrease with poor performance. Not surprisingly, this type of fee (also called a "fulcrum" fee), is not very popular among mutual funds. Elton, Gruber, and Blake (2003) document that of their sample of over 6,000 mutual funds, only 108 use fulcrum fees. Of our sample of 51 hedged mutual funds, only 2 use fulcrum fees.

control expenses, manage cash flows, and manage risk. Additionally, the very existence of investment constraints is consistent with optimal contracting in the mutual fund industry — funds with a greater need for monitoring have more investment restrictions.

While this strand of literature asks *why* mutual fund managers are allowed flexible investment strategies, we examine *how* a subset of mutual funds using hedge-fund-like strategies performs compared to all other mutual funds. In contrast to the prior literature, we find a strong relation between hedge-fund-like investment strategies and performance. In other words, hedged mutual fund strategies, which by definition, require significant investment flexibility, outperform non-hedge mutual fund strategies. This is in spite of the fact that many mutual funds not defined as hedged mutual funds do allow some degree of investment flexibility.

We believe that the difference in performance occurs because funds that do not use hedge-fund-like strategies but do allow investment flexibility do so for reasons other than performance enhancement, such as cost control, risk monitoring and cash flow management. Using our sample of hedged mutual funds, we can differentiate between funds that use flexibility to improve performance reasons from those that use flexibility for other reasons, thus providing an important contribution to the literature on investment flexibility. The hedged mutual funds in our sample also have higher turnover and expenses than non-hedged mutual funds, further confirming that these funds use their investment flexibility for performance enhancement, not for cost reduction.

The paper is structured as follows. Section 2 discusses related literature and outlines the three hypotheses. Section 3 describes the data. Section 4 investigates the *Strategy Hypothesis.* Section 5 examines the *Skill Hypothesis*, and Section 6 tests the *Regulation and Incentives Hypothesis.* Section 7 concludes.

2. Related literature and testable hypotheses

2.1. Related literature

As noted in the Introduction, our paper is related to literature that examines the motivation for controlling a mutual fund's investment flexibility. One reason for restricting a fund's flexibility is to minimize agency costs by preventing the manager from strategically altering the fund's risk to increase his own compensation (Almazan et. al. (2004)).[8] Another reason for allowing a fund flexibility is to reduce transaction costs, liquidity costs, and opportunity costs of holding cash (rather than to enhance performance) (Koski and Pontiff (1999), Deli and Varma (2002)). We contribute to this strand of literature by demonstrating that a certain type of investment flexibility, which enables managers to use hedge-fund-like trading strategies, can actually enhance fund performance.

To further highlight the differences between our paper and prior work, we calculate the constraint score for our sample as in Almazan et. al. (2004). This score is computed using SEC filings that report whether funds are permitted to use derivatives, leverage, short selling, and restricted securities. A score of 0 means the fund is completely unrestricted, while a score of 1 means the fund is completely restricted. The average score for the universe of mutual funds in their sample is 0.36, while the average score for our sample is 0.23, indicating that, on the whole, our funds are less restricted than the entire sample of mutual funds.

More important however, are our constraint score results for short sales, the investment technique most commonly associated with the hedge fund strategies of funds in our sample (equity long-short and equity market neutral). Within our sample, 78% of funds are permitted to use short sales, as compared with 31% of all mutual funds as reported by Almazan et. al. (2004).

[8] For example, the tournaments literature (e.g., Brown, Harlow, and Starks (1996), Chevalier and Ellison (1997)) documents that mutual funds strategically change their risk in the latter half of the year to be "winners" and thereby attract greater capital flows, which results in higher compensation for the manager.

Further, only about 10% of this 31% of these funds actually do short-sell, which is 3.1% of the total universe of mutual funds. By contrast, of our 78% of funds permitted to short sell, 78% actually do, which constitutes 61% of our sample. Finally, short sales as a percentage of assets under management in the funds in our sample is about 19%, indicating that short-selling is indeed a crucial component of our funds' investment strategies.[9] In addition, our analysis comparing the performance of hedged mutual funds and hedge funds operated by the same manager complements two recent working papers. Both examine potential conflicts of interest in side-by-side management of mutual funds and hedge funds. Cici, Gibson, and Moussawi (2006) examine this relationship from the management company perspective, while Nohel, Wang, and Zheng (2006) examine the relationship from the individual manager perspective. While our paper also examines side-by-side management with respect to the *Manager Skill Hypothesis*, our focus is on a subset of hedged mutual funds and hedge funds with the same manager. By comparing the performance of these two investment vehicles which are homogenous in the nature of their trading strategies, we shed light on the notion that the skill associated with managing a hedge fund must be helpful in improving the performance of a hedged mutual fund.

Finally, there is a large literature on hedge funds that examines risk and return characteristics, performance, and compensation structures, but relatively scant literature that compares hedge funds and mutual funds directly.[10] One reason is that significant differences in regulation, incentives, and trading strategies between hedge funds and mutual funds make such a comparison difficult. Our study alleviates these differences to some extent, since hedged mutual funds and hedge funds use similar trading strategies. In the process, our paper also contributes to

[9] Almazan et. al. (2004) do not report this statistic for the funds in their sample.

[10] See, for example, Ackermann, McEnally, and Ravenscraft (1999), Agarwal and Naik (2000, 2004), Asness, Krail, and Liew (1999), Baquero, ter Horst, and Verbeek (2004), Boyson (2005), Brown, Goetzmann, and Ibbotson (1999), Brown, Goetzmann, and Liang (2004), Brown, Goetzmann, and Park (2001), Das and Sundaram (2002), Fung and Hsieh (1997, 2000, 2001, 2004), Getmansky, Lo, and Makarov (2004), Goetzmann, Ingersoll, and Ross (2003), Jagannathan, Malakhov, and Novikov (2006), Kosowski, Naik, and Teo (2006), Liang (1999, 2000), and Mitchell and Pulvino (2001).

the vast literature on mutual funds.[11] It is closest in spirit to studies of individual mutual fund asset classes such as money market funds, equity mutual funds, and bond funds.[12]

2.2. Development of hypotheses

This paper tests three hypotheses. First, the *Strategy Hypothesis* posits that since hedged mutual funds (HMFs) follow trading strategies such as long/short equity, arbitrage, and other techniques traditionally used by hedge funds (HFs), HMFs should outperform traditional mutual funds (TMFs) that do not use these trading strategies.

Second, the *Manager Skill Hypothesis* predicts that HMF managers with experience in implementing hedge fund strategies should outperform those without these skills, and by extension of the *Strategy Hypothesis*, should outperform TMFs as well. As a measure of skill, we use a manager's experience in the hedge fund industry. Specifically, if the HMF manager concurrently manages a hedge fund along with a HMF, she is considered to be a skilled/experienced manager.[13]

The final hypothesis is the *Regulation and Incentives Hypothesis.* We hypothesize that due to lighter regulation and better incentives, hedge funds should outperform hedged mutual funds regardless of the HMF manager's skill level. Mutual funds are regulated by the SEC through four federal laws: the Securities Act of 1933, the Securities Exchange Act of 1934, the Investment Company Act of 1940, and the Investment Advisers Act. These Acts impose several constraints on mutual funds. The Investment Company Act of 1940 restricts the ability to use leverage or borrow against the value of securities in the portfolio. The SEC requires that funds engaging in certain investment techniques, including the use of options, futures, forwards, and

[11] See, for example, Brown and Goetzmann (1995), Carhart (1997), Chevalier and Ellison (1999), Daniel, Grinblatt, Titman and Wermers (1997), Elton, Gruber, and Blake (1996a&b), Jegadeesh and Titman (1993), Jensen (1968), and Wermers (2000).
[12] For example, see Comer (2005), Elton, Gruber, and Blake (1995), Ferson (2005), and Tiwari and Vijh (2004).
[13] As mentioned before, we use the term "skill" to jointly refer to experience and externalities of concurrently managing a hedge fund and a hedged mutual fund. Hence, we require that managers must have concurrent hedge fund and hedged mutual fund experience, or alternatively, hedge fund experience that precedes hedged mutual fund experience. Since managers at hedged mutual funds may change, a fund may be categorized as having a hedge fund manager during some years but not others.

short selling, to cover their positions. With respect to pricing and liquidity, mutual funds are required to provide daily net asset values (NAVs) and allow shareholders to redeem their shares at any time. By contrast, HFs are largely unregulated with respect to investment options, disclosure, and incentives. Finally, HF managers are compensated through performance-based incentive fees, providing better incentives to deliver superior performance. As a result, we expect HMFs to underperform hedge funds.[14]

3. Data and variable construction

3.1 Mutual fund (HMF and TMF) data and sample selection

We utilize a rigorous process to select the sample of HMFs. For brevity, we summarize the process here and describe it in detail in Appendix A. We begin the sample selection by including all hedged mutual funds that appear in the Morningstar and Lipper databases. This step results in 26 unique funds. However, since the Morningstar and Lipper lists are new (they were compiled in early 2006), they do not include defunct funds. In addition, the lists do not include funds that follow hedge fund investment strategies other than Long/Short Equity and Equity Market Neutral. To overcome these limitations, we search news archives for articles regarding hedged mutual funds. This search yields a list of over 90 additional funds from which we eliminate those that do not use equity-based strategies or that use passive (index-based) investment strategies, based on their descriptions from Morningstar (at www.morningstar.com). We then review the annual reports and prospectuses of the remaining funds from 1995 to the present to determine whether they are, in fact, following "real" hedge fund strategies. We

[14] Under the Investment Advisers Act, the SEC recently proposed that HF advisers be subject to some of the same requirements as mutual fund advisers, including registration with the SEC, designation of a Chief Compliance Officer, implementation of policies to prevent misuse of nonpublic customer information and to ensure that client securities are voted in the best interest of the client, and implementation of a code of ethics. Since February 2006, HF advisers have been asked to comply with these requirements, which are still much less onerous than for mutual fund managers. However, a federal appeals court decision recently invalidated the SEC rule regulating HFs, so the future of this regulation is uncertain.

identify 25 additional funds through this process providing us a final sample of 51 funds, 14 of which are "dead" at the end of the sample period, 1994-2004. Our choice of this sample period is driven by two reasons: first, there were less than 10 HMFs in operation prior to 1994, and second, to match with the hedge fund data, which begins in 1994.

For the analysis of hedged and traditional mutual funds, we combine duplicate share classes and take asset-weighted averages of the expenses, turnover, loads, and fees following Kacperczyk, Sialm, and Zheng (2006). We then categorize these mutual funds into six groups, which excludes categories for which there are no hedged mutual funds. The six groups from the CRSP Survivorship-Bias-Free Mutual Fund database are: Aggressive Growth, Growth, Income, Growth and Income, Sector, and Flexible.[15] We identify 3,640 TMFs within these six groups.

For the analysis of hedged mutual funds and hedge funds, we categorize hedged mutual funds into two hedge fund categories from Lipper/Tremont Advisory Shareholder Services (hereafter, TASS), the hedge fund database provider. These categories include: Long-Short Equity and Multi-Strategy/Other. Long/Short equity is defined by TASS as follows:

> Long/Short Equity managers seek to profit from investing on both the long and short sides of equity markets. Managers have the ability to shift from value to growth, from small to medium to large capitalization stocks, and from net long to net short. Managers can change their exposures from net long to net short or market neutral at times. In addition to equities, long/short managers can trade equity futures and options as well as equity related securities and debt. Manager focus may be global, regional, or sector specific, such as technology, healthcare or financials. Managers tend to build portfolios that are more concentrated than traditional long-only equity funds.[16]

The rationale for using only two hedge fund categories in this comparison of HMFs and HFs, rather than all the hedge fund categories in which we have hedged mutual funds, is that for all categories except for Long/Short Equity and Multi-Strategy/Other, there are less than 2 funds per category. We identify 5 funds as Multi-Strategy/Other, which represents the largest number of funds other than Long/Short Equity which has 39 funds. Thus, we group all hedged mutual

[15] This classification is similar to Pástor and Stambaugh (2002) and Huij and Verbeek (2004). Please note that unlike Morningstar and Lipper, CRSP does not have a separate categorization for hedged mutual funds.
[16] See www.hedgeindex.com.

funds that are not Long/Short Equity into the Multi-Strategy/Other category, defined by TASS as follows:

> Multi-Strategy managers seek to profit from allocating to a number of different strategies and adjusting their allocations based upon perceived opportunities. Many Multi-Strategy managers began as convertible arbitrage managers that diversified into other strategies. Because each strategy is not in a separate fund, these managers often have the ability to run higher leverage levels than single strategy managers.[17]

All results reported hold when we include the entire sample of hedge funds, rather than only the two categories described above.

3.2. Hedge fund data

We use HF data from the TASS database, which includes monthly net-of-fee returns, as well as expenses, fees, size, terms (such as notice and redemption periods), and style of the HFs. It has been well-documented that HF databases suffer from several biases including survivorship bias and instant history or backfilling bias.[18] We control for survivorship bias by including defunct funds until they disappear from the database and mitigate the backfilling bias by excluding the fund's "incubation period" from the time-series of returns.[19] The final sample includes 1,770 HFs.

3.3. Key variables

Since mutual funds and hedge funds are exposed to a number of risk factors, we use risk-adjusted performance measures (alphas) for all the analyses. Alphas are defined as the intercepts from two separate regression models. The first is the Carhart (1997) four-factor model widely used in mutual fund studies. The four factors include the CRSP value-weighted market return, the two Fama and French (1993) factors — size (SMB) and book-to-market (HML), and the Jegadeesh and Titman (1993) UMD (momentum) factor.

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[17] See www.hedgeindex.com.

[18] For example, see Ackermann, McEnally, and Ravenscraft (1999), Fung and Hsieh (2000), Liang (2000), and Brown, Goetzmann, and Park (2001).

[19] To mitigate the incubation bias, we use data from the "Performance Start Date" instead of the "Inception Date" from the TASS database.

The second model is based on Agarwal and Naik (2004) who capture nonlinear risks of hedge funds through an out-of-the-money (OTM) index put option. Hence, our second model augments the Carhart (1997) four-factor model with an OTM put option factor. In addition, we perform robustness tests using the Fung and Hsieh (2004) model which includes an equity market factor, a size-spread factor, a bond market factor, a credit spread factor, and three option-based factors for bonds, currencies, and commodities.[20] For both models, we estimate alphas individually for each fund using the prior 24 months of data for both gross and net performance measures.[21] The results from the Fung and Hsieh (2004) model are qualitatively similar to the results for the four- and five-factor models, and are not reported for brevity (results available from authors upon request).

Finally, we estimate two other models as additional robustness checks. The first has five factors, including the Carhart (1997) four factors plus the liquidity factor from Pastor and Stambaugh (2002). The results from this augmented model are nearly identical to the results from the four factor model. The second model includes five factors (Carhart four factors and the out-of-the-money put option) and adds a sixth factor – an out-of-the-money call option, since hedge fund manager compensation resembles the payoff from a call option. Again, this model provides results that are very similar to those from the model without the call option returns. For the sake of brevity, we do not report the results from either of these two models in the paper.

The next section tests the first hypothesis.

4. Testing the *Strategy Hypothesis*

[20] We thank Kenneth French and David Hsieh for making the returns data on the four and seven factors, respectively, available on their websites.

[21] For the hedge fund analysis in Section 6, we calculate the gross performance measures accounting for the option-like incentive-fee contract as in Agarwal, Daniel, and Naik (2006). To compute gross-of-fee returns for mutual funds, we follow Gaspar, Massa, and Matos (2006) and others, and add to each month's net-of-fee returns, the fund's annual expense ratio divided by 12 and the total load divided by 7, as most loads expire after 7 years.

The first hypothesis is as follows:

Strategy Hypothesis: Hedged mutual funds (HMFs) should outperform traditional mutual funds (TMFs) due to major differences in strategy.

HMFs use strategies such as long/short equity, merger arbitrage, and equity market neutral that are not commonly used by mutual funds. The flexibility to profit from both long and short trades in equity markets with minimal systematic risk should enable HMFs to outperform TMFs.

Table 1 reports the summary statistics for HMFs and TMFs. We divide the HMF sample into "live" and "dead" funds to compare characteristics and performance of the two groups. Since dead funds comprise 28% of the HMF sample (14 of 51 funds), we believe survivorship bias does not affect our results.[22] Panel A reports the number of funds and total assets for the sample for each year between 1994-2004. Over this period, HMFs and TMFs have grown dramatically, both in number and in size. HMFs have experienced huge growth, more than tripling in size from about $5 billion in assets in 2002 to over $17 billion in assets in 2004. Panel B reports the number of funds by mutual fund style category. The vast majority of HMFs fall into the Aggressive Growth category while most of the TMFs are in the Growth category. In our multivariate analysis later, we control for the style effects by including dummies for the different fund categories.

Panel C describes fund characteristics. We report expenses, loads, and turnover as a percentage of assets. Age is the number of years that the fund has been in existence. Size is assets under management as of the end of the sample period. Flow is the end-of-year assets less

[22] We investigate the cause of fund failure for the 14 funds in the sample by examining SEC filings. Of the 14 funds, 2 were merged into other funds, 6 were closed because they were not attracting enough assets, and an explicit reason was not given for the closure of the other 6 funds, although our analysis indicates that they were quite small in size and had lower-than-average performance.

the beginning-of-year assets adjusted for the return during the year, scaled by beginning-of-year assets. HMFs are younger, smaller, have higher expenses and turnover, and have lower load fees than TMFs. The results on expenses and turnover are consistent with the idea that HMFs use active trading strategies to enhance returns. In addition, the higher flows indicate investors' interest in HMFs. Comparing dead HMF funds to live HMF funds, dead funds are smaller with higher expenses and much higher turnover. Although not noted in the table, these differences are significant at the 1% level.

Panel D reports performance measures. HMFs outperform TMFs based on both four-factor and five-factor alphas. Gross outperformance is larger than net, reflecting the higher expenses of HMFs. Live HMFs outperform dead HMFs, with differences (not reported in the table) significant at the 1% level. Panels E and F report average beta estimates from the four and five factor models. The market beta (B_{Mkt}) differs significantly between HMFs and TMFs (0.343 versus 0.931). This low market beta for HMFs provides evidence that they use unique trading strategies relative to TMFs (i.e., they clearly are not practicing "long-only" strategies). The differences between HMFs and TMFs in the other factors' beta estimates are not statistically significant. Comparing live and dead HMFs indicates no significant differences in beta loadings.

Finally, Panel G reports three measures of risk: standard deviation, skewness, and kurtosis. It is well-known that hedge fund returns are not normally distributed, and similarly, HMFs exhibit non-normality in returns, with positive excess kurtosis higher than that for TMFs. The standard deviation of HMFs is also lower than TMFs. Both these results are statistically significant at the 5% level. Comparing live and dead HMFs, live funds have significantly lower standard deviation, lower skewness, and higher kurtosis than dead funds.

While Table 1 provides initial evidence that HMFs outperform TMFs on a risk-adjusted basis, these univariate statistics do not control for fund characteristics, past performance, or other factors that have been shown to be related to mutual fund returns. Hence, we estimate the following regression using annual data to explicitly control for these factors and report our results in Table 2:

$$\begin{aligned} Perf_{i,t} = {} & \lambda_0 + \lambda_1 HMF + \lambda_2 Perf_{i,t-2} + \lambda_3 \sigma_{i,t-2} + \lambda_4 Size_{i,t-1} + \lambda_5 Age_{i,t-1} \\ & + \lambda_6 Expense_{i,t-1} + \lambda_7 Load_{i,t-1} + \lambda_8 Turnover_{i,t-1} + \lambda_9 Flow_{i,t-1} \\ & + \sum_{s=1}^{6} \lambda_{10}^{s} I(MFStyle_{i,s}) + \sum_{t=1}^{10} \lambda_{11}^{s} I(Year_t) + \xi_{i,t} \end{aligned} \qquad \textbf{(1)}$$

where $Perf_{i,t}$ and $Perf_{i,t-2}$ are the performance measures of fund *i* in years *t* and *t-2* respectively, HMF is an indicator variable that equals 1 if fund is a HMF and 0 otherwise, $\sigma_{i,t-2}$ is the standard deviation of the monthly returns of fund *i* during year *t-2*, $Size_{i,t-1}$ 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*, $Expense_{i,t-1}$ is the expense ratio of fund *i* during year *t-1*, $Load_{i,t-1}$ is the total load of fund *i* during year *t-1*, $Turnover_{i,t-1}$ is the turnover of fund *i* during year *t-1*, $Flow_{i,t-1}$ is the percentage money flows in fund *i* in year *t-1*, $I(MFStyle_{i,s})$ are MF style dummies that take a value of 1 if fund *i* has MF style *s* 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. The MF style dummies correspond to the six MF styles – Aggressive growth, Growth, Income, Growth and Income, Sector, and Flexible.

Since the regressions use annual data but the dependent variable is measured using 24-month alphas, there is overlap in the dependent variable of one year. This overlap causes understatement in the standard errors; hence we use White (1980) standard errors adjusted to

account for autocorrelation within a "cluster", where each individual fund represents a cluster.[23] In addition, we lag performance and risk measures used as independent variables by two periods to ensure the independent and dependent variables also have no overlap.[24] As an additional robustness check, we split the sample into two sub-samples using odd and even years. Results for the split sample (not reported) are similar to the results for the combined sample.

In Table 2, a positive and significant coefficient on the HMF indicator variable provides support for the *Strategy Hypothesis*. For both four-factor and five-factor models, regardless of whether we use gross or net returns, we find strong support for this hypothesis: HMFs outperform TMFs in a statistically and economically significant way. The differences in performance range from a low of 23.6 basis points a month (about 2.8% a year) for the net four-factor model, to a high of 31.1 basis points a month (about 3.7% a year) for the gross five-factor model. These results are particularly striking given the higher expenses and turnover of HMFs.

These results from multivariate regression highlight the importance of controlling for past performance, risk, and fund characteristics, as every control variable is significant in at least one regression model. The statistical significance of these results is even more impressive given the small sample size of HMFs. We also perform Fama-MacBeth (1973) regressions as a robustness check, and while the results are qualitatively similar, the statistical significance is lower due to the small sample size for HMFs during the first few years of the sample.

[23] This correction is also known as the Rogers correction, and controls for autocorrelation over the entire time-series of each fund's observations. This adjustment may be contrasted with the Newey-West correction for autocorrelation, which can be specified up to a particular lag length. As Petersen (2006) notes, the Rogers correction produces unbiased estimates, while the Newey-West correction will lead to biased estimates (although the longer the lag length, the smaller the bias).

[24] We acknowledge that this imposes a survival requirement of four years for funds to be included in our sample. This kind of bias is referred to as look-ahead bias (Carpenter and Lynch (1999). In our defense, we offer two explanations for why this should not affect our result. First, since we are interested in relative and not absolute performance of HMFs, such bias should not materially affect our results as it should affect the TMF and HF samples as well that we include for relative comparison in our regressions. Second, for robustness, we exclude the lagged alpha as independent variable from our regression, which brings down the survival requirement to two years. Our results remain unchanged with this alternative specification.

To summarize, the results in this section support the *Strategy Hypothesis*. We next investigate whether there are additional factors at work – beyond a manager's choice of fund strategy – that might help explain the outperformance of HMFs.

5. Testing the *Skill Hypothesis*

5.1. Regression Analysis

The previous section provides evidence that HMFs outperform TMFs based on strategy. In this section, we investigate whether skill is also driving this outperformance. The dataset of HMFs has a unique feature: about one-half of the funds have managers that concurrently oversee hedge funds. We hypothesize that experience gained in the hedge fund industry should be advantageous in managing a hedged mutual fund:

Skill Hypothesis: HMF managers with hedge fund experience will outperform those without.

To test this hypothesis, we subdivide the sample of HMFs into those funds with HF managers and those without. We gather information regarding managers from a variety of sources. The first approach is to match the manager name, management company name, and/or fund name from the CRSP database with the hedge fund database (TASS). We find 4 matches in this way, all of which we verify using the second approach, which is to search the mutual fund company's website for information about the manager and the additional funds he/she manages. This information is reported in the fund's Statement of Additional Information (SAI) that funds are required to file regularly with the SEC (available from funds' website or www.sec.gov). In addition to searching these venues, we perform a broad internet search looking for interviews with the manager in which he or she specifically discusses his/her management of both a HMF and a hedge fund.

We require that a manager concurrently manage both the HMF and a hedge fund (or that the manager started first in the hedge fund industry, and then moved to the mutual fund industry), and we only count the manager as managing both types of funds during the time frame that he was active in both. Hence, some of the HMFs in the sample have hedge fund managers in some years and not in others. It is important to note that in some cases, the mutual fund firm itself does not employ hedge fund managers, but subcontracts out the manager role to a HF manager. In this case, we count the manager as a hedge fund manager.

Using this approach, we identify a total of 27 HMFs that have a hedge fund manager for at least part of the sample and 24 that do not. Strikingly, the subsample of hedge funds without hedge fund managers includes all 14 defunct funds, providing preliminary support for the *Skill Hypothesis*. We create an indicator variable set to 1 for the years the hedged mutual fund has a hedge fund manager (HFMGR-YES) and zero otherwise. We also create a variable set to 1 if the hedged mutual fund does not have a hedge fund manager (HFMGR-NO) and zero otherwise. Effectively, we are splitting the HMF indicator variable from Table 2 into two separate variables.

Table 3 reports summary statistics for HMFs split into HFMGR-YES and HFMGR-NO. Panel A provides two interesting results. First, the number of HFMGR-YES managers was much higher than the number of HFMGR-NO managers early in the sample, but in 1998, the number of HFMGR-NOs increased fivefold, from 2 to 10 managers. This increase is likely to be related to the 1997 Tax Reform Act which repealed the short-short rule. Second, HFMGR-NO managers control about 60% of the assets at the end of the sample (in 2004). In Panel C, we show that the HFMGR-YES managers have lower expenses but higher turnover. The lower expenses may reflect the fact that the cost of research for these funds is shared by the HMFs and HFs run by the same manager.

Panel D compares performance between HFMGR-YES and HFMGR-NO. In all cases, performance of HFMGR-YES is better than HFMGR-NO, although these univariate results are not statistically significant. Panels E and F indicate little differences in betas for the market and other factors, implying these funds have similar market and other risk exposures. Finally, Panel G suggests that there are no major differences in standard deviation, skewness, or kurtosis among HMFs with and without hedge fund managers.

To formally test the *Skill Hypothesis*, we estimate the following multivariate regression:

$$\begin{aligned} Perf_{i,t} = {} & \delta_0 + \delta_1 HFMGR-YES + \delta_2 HFMGR-NO + \delta_3 Perf_{i,t-2} + \delta_4 \sigma_{i,t-2} \\ & + \delta_5 Size_{i,t-1} + \delta_6 Age_{i,t-1} + \delta_7 Expense_{i,t-1} + \delta_8 Load_{i,t-1} + \delta_9 Turnover_{i,t-1} \\ & + \delta_{10} Flow_{i,t-1} + \sum_{s=1}^{6} \delta_{11}^{s} I(MFStyle_{i,s}) + \sum_{t=1}^{10} \delta_{12}^{s} I(Year_t) + \psi_{i,t} \end{aligned} \qquad \textbf{(2)}$$

where all variables except *HFMGR-YES* and *HFMGR-NO* have been defined previously for regression in equation (1).

In the above regression, HFMGR-YES is set to 1 if the HMF manager also manages a hedge fund, and HFMGR-NO is set to 1 if the HMF manager does not manage a hedge fund. The missing variable is TMF. We perform the same regression analysis as in Table 2, but with the new indicator variables. If the *Skill Hypothesis* holds, then the difference between the HFMGR-YES and HFMGR-NO variable will be positive and statistically significant.

The results in Table 4 strongly support the *Skill Hypothesis.* In all four regression specifications, the difference between HFMGR-YES and HFMGR-NO is positive and statistically significant at the 5% level (see last row of Table 4), and ranges from a low of 34.6 basis points per month (4.2% annually) for the four-factor net return model, to a high of 54.8 basis points per month (6.8% annually) for the five-factor gross return model. In addition, the coefficient on the HFMGR-YES variable is always positive and statistically significant, while the coefficient on the HFMGR-NO variable is always negative and statistically insignificant.

To summarize, this section's results provide strong evidence in support of the *Skill Hypothesis*. In fact, the *Skill Hypothesis* complements the *Strategy Hypothesis* since only skilled HMF managers outperform TMFs. Strategy is not sufficient; managers need skill as well. To investigate if the HMFs managed by HF managers are indeed skilled, the next section examines performance persistence for HMFs with and without hedge fund managers.

5.2. Performance Persistence

Extant literature highlights the importance of using survivorship-bias-free data to study persistence (for example, see Brown, Ibbotson, and Ross (1992) and Brown and Goetzmann (1995)). Our analysis includes both surviving and defunct HMFs – 14 defunct and 37 live funds. Each HMF is ranked relative to all HMFs each year based on the fund's annual return in excess of the risk-free rate. If a fund is in the top (bottom) half of returns for the year, it is called a winner, *W* (loser, *L*). If a fund is a winner (loser) in two consecutive years, we denote it as *WW* (*LL*). If a fund fails after the first period, it is categorized as a loser in the second period. We report the contingency table of winners and losers in Table 5.

We use two statistical tests to measure the significance of the results. The first follows Brown and Goetzmann (1995) and Agarwal and Naik (2000), and uses the cross-product ratio (CPR) of funds that are repeat winners/losers to funds that are not, as well as the associated t-statistic. A positive (negative) and significant t-statistic implies that performance persists (reverses).[25] The second measure of statistical significance is similar, but we calculate it for the winner-winner and loser-loser funds separately to determine which group is driving persistence. For this purpose, we follow Malkiel (1995) to compute the z-statistic as follows:

[25] CPR is given by (WW*LL)/(WL*LW) while the standard error of the logarithm of CPR is $\sigma_{\log(CPR)} = \sqrt{\frac{1}{WW} + \frac{1}{WL} + \frac{1}{LW} + \frac{1}{LL}}$. See Brown and Goetzmann (1995) and Agarwal and Naik (2000) for more details.

$$z = \frac{Y - np}{\sqrt{np(1-p)}} \quad \textbf{(3)}$$

where n is the number of funds, p is the probability that a winner in one period continues to be a winner in the next period, and Y is a random variable for the number of persistently winning funds. When n is reasonably large (n>20), the z-statistic will be approximately distributed as normal with mean of zero and standard deviation of one.

The results in Table 5 indicate weak evidence of persistence in the performance of HMFs. This persistence is fairly evenly distributed among repeat winners and repeat losers, although winners repeat slightly more often than losers (57.26% and 55.45%, respectively, in the fifth column of Table 5, Panel A). We also perform these tests using 4-factor and 5-factor alphas and find that the results are generally consistent (results not reported for brevity).

We next investigate if higher skill is associated with higher persistence. As in the prior section, we divide the sample into HFMGR-YES and HFMGR-NO funds. We next calculate the percentage of winner/winner and loser/loser funds based on the total number of funds in each category every year. Panel B reports results.

For the sample period, there are 21 winner-winner HMFs that do not have a HF manager and 46 winner-winner HMFs that do have a HF manager. The 21 winner-winner HMFs without HF managers represent 22.11% (21 divided by 95) of the total HMFs without HF managers. The 46 HMFs with a HF manager represent 34.85% (46 divided by 132) of the total HMFs with a HF manager. Hence, in terms of proportion, more of the winner/winner HMFs are those with a HF manager. The null hypothesis for no persistence implies that the proportion of funds with repeat performance should be 25% (as opposed to 22% and 35% above). The same interpretation holds for loser-loser funds.

Overall, the results in Table 5 provide evidence that the repeat winners are HMFs with HF managers, while the repeat losers are HMFs with TMF managers. Despite a moderate sample size, this analysis provides further evidence that HMFs with HF managers have skill while their counterparts do not, which can explain the outperformance of HMFs over TMFs.

5.3 Robustness Tests

We perform several robustness tests to check the validity of our results. To control for fund-specific and management-company-specific effects, we repeat our analysis with management-company fixed effects, management-company random effects, fund random effects, management-company between effects, and fund between effects. We report the robustness checks for all the analyses collectively in Table 8. For the ease of comparison, the first row of this table repeats the findings from the main tables. Panels A and B indicate that the findings regarding HMFs and TMFs are generally robust to use of a wide range of econometric specifications.

We also perform robustness checks examining whether our results are sensitive to general market conditions. The sample period can be divided roughly in half with 1994-1999 representing a "bull" market and 2000-2004 representing a "bear" market. Alternatively, we can divide the sample into "up" years (1995-1999 and 2003) and "down" years (1994, 2000-2002, 2004), based on the median return of the S&P 500 index. This robustness test is important since hedge funds are often cited for their ability to provide strong performance in all market conditions. We re-estimate the regressions from Table 2 and Table 4 after dividing the sample period into bull and bear markets. We find that our results (not reported) are generally similar to the reported results, regardless of the definition of bull and bear markets. Thus, HMFs

outperform TMFs and HFMGR-YES funds outperform HFMGR-NO funds regardless of market conditions.

Given the result that HMF managers that also manage hedge funds exhibit skill (and persistence) in managing HMFs, we are interested in whether these skilled managers can match the performance of hedge funds, despite differences in regulation and incentives between the mutual fund and hedge fund industries. We investigate this idea in detail in the following section.

6. Testing the *Regulation and Incentives Hypothesis*

The results from the prior section indicate that a subset of HMF managers – those that also manage hedge funds – can outperform both traditional mutual funds and HMF managers without hedge funds. But how do these managers stack up again hedge funds, which face less stringent regulations and have better incentives? To examine this issue, we propose the following hypothesis:

Regulation and Incentives Hypothesis: Given the more stringent regulation and weaker incentives faced by mutual funds as compared to hedge funds, we expect HMF managers to underperform hedge funds.

We expect that differences in regulation related to trading, leverage, disclosure, liquidity, and transparency between HMFs and HFs, as well as differences in incentive compensation plans will cause HMFs to underperform. We test this hypothesis by performing the same regression analysis as in Table 2, but with the pooled sample of HMFs and HFs (hedge funds). We report summary statistics in Table 7.

Panels A and B report the size and number of HMFs and HFs by year and by strategy. The hedge fund industry has experienced huge growth over this period, with assets growing from about $13 billion in 1994 to over $175 billion by the end of 2004. Panel C reports fund

characteristics, comparing HFs to HMFs. HFs are younger, smaller, and have lower fixed expenses (measured as a percent of assets). HFs are also compensated with an incentive fee (percent of profits, typically about 20%), but since HMFs are not, we do not report this data here. HFs have similar flows compared to HMFs. Since turnover and load data is not available for HFs, we do not report these statistics. Panel D reports performance results. On a univariate basis, HMFs underperform HFs, although HMFs with HF managers do not underperform as severely. Panels E and F report betas from different multifactor models. The beta on the market factor for HMFs is lower than the market beta for HFs, and this difference is statistically significant. Additionally, HFs load more heavily on the SMB factor, indicating a small stock bias, and load less heavily on the momentum factor. Finally, from Panel G, we observe HFs have higher standard deviation but exhibit positive skewness. Both sets of funds have positive excess kurtosis, and this difference is not statistically significant.

We next conduct a multivariate analysis using the HMF variable by estimating the following regression:

$$\begin{aligned} Perf_{i,t} = {} & \beta_0 + \beta_1 HMF + \beta_2 Perf_{i,t-2} + \beta_3 \sigma_{i,t-2} + \beta_4 Size_{i,t-1} \\ & + \beta_5 Age_{i,t-1} + \beta_6 Expense_{i,t-1} + \beta_7 Flow_{i,t-1} \\ & + \beta_8 Long/Shortstyle_i + \sum_{t=1}^{10} \beta_9^s I(Year_t) + \vartheta_{i,t} \end{aligned} \qquad \textbf{(4)}$$

All the variables are as defined earlier in regression in equation (2) except $Long/Shortstyle_i$, which is set to 1 if a fund follows Long/Short equity style and 0 otherwise (thus, the missing style category is Other/Multi-strategy). The total load and turnover variables are not included in regression in equation (4) since they are not available for hedge funds. We report the results from the regression in Table 8.

Table 8 provides evidence supporting the *Regulation and Incentives Hypothesis*. In all regression models, the coefficient on the intercept (which represents hedge fund performance) is positive and statistically significant. In the two gross performance regression specifications, HMFs have statistically significant underperformance relative to hedge funds. In the two net performance regressions, the coefficient on the HMF indicator variable is negative, although not statistically significant. These results indicate that HFs outperform HMFs, and that they extract the rents in form of the fees (both management and incentive fees). While this result is not surprising, it does suggest that net of fees, HMFs might be a good investment option for investors who want the regulation of mutual funds but some of the risk-return characteristics of hedge funds.[26] This result is also consistent with the implications of Berk and Green's (2004) rational model of active portfolio management, where the skilled fund managers extract all the economic rents.

We also perform robustness tests on these results as in the prior section. In particular, we control for fund-specific and management-company-specific effects by estimating or regressions including management-company fixed effects, management-company random effects, fund random effects, management-company between effects, and fund between effects. The results in Panel C of Table 9 confirm that the findings comparing HMFs and HFs are robust to different econometric methodologies.[27]

7. Conclusion

[26] In unreported tests, we divide the HMF sample into HMFs with and without HF managers. While the HMFs with HF managers do outperform those without, as in Table 4, they fail to outperform HFs on both on the basis of net-of-fee and gross-of-fee performance measures.

[27] Note that we do not include the family fixed and family random effects models in these regressions. These models cause either the HMF variable to be dropped from the regression since controlling for family effects causes co-linearity in the HMF versus HF regressions.

This paper provides the first comprehensive look at a new category of mutual funds—hedged mutual funds. We define hedged mutual funds as mutual funds that emulate hedge fund strategies in order to enhance performance. We use this unique sample of funds to test three hypotheses regarding mutual fund performance.

The *Strategy Hypothesis* predicts that hedged mutual funds will outperform traditional mutual funds since HMFs implement strategies that should take advantage of good market conditions as well as bad, and profit from both long and short positions in the market. The results strongly support the *Strategy Hypothesis*, with hedged mutual funds handily outperforming traditional mutual funds by a statistically significant margin of about 3% a year.

The *Skill Hypothesis* provides an additional explanation for the outperformance of hedged mutual funds relative to traditional mutual funds. Specifically, the hypothesis predicts that managers with experience in hedge fund trading strategies will outperform those managers without such experience. Again, we find strong support for this prediction. Managers with hedge fund experience outperform those without by approximately 4.5% a year. In addition, we provide evidence that HMF managers with hedge fund experience are persistent "winners" while those without hedge fund experience are persistent "losers."

Taken together, these results imply that investors should consider purchasing hedged mutual funds with hedge fund managers. From a risk perspective, hedged mutual funds also perform well, with volatility that is well below that of traditional mutual funds. Thus, given their low standard deviations and high returns, these funds appear to be a good addition to an investor's portfolio.

The third hypothesis, the *Regulation and Incentives Hypothesis*, posits that despite their excellent performance versus traditional mutual funds, hedged mutual funds will fail to

outperform hedge funds, due to significant differences in regulation and incentives between the two industries. This hypothesis holds true. Hedged mutual funds underperform hedge funds on a gross-of-fee basis, and fail to outperform on a net-of-fee basis. Our interpretation of this result is that the tighter regulatory environment in mutual funds, which limits funds' borrowing to one-third of their assets, requires that funds provide daily liquidity and pricing in addition to covering their short positions, constrains the ability of these hedged mutual funds to implement strategies with the same freedom they have in the hedge fund environment. Further, hedged mutual funds have weaker incentives to deliver superior performance in absence of performance-based compensation. Thus, it is not surprising that, as a group, hedged mutual funds do not outperform hedge funds.

An interesting question arises from this research: why would a hedge fund also wish to offer a hedged mutual fund? There can be several potential explanations. First, it may be that hedge fund managers that also manage mutual funds use their mutual funds as a "gateway" to attract assets to their hedge funds. Second, it may simply be that it is worth their effort to offer a similar product to a class of investors that are unable to invest in hedge funds. Finally, it is possible that the mutual fund business can subsidize the hedge fund business during bad times, since fees on mutual funds are not performance-dependent. Regardless, the findings of this paper indicate that it is very difficult for mutual funds to outperform hedge funds, even when both employ similar trading strategies.

Table 1: Summary statistics for hedged mutual funds (HMF) and traditional mutual funds (TMF)

Panel A of this table reports the number of hedged mutual funds (HMFs) and traditional mutual funds (TMFs) each year during the sample period, 1994-2004. Panel B reports the number of HMFs and TMFs classified in different TMF styles. Panel C reports the average fund age, size (the beginning-of-the-year assets under management (AUM)), expense ratio, fund 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*), total load, and turnover for HMFs and TMFs, and also reports the mean differences and results of a t-test that compares the means. The expense ratio is the fund's total expenses stated as a percentage of assets. Panel D of this table provides the averages of performance measures for HMFs and TMFs, and also reports the mean differences and results of a t-test that compares the means. Differences marked with ***, **, and * are significant at the 1%, 5%, and 10% levels, respectively.

Panel A: Number of funds by type and year

Year	Number of HMFs			HMF total assets under management ($ millions)			Number of TMFs	TMF total assets under management ($ millions)
	Live	Dead	All	Live	Dead	All		
1994	8	2	10	$741	$1	$742	1,453	$540,995
1995	8	2	10	$753	$29	$782	1,597	$781,054
1996	10	2	12	$1,085	$79	$1,164	1,756	$1,037,594
1997	10	2	12	$1,235	$49	$1,284	1,988	$1,393,250
1998	16	8	24	$1,843	$79	$1,922	2,243	$1,737,621
1999	20	8	28	$2,514	$491	$3,005	2,427	$2,301,380
2000	24	10	34	$4,080	$268	$4,348	2,713	$2,276,211
2001	27	10	37	$4,820	$198	$5,018	2,788	$1,895,996
2002	34	8	42	$5,033	$254	$5,287	2,790	$1,469,021
2003	37	9	46	$9,009	$289	$9,298	2,768	$1,999,150
2004	37	7	44	$16,919	$225	$17,144	2,648	$2,250,094

Panel B: Number of funds by mutual fund style

Style	Total number of HMFs			Total number of TMFs
	Live	Dead	All	
Aggressive growth	23	5	28	314
Growth	4	1	5	1,586
Income	2	2	4	160
Growth and income	3	2	5	761
Sector	2	2	4	629
Flexible	3	2	5	190

Panel C: Fund characteristics

Fund Characteristic	Mean: HMF			Mean:	Difference
	Live	Dead	All	TMF	(HMF - TMF)
Fund age (years)	16.61	13.71	15.95	19.10	-3.15*
Size ($ millions)	$235.46	$35.66	$193.03	$788.30	-$595.27***
Expenses (% of assets)	1.84%	2.55%	1.99%	1.31%	0.68%***
Annual fund flows (% of assets)	66.55%	37.44%	60.76%	28.34%	32.42%***
Total load (% of assets)	2.72%	2.37%	2.59%	2.93%	-0.34%*
Turnover	308.60%	578.33%	360.95%	96.55%	264.40%***

Panel D: Performance measures

Performance measure	Mean: HMF			Mean: TMF	Difference
	Live	Dead	All		(HMF-TMF)
Net return: Annualized					
24-month 4-factor alpha	1.04%	-5.97%	1.26%	-0.56%	1.82%***
24-month 5-factor alpha	2.43%	-1.37%	1.72%	-0.58%	2.30%***
Annual return	9.43%	1.11%	7.85%	9.41%	-1.56%
Gross return: Annualized					
24-month 4-factor alpha	2.92%	-4.11%	3.95%	1.12%	2.83%***
24-month 5-factor alpha	5.16%	0.93%	4.44%	0.99%	3.45%***
Annual return	11.42%	2.11%	10.19%	11.34%	-1.15%

Table 1 (contd.): Summary statistics for hedged mutual funds (HMF) and traditional mutual funds (TMF)

Panel E reports the averages of the 24-month beta coefficient estimates from the Carhart (1997) four-factor regression model for HMFs and TMFs. The four factors are the value-weighted CRSP index less the risk-free rate which is called the market factor (B_{MKT}), the Fama-French (1993) Small minus Big (SMB) and High minus Low (HML) factors (B_{SMB} and B_{HML}), and Jegadeesh and Titman's (1993) Momentum factor (B_{UMD}). The data on these factors is from the website of Kenneth French. Panel F reports estimates from a five-factor model, which includes the Carhart four factors and an additional factor: B_{OTM}, which represents the return on an out-of-the-money put option on the S&P index, computed using the procedure in Agarwal and Naik (2004). It also reports the average adjusted R^2 for the four- and five-factor models. Panel G reports the average standard deviation, skewness, and kurtosis of HMF and TMF monthly returns. For these three panels, differences between HMF and TMF beta and risk values are reported, and t-tests for the difference in means are performed. Differences marked with ***, **, and * are significant at the 1%, 5%, and 10% levels, respectively.

Panel E: Four-factor model beta estimates

	Mean: HMF			Mean: TMF	Difference (HMF-TMF)
	Live	Dead	All		
B_{MKT}	0.364	0.290	0.343	0.931	-0.588***
B_{SMB}	0.162	0.289	0.125	0.104	0.021
B_{HML}	0.037	0.028	0.048	0.025	0.023
B_{UMD}	0.028	-0.075	0.020	0.005	0.015
Adjusted R^2	49.9	29.9	46.9	79.9	NA

Panel F: Five-factor model beta estimates

	Mean: HMF			Mean: TMF	Difference (HMF-TMF)
	Live	Dead	All		
B_{MKT}	0.295	0.359	0.307	0.955	-0.648***
B_{SMB}	0.110	0.089	0.106	0.101	0.005
B_{HML}	0.055	-0.006	0.044	0.025	0.019
B_{UMD}	-0.002	0.005	-0.001	0.006	-0.007
B_{OTM}	0.002	0.005	0.002	0.001	0.001
Adjusted R^2	50.5	32.4	47.2	80.4	NA

Panel G: Risk measures of monthly returns

	Mean: HMF			Mean: TMF	Difference (HMF-TMF)
	Live	Dead	All		
Standard Deviation	2.90%	3.59%	3.03%	4.98%	-1.95%***
Skewness	-0.13	0.14	-0.07	-0.14	0.07
Kurtosis	0.56	0.08	0.46	0.13	0.33***

Table 2: Performance of hedged mutual funds (HMF) and traditional mutual funds (TMF)

This table reports the results from the following OLS regression using annual data for the period 1994 to 2004:
$Perf_{i,t} = \lambda_0 + \lambda_1 HMF + \lambda_2 Perf_{i,t-2} + \lambda_3 \sigma_{i,t-2} + \lambda_4 Size_{i,t-1} + \lambda_5 Age_{i,t-1} + \lambda_6 Expense_{i,t-1} + \lambda_7 Load_{i,t-1} + \lambda_8 Turnover_{i,t-1} + \lambda_9 Flow_{i,t-1} + \sum_{s=1}^{6} \lambda_{10}^{s} I(MFStyle_{i,s}) + \sum_{t=1}^{10} \lambda_{11}^{s} I(Year_t) + \xi_{i,t}$ where $Perf_{i,t}$ is the performance measure of fund *i* in year *t*, *HMF* is a dummy that equals 1 if fund is a hedged mutual fund and 0 otherwise, $Perf_{i,t-2}$ is the performance measure of fund *i* during year *t-2*, $\sigma_{i,t-2}$ is the standard deviation of the monthly returns of fund *i* during year *t-2*, $Size_{i,t-1}$ and $Age_{i,t-1}$ are fund size and age of fund *i* at the end of year *t-1*, $Expense_{i,t-1}$, $Load_{i,t-1}$, $Turnover_{i,t-1}$, and $Flow_{i,t-1}$ are the expense ratio, total load, turnover, and % money flows in fund *i* in year *t-1*, $I(MFStyle_{i,s})$ are the MF style dummies that take a value of 1 if fund *i* has MF style *s* and 0 otherwise, $I(Year_t)$ are year dummies that take a value of 1 during a particular year and 0 otherwise, and $\xi_{i,t}$ is the error term. t-statistics using White standard errors adjusted for autocorrelation within a cluster (also known as Rogers standard errors with "cluster" variable being the fund) are shown below the coefficients in parentheses. Coefficients marked with ***, **, and * are significant at the 1%, 5%, and 10% levels, respectively.

	Performance = 24-month 4-factor alpha		Performance = 24-month 5-factor alpha	
	Gross	**Net**	**Gross**	**Net**
Intercept (TMF)	-0.279%***	-0.252%***	-0.365%***	-0.328%***
	(-3.30)	*(-3.29)*	*(-4.02)*	*(-3.96)*
HMF indicator	0.278%***	0.236%***	0.311%***	0.267%***
	(2.50)	*(2.37)*	*(2.50)*	*(2.47)*
Control Variables				
Twice-lagged performance measure	-0.0423***	-0.0386***	-0.0735***	-0.0633***
	(-2.85)	*(-2.94)*	*(-4.70)*	*(-4.64)*
Twice-lagged standard deviation	0.0188***	0.0139***	0.0258***	0.0222***
	(3.49)	*(2.84)*	*(4.43)*	*(4.21)*
Lagged log of fund size	0.0004***	0.0004***	0.0005***	0.0005***
	(8.34)	*(9.37)*	*(8.86)*	*(10.02)*
Lagged log of fund age	-0.0001	-0.0002*	-0.0002	-0.0002**
	(-1.36)	*(-1.88)*	*(-1.43)*	*(-1.98)*
Lagged expense as a percent of assets	0.0520***	-0.0257	0.0529***	-0.0374*
	(2.54)	*(-1.34)*	*(2.39)*	*(-1.78)*
Lagged total load as a percent of assets	-0.0005	-0.0127***	-0.0011	-0.0129***
	(-0.18)	*(-4.39)*	*(-0.36)*	*(-4.13)*
Lagged turnover as a percent of assets	-0.0002*	-0.0002***	-0.0001	-0.0001
	(-1.72)	*(-2.40)*	*(-1.15)*	*(-1.61)*
Lagged flow as a percent of assets	0.0017***	0.0015***	0.0018***	0.0016***
	(9.68)	*(11.25)*	*(9.35)*	*(10.89)*
Adjusted R^2	15.05	15.05	16.76	16.72
Includes time-trend dummies	Yes	Yes	Yes	Yes
Includes style dummies?	Yes	Yes	Yes	Yes
Number of fund-years	9,309	10,724	8,557	9,905

Table 3: Summary statistics for hedged mutual funds with (HFMGR-YES) and without (HFMGR-NO) hedge fund managers versus traditional mutual funds (TMFs)

Panel A of this table reports the number of hedged mutual funds with hedge fund managers (HFMGR-YES) and without (HFMGR-NO) each year during the sample period, 1994-2004. Panel B reports the number of HFMGR-YESs and HFMGR-NOs by mutual fund style. Panel C reports the average fund age, size (beginning of year assets under management (AUM)), expense ratio, fund 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), total load, and turnover for HFMGR-YESs and HFMGR-NOs. It also reports the differences with the results of a t-test comparing the means of HFMGR-YES with HFMGR-NO, and HFMGR-YESs with traditional mutual funds (TMFs). Panel D provides the averages of performance measures for HFMGR-YESs and HFMGR-NOs and again compares the HFMGR-YESs with TMF. All data for TMFs is from Table 1. Differences marked with ***, **, and * are significant at the 1%, 5%, and 10% levels, respectively.

Panel A: Number of funds and assets managed by type and year

Year	Number of HFMGR-YESs	HFMGR-YES total assets ($ millions)	Number of HFMGR-NOs	HFMGR-NO total assets ($ millions)
1994	8	$577	2	$52
1995	8	$602	2	$181
1996	10	$966	2	$198
1997	10	$1,022	2	$262
1998	14	$1,398	10	$524
1999	15	$1,477	13	$1,528
2000	19	$2,050	15	$2,298
2001	21	$2,963	16	$2,055
2002	25	$3,602	17	$1,685
2003	26	$5,741	20	$3,557
2004	25	$6,784	19	$10,360

Panel B: Number of funds by mutual fund style

Style	Total number of HFMGR YESs	Total number of HFMGR NOs
Aggressive growth	18	10
Growth	1	4
Income	3	1
Growth and income	1	4
Sector	1	3
Flexible	3	2

Panel C: Fund characteristics

Fund Characteristic	Mean: HFMGR YESs	Mean: HFMGR NOs	Mean: TMF	Difference(HFMGR YES – HFMGR NO)	Difference (HFMGR YES – TMF)
Fund age (years)	16.65	14.87	19.10	1.78	-2.45
Size ($ millions)	$168.83	$232.78	$788.30	-$63.95	-$619.47***
Expenses (% of assets)	1.85%	2.22%	1.31%	-0.37%***	0.54%***
Annual fund flows (% of assets)	59.01%	63.98%	28.34%	-4.97%	30.67%***
Total load (% of assets)	2.57%	2.62%	2.93%	-0.05%	-0.36%
Turnover	439.58%	220.34%	96.55%	219.24%***	343.03%***

Panel D: Performance Measures

Performance measure	Mean: HFMGR-YES	Mean: HFMGR-NO	Mean:TMF	Difference (HFMGR YES-HFMGR NO)	Difference (HFMGR YES-TMF)
Net Returns (Annual)					
24-month 4-factor alpha	2.56%	-0.07%	-0.56%	2.63%	3.12%***
24-month 5-factor alpha	2.36%	1.08%	-0.58%	1.28%	2.94%***
Annual return	8.50%	6.75%	9.41%	1.75%	-0.91%
Gross Returns (Annual)					
24-month 4-factor alpha	4.47%	1.93%	1.12%	2.54%	3.35%***
24-month 5-factor alpha	4.81%	4.15%	0.99%	0.66%	3.82%***
Annual return	10.52%	9.49%	11.34%	1.03%	-0.82%

Table 3 (contd.):Summary statistics for hedged mutual funds with (HFMGR-YES) and without (HFMGR-NO) hedge fund managers versus traditional mutual funds (TMFs)

Panel E reports the averages of the 24-month beta coefficient estimates from the Carhart (1997) four-factor regression model for HMF with hedge fund managers (HFMGR-YES) and HMF without hedge fund managers (HFMGR-NO) and compares these to each other and to TMFs. The four factors are the value-weighted CRSP index less the risk-free rate which is called the market factor (B_{Mkt}), the Fama-French (1993) Small minus Big (SMB) and High minus Low (HML) factors (B_{SMB} and B_{HML}), and Jegadeesh and Titman's (1993) Momentum factor (B_{UMD}). We obtain the data on these factors from the website of Kenneth French. Panel F reports estimates from a five-factor model, which includes the Carhart four factors and an additional factor: B_{OTM}, which represents the return on an out-of-the-money put option on the S&P index. We compute the return to this factor following Agarwal and Naik (2004). Panels E and F also report the average adjusted R^2 from the four- and five-factor models. Panel G reports the average standard deviation, skewness, and kurtosis of TMF and HMF monthly returns. For these three panels, differences between HFMGR-YES and HFMGR-NO as well as between HFMGR-YES and TMF beta and risk values are calculated, and t-tests for the difference in means are performed. All data for TMFs is from Table 1. Differences marked with ***, **, and * are significant at the 1%, 5%, and 10% levels, respectively.

Panel E: Four-factor model beta estimates

	Mean: HFMGR-YES	Mean: HFMGR-NO	Mean:TMF	Difference (HFMGR YES-HFMGR NO)	Difference (HFMGR YES-TMF)
B_{MKT}	0.333	0.365	0.931	-0.032	-0.598***
B_{SMB}	0.150	0.076	0.104	0.074*	0.046
B_{HML}	.000	0.030	0.025	-0.030	-0.025
B_{UMD}	0.010	0.050	0.005	-0.040	0.005
Adjusted R^2	0.440	0.540	79.89	NA	NA

Panel F: Five-factor model beta estimates

	Mean: HFMGR-YES	Mean: HFMGR-NO	Mean:TMF	Difference (HFMGR YES-HFMGR NO)	Difference (HFMGR YES-TMF)
B_{MKT}	0.305	0.412	0.955	-0.107*	-0.650***
B_{SMB}	0.127	0.147	0.101	-0.020	0.026
B_{HML}	0.057	0.067	0.025	-0.011	0.032
B_{UMD}	-0.002	0.000	0.006	-0.002	-0.008
B_{OTM}	0.003	0.003	0.001	0.000	0.003
Adjusted R^2	43.99	55.00	80.43	NA	NA

Panel G: Risk measures of monthly returns

	Mean: HFMGR-YES	Mean: HFMGR-NO	Mean:TMF	Difference (HFMGR YES-HFMGR NO)	Difference (HFMGR YES-TMF)
Standard Deviation	2.86%	3.32%	4.976%	-0.46%	-2.12%***
Skewness	-0.099	-0.040	-0.142	-0.059	0.043
Kurtosis	0.575	0.285	0.128	0.290	0.447***

Table 4: Performance of hedged mutual funds with hedge fund managers (HFMGR-YES) and without hedge fund mangers (HFMGR-NO) compared to traditional mutual funds (TMF)

This table reports the results from the following OLS regression using annual data for the period 1994 to 2004:
$Perf_{i,t} = \delta_0 + \delta_1 HFMGR-YES + \delta_2 HFMGR-NO + \delta_3 Perf_{i,t-2} + \delta_4 \sigma_{i,t-2} + \delta_5 Size_{i,t-1} + \delta_6 Age_{i,t-1} + \delta_7 Expense_{i,t-1} + \delta_8 Load_{i,t-1} + \delta_9 Turnover_{i,t-1} + \delta_{10} Flow_{i,t-1} + \sum_{s=1}^{5} \delta_{11}^{s} I(MFStyle_{i,s}) + \sum_{t=1}^{10} \delta_{12}^{s} I(Year_t) + \psi_{i,t}$ where $Perf_{i,t}$ is the performance measure of fund *i* in year *t*, *HFMGR-YES* (*HFMGR-NO*) is a dummy variable that equals 1 if the hedged mutual fund has (does not have) a hedge fund manager and zero otherwise, (hence, the missing dummy variable represents traditional mutual funds), $Perf_{i,t-2}$ is the performance of fund *i* at year *t-2*, $\sigma_{i,t-2}$ is the standard deviation of the monthly returns of fund *i* during year *t-2*, $Size_{i,t-1}$ and $Age_{i,t-1}$ are fund size and age of fund *i* at the end of year *t-1*, $Expense_{i,t-1}$, and $Load_{i,t-1}$, $Turnover_{i,t-1}$, and $Flow_{i,t-1}$ are the expense ratio, total load, turnover, and percentage money flows in fund *i* in year *t-1*, $I(MFStyle_{i,s})$ are the MF style dummies that take a value of 1 if fund *i* has MF style *s* and 0 otherwise, $I(Year_t)$ are year dummies that take a value of 1 during a particular year and 0 otherwise, and $\psi_{i,t}$ is the error. t-statistics using White standard errors adjusted to account for autocorrelation within a cluster (also known as Rogers standard errors; in this case, the "cluster" variable is the fund) are shown below the coefficients in parentheses. The difference between the coefficients on *HFMGR-YES* and *HFMGR-NO is* also reported, and F-tests for the significance in this difference are performed. Coefficients marked with ***, **, and * are significant at the 1%, 5%, and 10% levels, respectively.

	Performance = 24-month 4-factor alpha		Performance = 24-month 5-factor alpha	
	Gross	**Net**	**Gross**	**Net**
Intercept (TMF)	-0.287%***	-0.257%***	-0.374%***	-0.333%***
	(-3.36)	*(-3.33)*	*(-4.09)*	*(-3.99)*
HFMGR-YES	0.393%***	0.341%***	0.453%***	0.396%***
	(3.25)	*(2.91)*	*(3.47)*	*(3.10)*
HFMGR-NO	-0.045%	-0.005%	-0.095%	-0.008%
	(-0.21)	*(-0.04)*	*(-0.42)*	*(-0.05)*
Control Variables				
Twice-lagged performance measure	-0.0427***	-0.0390***	-0.0739***	-0.0635***
	(-2.88)	*(-2.96)*	*(-4.72)*	*(-4.65)*
Twice-lagged standard deviation	0.0189***	0.0140***	0.0259***	0.0223***
	(3.51)	*(2.86)*	*(4.45)*	*(4.22)*
Lagged log of fund size	0.0004***	0.0000***	0.0005***	0.0005***
	(8.39)	*(9.40)*	*(8.92)*	*(10.04)*
Lagged log of fund age	-0.0001	0.0000**	-0.0002	-0.0002**
	(-1.30)	*(-1.86)*	*(-1.36)*	*(-1.96)*
Lagged expense as a percent of assets	0.0558***	-0.0230	0.0568***	-0.0351*
	(2.64)	*(-1.20)*	*(2.53)*	*(-1.66)*
Lagged total load as a percent of assets	-0.0007	-0.0130***	-0.0013	-0.0130***
	(-0.22)	*(-4.41)*	*(-0.40)*	*(-4.15)*
Lagged turnover as a percent of assets	-0.0002*	0.0000***	-0.0001	-0.0001*
	(-1.87)	*(-2.51)*	*(-1.32)*	*(-1.73)*
Lagged flow as a percent of assets	0.0018***	0.0015***	0.0018***	0.0016***
	(9.96)	*(11.42)*	*(9.68)*	*(11.06)*
Adjusted R^2	15.13	15.10	16.86	16.79
Includes time-trend dummies	Yes	Yes	Yes	Yes
Includes style dummies?	Yes	Yes	Yes	Yes
Number of fund-years	9,309	10,724	8,557	9,905
Difference between HFMGR-YES and HFMGR-NO	**0.438%***	**0.346%***	**0.548%****	**0.404%****

Table 5: Tests of persistence in fund performance

This table presents two-way tables of ranked total returns over one year intervals for the entire sample period. Panel A reports persistence results for the entire sample of HMFs. Funds are ranked in the first year and held for one year. If a fund's returns are in the top (bottom) half of all returns for the period, we designate it as a "winner", *W* ("loser", *L*). The percent repeat winner/loser column is relative to the number of funds ranked a winner/loser in the prior period. We compute the cross-product-ratio (CPR) as $\frac{(WW * LL)}{(WL * LW)}$ where WW (LL) are the repeat winners (losers) and WL (LW) are winner-loser (loser-winner) over two consecutive periods and the standard error of the logarithm of CPR is given by $\sigma_{\log(CPR)} = \sqrt{\frac{1}{WW} + \frac{1}{WL} + \frac{1}{LW} + \frac{1}{LL}}$. We compute the t-statistic as the log of CPR divided by its standard error. We compute the z-statistic as $\frac{Y - np}{\sqrt{np(1-p)}}$ where *n* is the number of funds, *p* is the probability that a winner in one period continues to be a winner in the next period, and *Y* is a random variable for the number of persistently winning funds. Coefficients with three, two, and one asterisks are significant at the 1%, 5%, and 10% level respectively. The null hypothesis is that 50% of the funds will be repeat winners and 50% of the funds will be repeat losers. Panel B examines persistence by splitting the sample of hedged mutual funds into funds with hedge fund managers (YES-HFMGR) and funds with traditional mutual fund managers (NO-HFMGR). We report the total number of hedged mutual funds in each category, the total number of winner/winner funds, and the total number of loser/loser funds. We also report the percentage of winner/winner and loser/loser funds relative to the total number of hedged mutual funds in each category. The null hypothesis is that 25% of hedged mutual funds in each category should be repeat winners and 25% of hedged mutual funds in each category should be repeat losers.

Panel A: Overall HMF Sample

Initial year		Next year: Winner	Next year: Loser	Percent repeat winner or loser	Cross-product ratio t-test	z-test for repeat winner or loser
1994-2004	**Winner**	67	50	57.26%	1.911*	1.5717
	Loser	49	61	55.45%		1.1442

Panel B: NO-HFMGR and YES-HFMGR Comparison

First year	Description	Total # of funds by category	# of winner/ winner funds	% winner/winner	# of loser/loser funds	% loser/loser
1994-2004	**NO-HFMGR**	95	21	22.11%	29	**30.53%**
	YES-HFMGR	132	46	**34.85%**	32	24.24%

Table 6: Robustness tests for HMF and TMF regressions

This table presents the results of the robustness to various econometric techniques for the HMF, HFMGR-YES, and HFMGR-NO variables in HMF and TMF regressions. For the sake of comparison, it also reports the results from Tables 2 and 4 in the first row. The alternative econometric techniques include management-company (MC) level fixed effects, random effects, and between effects, and fund-level random effects and between effects. For brevity, it only reports the coefficients on the HMF variable (from Table 2) and on the HFMGR-YES and HFMGR-NO variables (from Table 4). Panel A reports the results for HMF vs TMF, with the HMF variable. Panel B reports the results from Table 4, HMF vs. TMF, with the HMF indicator variable split into HFMGR-YES and HFMGR-NO indicators. It reports t-statistics below the coefficients in parentheses. Figures marked with ***, **, and * are significant at the 1%, 5%, and 10% levels, respectively.

Panel A: Coefficients on the Intercept and HMF variables in HMF-TMF regressions

Specification	Performance = 24-month 4-factor alpha		Performance = 24-month 5-factor alpha	
	Gross	**Net**	**Gross**	**Net**
From Table 2				
Intercept	-0.279%***	-0.252%***	-0.365%***	-0.328%***
	(-3.30)	*(-3.29)*	*(-4.02)*	*(-3.96)*
HMF variable	0.278%***	0.236%***	0.311%***	0.267%***
	(2.50)	*(2.37)*	*(2.50)*	*(2.47)*
1. Family random effects				
Intercept	-0.302%***	-0.279%***	-0.357%***	-0.335%***
	(-4.26)	*(-4.27)*	*(-4.56)*	*(-4.51)*
HMF variable	0.258%***	0.193%***	0.298%***	0.217%***
	(3.39)	*(2.72)*	*(3.64)*	*(2.80)*
2. Fund random effects				
Intercept	-0.325%***	-0.291%***	-0.415%***	-0.372%***
	(-4.19)	*(-4.10)*	*(-4.74)*	*(-4.58)*
HMF variable	0.294%***	0.234%***	0.331%***	0.269%***
	(3.29)	*(2.89)*	*(3.40)*	*(3.04)*
3. Family between effects				
Intercept	-0.034%	-0.230%	-0.061%	-0.340%*
	(-0.19)	*(-1.31)*	*(-0.33)*	*(-1.77)*
HMF variable	0.464%***	0.618%***	0.536%***	0.733%***
	(3.20)	*(4.29)*	*(3.63)*	*(4.68)*
4. Fund between effects				
Intercept	-0.174%***	-0.188%**	-0.214%***	-0.194%***
	(-1.84)	*(-2.19)*	*(-2.09)*	*(-2.04)*
HMF variable	0.125%	0.084%	0.104%	0.105%
	(1.28)	*(1.00)*	*(0.98)*	*(1.16)*
5. Family fixed effects				
Intercept	-0.433%***	-0.393%***	-0.486%***	-0.437%***
	(-4.04)	*(-4.31)*	*(-4.24)*	*(-4.48)*
HMF variable	0.116%	0.050%	0.177%	0.099%
	(0.88)	*(0.60)*	*(1.47)*	*(1.11)*

Table 6: Robustness tests for HMF and TMF regressions, continued

Panel B: Coefficients on the Intercept and HFMGR-YES AND HFMGR-NO variables in HMF-TMF regressions

Specification	Performance = 24-month 4-factor alpha		Performance = 24-month 5-factor alpha	
	Gross	**Net**	**Gross**	**Net**
From Table 4				
Intercept	-0.287%***	-0.257%***	-0.374%***	-0.333%***
	(-3.36)	*(-3.33)*	*(-4.09)*	*(-3.99)*
HFMGR-YES variable	0.393%***	0.341%***	0.453%***	0.396%***
	(3.25)	*(2.91)*	*(3.47)*	*(3.10)*
HFMGR-NO variable	-0.045%	-0.005%	-0.095%	-0.008%
	(-0.21)	*(-0.04)*	*(-0.42)*	*(-0.05)*
1. Family random effects				
Intercept	-0.307%***	-0.283%***	-0.338%***	-0.363%***
	(-4.33)	*(-4.32)*	*(-4.56)*	*(-4.65)*
HFMGR-YES variable	0.345%***	0.266%***	0.305%***	0.421%***
	(3.92)	*(3.13)*	*(3.23)*	*(4.47)*
HFMGR-NO variable	0.022%	0.037%	0.046%	-0.045%
	(0.15)	*(0.30)*	*(0.36)*	*(-0.29)*
2. Fund random effects				
Intercept	-0.295%***	-0.333%***	-0.423%***	-0.376%***
	(-4.16)	*(-4.29)*	*(-4.83)*	*(-4.63)*
HFMGR-YES variable	0.353%***	0.429%***	0.488%***	0.410%***
	(3.62)	*(4.17)*	*(4.36)*	*(3.78)*
HFMGR-NO variable	-0.014%	-0.090%	-0.115%	0.005%
	(-0.10)	*(-0.53)*	*(-0.62)*	*(0.03)*
3. Family between effects				
Intercept	-0.059%	-0.233%	-0.089%	-0.343%*
	(-0.32)	*(-1.32)*	*(-0.48)*	*(-1.79)*
HFMGR-YES variable	0.539%***	0.642%***	0.629%***	0.767%***
	(3.56)	*(4.24)*	*(4.07)*	*(4.64)*
HFMGR-NO variable	-0.312%	0.411%	-0.369%	0.459%
	(-0.65)	*(0.97)*	*(-0.78)*	*(1.01)*
4. Fund between effects				
Intercept	-0.188%**	-0.194%**	-0.230%**	-0.201%**
	(-1.99)	*(-2.26)*	*(-2.24)*	*(-2.11)*
HFMGR-YES variable	0.268%***	0.230%**	0.274%**	0.283%***
	(2.40)	*(2.17)*	*(2.26)*	*(2.43)*
HFMGR-NO variable	-0.309%	-0.143%	-0.414%**	-0.144%
	(-1.62)	*(-1.09)*	*(-2.01)*	*(-1.05)*
5. Family fixed effects				
Intercept	-0.432%***	-0.393%***	-0.485%***	-0.436%***
	(-4.02)	*(-4.30)*	*(-4.23)*	*(-4.53)*
HFMGR-YES variable	0.105%	0.047%	0.132%	0.069%
	(0.82)	*(0.51)*	*(1.08)*	*(0.62)*
HFMGR-NO variable	0.137%	0.055%	0.244%	0.135%
	(0.46)	*(0.36)*	*(1.03)*	*(0.78)*

Table 7: Summary statistics for hedged mutual funds (HMF) versus hedge funds (HFs)

Panel A of this table reports the number of hedged mutual funds (HMFs) and hedge funds (HFs) each year during the sample period, 1994-2004. Panel B reports the number of HMFs and HFs classified in different HF styles. Panel C reports the average fund age, size (beginning of year assets under management (AUM)), expense ratio, and fund 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*), for HMFs, and also reports the results of a t-test comparing the means between HMFs and HFs. The expense ratio for both hedge funds and mutual funds is the fund's fixed expenses stated as a percentage of assets. It does not include incentive fees (usually a percentage of profits) that are charged by hedge funds but not by mutual funds. Panel D of this table provides the averages of performance measures for HMFs and HFs. All data for HMFs is from Table 1. Differences marked with ***, **, and * are significant at the 1%, 5%, and 10% levels, respectively.

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

Year	Number of HMFs	Number of HFs	HF total AUM ($millions)
1994	10	270	$12,508
1995	10	345	$16,371
1996	12	458	$23,446
1997	12	571	$32,799
1998	24	671	$38,624
1999	28	805	$62,915
2000	34	965	$84,785
2001	37	1,054	$99,541
2002	42	1,103	$102,933
2003	46	1,118	$137,975
2004	44	993	$175,370

Panel B: Number of funds by hedge fund style

Style	Total number of HMFs	Total number of HFs
Long-Short equity	39	1613
Other/Multi-strategy	12	157

Panel C: Fund characteristics

Fund Characteristic	Mean: HMF	Mean: HF	Difference (HMF – HF)
Fund age (years)	15.95	4.02	11.93***
Size ($ millions)	$193.03	$112.48	$80.55***
Expenses (% of assets)	1.99%	1.18%	0.81%***
Annual fund flows (% of assets)	60.76%	63.88%	-3.12%
Total load (% of assets)	2.59%	NA	NA
Turnover	360.95%	NA	NA

Panel D: Performance Measures

Performance measure	Mean: HMF	Mean: HF	Difference (HMF - HF)
Net Returns (Annual)			
24-month 4-factor alpha	1.26%	8.21%	-6.95%***
24-month 5-factor alpha	1.72%	8.48%	-6.76%***
Annual return	7.85%	15.25%	-7.40%***
Gross Returns (Annual)			
24-month 4-factor alpha	3.95%	9.45%	-4.98%*
24-month 5-factor alpha	4.44%	10.63%	-5.82%***
Annual return	10.19%	16.59%	-6.07%***

Table 7 (contd.): Summary statistics for hedged mutual funds (HMF) versus hedge funds (HFs)

Panel E reports the averages of the 24-month beta coefficient estimates from the Carhart (1997) four-factor regression model for HMFd and compares these to HFs. The four factors are the value weighted CRSP index less the risk-free rate which is called the market factor (B_{Mkt}), the Fama-French (1993) Small minus Big (SMB) and High minus Low (HML) factors (B_{SMB} and B_{HML}), and Jegadeesh and Titman's (1993) Momentum factor (B_{UMD}). Data on these factors is from the website of Kenneth French. Panel F reports estimates from a five-factor model, which includes the Carhart four factors and an additional factor: B_{OTM}, which represents the return on an out-of-the-money put option on the S&P index. Calculation of the returns on this factor is based on Agarwal and Naik (2004). Panels E and F also report the average adjusted R^2 for the regression models. Panel G reports the average skewness and kurtosis of HF and HMF monthly returns. The three panels also report the differences between HMFs and HFs as well as the results of a t-test comparing the means between HMFs and HFs. The data for HMFs is taken from Table 1. Differences marked with ***, **, and * are significant at the 1%, 5%, and 10% levels, respectively.

Panel E: Four-factor model beta estimates

	Mean: HMF	Mean:HF	Difference (HMF - HF)
B_{MKT}	0.343	0.396	-0.053***
B_{SMB}	0.125	0.234	-0.109***
B_{HML}	0.048	0.062	-0.014
B_{UMD}	0.020	0.009	0.011***
Adjusted R^2	46.93	37.21	NA

Panel F: Five-factor model beta estimates

	Mean: HMF	Mean:HF	Difference (HMF - HF)
B_{MKT}	0.307	0.414	-0.107***
B_{SMB}	0.106	0.231	-0.125***
B_{HML}	0.044	0.063	-0.019
B_{UMD}	-0.001	0.005	-0.006
B_{OTM}	0.002	0.001	0.001
Adjusted R^2	47.17	37.68	NA

Panel G: Risk (Monthly)

	Mean: HMF	Mean:HF	Difference (HMF - HF)
Standard Deviation	3.03%	4.44%	-1.41%***
Skewness	-0.077	0.091	-0.168***
Kurtosis	0.467	0.633	-0.166

Table 8: Performance of hedged mutual funds (HMF) compared to hedge funds (HF)

This table reports the results from the following OLS regression using annual data for the period 1994 to 2004:

$$Perf_{i,t} = \beta_0 + \beta_1 HMF + \beta_2 Perf_{i,t-2} + \beta_3 \sigma_{i,t-2} + \beta_4 Size_{i,t-1} + \beta_5 Age_{i,t-1} + \beta_6 Expense_{i,t-1} + \beta_7 Flow_{i,t-1} + \beta_8 Long/Shortstyle_i + \sum_{t=1}^{10} \beta_9^s I(Year_t) + \vartheta_{i,t}$$

where $Perf_{i,t}$ is the performance measure of fund *i* in year *t*, *HMF* is a dummy variable that equals 1 if the fund is a hedged mutual fund and zero otherwise (hence, the missing dummy variable represents hedge funds), $Perf_{i,t-2}$ is the performance of fund *i* in year *t-2*, $\sigma_{i,t-2}$ is the standard deviation of the monthly returns of fund *i* during year *t-2*, $Size_{i,t-1}$ and $Age_{i,t-1}$ are fund's size and age measured as the log of the assets under management and log of the age of fund *i* at the end of year *t-1*, $Expense_{i,t-1}$, and $Flow_{i,t-1}$ are the expense ratio and percentage money flows in fund *i* in year *t-1*, $Long/Short_i$ is set to 1 if a fund is Long/short equity style and 0 otherwise (thus, the missing style category is Other/Multi-strategy), $I(Year_t)$ are year dummies that take a value of 1 during a particular year and 0 otherwise, and $\vartheta_{i,t}$ is the error. t-statistics using White standard errors adjusted to account for autocorrelation within a cluster (also known as Rogers standard errors; in this case, the "cluster" variable is the fund) are shown below the coefficients in parentheses. Differences marked with ***, **, and * are significant at the 1%, 5%, and 10% levels, respectively.

	Performance = 24-month 4-factor alpha		Performance = 24-month 5-factor alpha	
	Gross	**Net**	**Gross**	**Net**
Intercept (HF)	0.715%**	0.816%***	0.630%*	0.930%***
	(2.17)	*(2.40)*	*(1.91)*	*(2.58)*
HMF	-0.371%***	-0.120%	-0.407%***	-0.124%
	(-2.62)	*(-0.81)*	*(-2.78)*	*(-0.79)*
Control Variables				
Twice-lagged performance measure	0.0278	0.0233	0.0151	-0.0252
	(0.99)	*(0.82)*	*(0.58)*	*(-0.91)*
Twice-lagged standard deviation	0.0413***	0.0400***	0.0420***	0.0234
	(2.82)	*(2.69)*	*(3.06)*	*(1.43)*
Lagged log of fund size	0.0005**	0.0007***	0.0005***	0.0007***
	(2.31)	*(3.33)*	*(2.42)*	*(3.36)*
Lagged log of fund age	-0.0020***	-0.0027***	-0.0020***	-0.0029***
	(-3.02)	*(-3.87)*	*(-3.04)*	*(-3.99)*
Lagged expense as a percent of assets	0.2194***	0.1452**	0.2221***	0.1541**
	(3.10)	*(2.21)*	*(3.03)*	*(1.98)*
Lagged flow as a percent of assets	0.0014***	0.0020***	0.0014***	0.0020***
	(5.37)	*(5.53)*	*(5.45)*	*(5.05)*
Adjusted R^2	20.69	20.68	20.75	16.47
Includes time-trend dummies	Yes	Yes	Yes	Yes
Includes style dummies?	Yes	Yes	Yes	Yes
Number of fund-years	2,230	2,311	2,223	2,309

Table 9: Robustness tests for HMF and HF

This table reports the results for the robustness to various econometric techniques for the HMF variable in HMF and HF regressions. For the sake of comparison, it also reports the results from Table 8 in the first row. The alternative econometric techniques include management-company (MC) level fixed effects, random effects, and between effects, and fund-level random effects and between effects. For brevity, it only reports the coefficients on the HMF variable (from Table 8). It reports t-statistics below the coefficients in parentheses. Figures marked with ***, **, and * are significant at the 1%, 5%, and 10% levels, respectively.

Coefficients on the Intercept and HMF variables in HMF-HF regressions

Specification	Performance = 24-month 4-factor alpha		Performance = 24-month 5-factor alpha	
	Gross	**Net**	**Gross**	**Net**
From Table 7				
Intercept	0.715%**	0.816%***	0.630%*	0.930%***
	(2.17)	*(2.40)*	*(1.91)*	*(2.58)*
HMF variable	-0.371%***	-0.120%	-0.407%***	-0.124%
	(-2.62)	*(-0.81)*	*(-2.78)*	*(-0.79)*
1. Fund random effects				
Intercept	1.266%***	1.708%***	1.112%***	1.038%***
	(3.87)	*(3.17)*	*(3.72)*	*(2.74)*
HMF variable	-0.349%*	-0.253%	-0.282%	-0.267%
	(-1.70)	*(-1.39)*	*(-1.48)*	*(-1.32)*
2. Family between effects				
Intercept	-0.746%	-0.318%	-0.725%	-0.105%
	(-1.34)	*(-0.64)*	*(-1.30)*	*(-0.19)*
HMF variable	-0.487%*	-0.524%***	-0.480%*	-0.466%**
	(-1.78)	*(-2.49)*	*(-1.71)*	*(-1.99)*
3. Fund between effects				
Intercept	-0.873%*	-0.410%	-0.865%*	-0.162%
	(-1.82)	*(-0.95)*	*(-1.82)*	*(-0.33)*
HMF variable	-0.733%***	-0.563%***	-0.744%***	-0.525%**
	(-2.88)	*(-2.83)*	*(-2.85)*	*(-2.29)*

Appendix A: Hedged Mutual Fund Sample Selection Process

To select the sample of HMFs, we begin with the categorical lists of mutual funds provided by Morningstar and Lipper. Morningstar categorizes HMFs as Long/Short Equity funds, while Lipper divides funds into two categories: Long/Short and Equity Market Neutral. As long as a mutual fund is on either of the lists, we include it in the sample. There are only a small number of funds in Lipper's list of Equity Market Neutral funds, all of which are included on Morningstar's Long/Short list. Hence, we simplify the nomenclature and refer to the funds on these lists "Long/Short Equity." This process results in 26 unique funds.[1]

There are two major issues with using only the Morningstar and Lipper data to compile the sample. The first is that since these categorizations are quite new (they were implemented in early 2006), defunct funds are not included on either of the lists. Second, a handful of other mutual funds using hedge fund strategies such as fund-of-funds, merger arbitrage, managed futures, multi-strategy, and event driven are not picked up by Morningstar or Lipper. We address both issues by searching news archives (including Morningstar's website, Lexis/Nexis, and www.google.com) for articles regarding hedged mutual funds. In addition, we search the Morningstar and CRSP mutual fund databases, using the following search terms: "long/short", "short", "option", "market neutral", "arbitrage", "hybrid mutual fund", "hedged mutual fund,", "merger", "distressed", "hedged", "fund of funds", and "alternative." From this search, we identified about 90 additional possibilities for inclusion in the sample. Since we focus on equity-based strategies in this paper, we first exclude funds that do not invest in equities as a major part of their trading strategies. This excludes 5 funds from the sample.

[1] The key theoretical differences in Long/Short Equity and Equity Market Neutral funds are that Equity Market Neutral funds have the specific goal of reducing market risk to a very low level – for example, it is common for Equity Market Neutral funds to have market betas of close to zero. A Long/Short equity fund, by contrast, does not always strive to be market neutral, and typically has a positive, though not too large, market beta.

The overriding criterion for including a fund in the sample of hedged mutual funds is that the fund must closely adhere to the spirit of a "real" hedge fund. Specifically, the manager's goal must be to add value through hedge-fund-like active trading strategies. This simple criterion that the fund manager be "active", allows us to eliminate over half the funds that we initially identified as being possible hedged mutual funds. Specifically, we exclude a number of mutual funds offered by Rydex and ProFunds, two fund families that offer a variety of mutual funds in the "enhanced index" category. Usually through the use of futures contracts, these funds track the performance of common market indices, such as the S&P 500 or certain market sectors. Although these funds have "flexible" trading programs and use large amounts of derivative securities, they are passively managed in terms of stock-picking. Thus, we exclude these funds from the sample.

We also exclude funds that fall into the category of "short-only" or "bear market". The goal of these funds is typically to hold a nearly 100% short portfolio. While this is a genuine hedge fund strategy, we identify less than 5 mutual funds that appear to follow "active" short-only trading strategies, although there are a number of passive short-only funds that attempt to replicate the inverse performance of an index, many offered by ProFunds and Rydex. Thus, we exclude these funds from the analysis.

We do not rely on the fund names as these can be sometimes misleading (e.g., Cooper, Gulen, and Rau, (2005)). Instead, for each of the remaining funds, we review prospectuses and annual reports from the SEC website (www.sec.gov) going back to 1995 (the first year for which the SEC has electronic filings available). After careful review of all annual reports and prospectuses, we include additional funds in the sample using the following methodology. For funds that we identify as being defunct, we impose the exact same criterion that Morningstar

imposes in compiling its long/short list, namely that the fund have at least 20% short exposure each year.[2] Using this approach, we identify 13 long/short mutual funds that would have been included on Morningstar's list had they categorized funds in this manner historically. This brings us to a total of 39 funds.

Using the SEC filings and news articles, we next include funds that practice hedge fund strategies other than long/short or market neutral. We identify a total of 17 additional funds for possible inclusion. Of these 17 funds, 7 describe well-known "hedge fund" strategies in their prospectuses. These include 2 fund-of-funds (mutual funds that invest either directly in hedge funds or in mutual funds that follow hedge fund strategies) one of which is defunct, 3 merger arbitrage funds, 1 commodity trading adviser, and 1 distressed securities/event driven fund. From reviewing the funds' annual reports, it is clear that these funds are indeed following their intended strategies. We initially recommend including these 7 funds in the sample.

This leaves 10 remaining funds. We identify all of these by at least one news article as being "hedge-like" in nature, and a review of their annual reports and prospectuses indicates that many of them are using hedge fund strategies that cross over many styles: shorting stocks, using leverage to make broad sector bets, and so forth. In addition, we find several manager interviews for these funds where the managers describe their funds as "using hedge fund strategies." We tentatively recommend including these 10 funds in the sample.

While these 17 funds all appear to be using some types of hedging strategies, we want a more objective way to make the final include/reject decision. We seek to avoid including funds that use "flexible" trading strategies for the purpose of reducing risk or managing cash flows, but rather, wish to include funds that are following unique strategies similar to those followed by hedge funds. Since, in general, most hedge fund managers are active traders that try to add value

[2] Per discussion with Dan McNeela of Morningstar on June 7, 2006.

while minimizing market exposure, we use a fund's "market beta" as the final selection criterion by applying the following test: the fund's average 24-month "market beta" (the coefficient on the market factor in Carhart's (1997) four-factor regression) must be less than the highest market beta from the combined Morningstar/Lipper fund list.[3]

The highest market beta for the Morningstar/Lipper list is 0.81. Using 0.81 as the cut-off criterion removes 5 funds from the list of 17. The 7 funds that we identify as using well-defined hedge fund strategies other than long/short equity easily make this cutoff, and 5 of the remaining 10 funds also make the list, with market betas ranging from 0.35 to 0.76. We recognize that there are likely other funds in the broad sample of mutual funds that have betas lower than 0.81 for a number of reasons, although the average 24-month beta for the traditional mutual fund sample is very high, at 0.94. However, we are comfortable that our approach has been rigorous and unbiased in searching for hedged mutual funds.[4]

[3] We thank Dennis Bein of Analytical Investors for helping us define this general criterion.

[4] We also perform all the analyses in the paper using the larger sample of 56 funds, which includes the 5 we rejected due to high market betas, and all results hold. In addition, we calculate the market beta for all 51 funds in the sample. All the funds except for two of the defunct funds had market betas less than 0.81, although as noted earlier, a review of the annual reports of these defunct funds indicates that they indeed would have been included in the Morningstar list since they met the 20% short criterion. We reperform all our tests without these 2 funds, and the results are even stronger. Hence, to be conservative in including defunct funds, we keep these funds in the sample.

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