Poor Man's Hedge Funds?
Performance and Risk-taking of Hedged Mutual Funds

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Abstract

This paper examines the role of regulation, incentives, and flexibility in managed portfolios by studying a relatively new type of investment product known as a "hedged" mutual fund (HMF). HMFs are mutual funds that claim to use hedge-fund-like trading strategies. On one hand, they are similar to hedge funds (HFs) with respect to investment flexibility, but face stricter regulation and weaker incentives. On the other hand, they face the same regulatory constraints and incentives as traditional mutual funds (TMFs), but enjoy greater investment flexibility. Hence, HMFs lie between HFs and TMFs, which allows us to address the following question: How do differences in regulation, incentives, and flexibility affect the performance and risks of HMFs relative to those of HFs and TMFs? Further, since some HMFs are run by HF management companies, we can answer another question: How does the skill of the management company in executing HF strategies impact the performance and risk-taking behavior of HMFs?

We find that HMFs significantly underperform HFs while incurring greater risk. This result is consistent with HMFs having stricter regulation and weaker incentives. Surprisingly, despite greater investment flexibility, we find that HMFs fail to outperform TMFs although they do exhibit lower risk. Interestingly, we observe that HMFs run by HF management companies significantly outperform other HMFs. This result suggests that along with flexibility, funds also need expertise to deliver superior performance.

JEL Classifications: G11, G12
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"This is me unplugged." – Ronald Baron, regarding his Baron Partners Fund, a Hedged Mutual Fund. This fund outperformed the S&P 500 by 10% in 2005.[1]

Recently, there has been a rapid growth in the number of mutual funds that purport to use hedge-fund-like trading strategies, with total assets under management of about $25 billion by the end of 2004.[2] Despite their use of hedge-fund-like strategies, these "hedged" mutual funds (HMFs) are regulated by the Securities and Exchange Commission (SEC) in exactly the same way as "traditional" mutual funds (TMFs). The idea that ordinary investors can have access to hedge fund (HF) investment strategies with mutual fund features including low minimum investments, asset transparency, SEC regulation, and lower fees, is appealing. In contrast to HFs, HMFs do not require that investors be "accredited". Hence, HMFs have been referred to in the popular press as "poor man's" hedge funds.[3]

Though extant literature (e.g., Ackermann, McEnally, and Ravenscraft, 1999; Liang, 1999) has compared HFs with mutual funds, it is not possible to isolate the effect of differences in regulation, incentives, and investment flexibility driving the results. Our study comparing HMFs with HFs and TMFs contributes to the literature by segregating the effects of regulation and incentives from that of flexibility. This is because HMFs lie between HFs and TMFs in the following way. On one hand, they resemble HFs due to similarities in investment flexibility but differ due to greater regulation and weaker incentives (since they do not charge performance-based

[1] Atlas, Riva, "From mutual funds to hedge funds and back again," 1/8/06, *New York Times.*

[2] This growth is partly driven by the repeal of the "short-short rule" by the Taxpayer Relief Act in 1997, which prohibited mutual funds from deriving more than 30% of their capital gains from positions held for less than three months. This rule had discouraged the use of derivatives by mutual funds as it typically involved realizing short-term gains. However, it is important to note that even before 1997, funds were allowed to use some flexibility in their investment policies as long as they disclosed it and obtained shareholders' approval.

[3] The median minimum investment in HMFs is $5,000 compared to $500,000 in HFs. An individual investor in HFs must be "accredited", i.e., she must have a net worth of at least $1 million or have an annual income of at least $200,000.

fees.) On the other hand, they face the same regulatory constraints and incentives as TMFs but differ in terms of investment flexibility.

Using these unique features of HMFs, we examine three key research questions: First, can differences in regulation and incentives explain the differences in performance and risk-taking behavior between HMFs and HFs? Second, can differences in investment flexibility explain the differences in performance and risk-taking behavior of HMFs and TMFs? Finally, what role does skill and expertise of the management company in executing HF strategies play in the performance and risk-taking behavior of HMFs?

The first part of the investigation involves comparing the performance and risk of HMFs with HFs. We expect HMFs to underperform HFs due to weaker incentives since HMFs do not charge a performance-based incentive fee. They might also underperform HFs due to costs associated with greater regulation. For example, SEC regulations require mandatory disclosure of portfolio holdings at regular intervals, which imposes compliance costs. In addition, this mandatory disclosure can result in leakage of the fund's private information to outsiders, who can trade on it and move security prices against the fund (see, e.g., Wermers, 2001, Frank et al, 2004). Arguably, some of these costs may be reduced since regulation could mitigate agency problems. Overall, however, we predict that greater regulation and weaker incentives should result in HMFs underperforming HFs.

The expected effect of regulation and incentives on risk-taking behavior of HMFs relative to HFs is not as clear-cut. Since HFs have call-option-like incentive contracts, one might expect HFs to exhibit higher risk than HMFs based on the theoretical work of Das and Sundaram (2002). However, Basak, Pavlova, and Shapiro (2006), Carpenter (2000), and Ross (2004) argue that option compensation does not always lead to higher risk since risk-taking depends on the nature of an

agent's utility function and the fund's performance relative to its benchmark. Further, Brown, Goetzmann, and Park (2001) and Boyson (2005) show empirically that career concerns can curb the risk-taking behavior of HFs. Finally, managerial co-investment in the fund also restrains risk-taking of HFs. In light of these offsetting effects, it remains an empirical question whether the risk-taking behavior in HFs will differ from that in HMFs.

The second part of our investigation compares HMFs to TMFs. Since both are subject to the same regulatory requirements and have similar compensation structures, the major difference between them is the flexibility of their investment strategies. Unlike TMFs, HMFs opt for greater investment flexibility through the use of derivatives, short-selling, leverage, etc. to implement HF-like trading strategies.[4] Arguably, greater flexibility enables HMFs to pursue trading strategies not used by TMFs. For example, HMFs can benefit from taking long positions in undervalued securities as well as short positions in overvalued securities, often employing leverage. They may also use derivatives to execute these strategies at lower costs. Therefore, we predict that HMFs will outperform TMFs.

Greater investment flexibility should also enable HMFs to manage risk better than TMFs through the use of derivatives and short-selling. For example, long-short and/or market-neutral trading strategies (followed by a large proportion of the HMFs in our sample) typically involve taking both long and short positions to hedge against systematic risk. HMFs can also use derivatives such as protective put options to shield against extreme market movements. However, derivatives and leverage can also be used to speculate and thereby increase risk. Overall, we believe that the risk-reduction effect should dominate, and therefore we predict that HMFs should have lower risk than TMFs.

[4] Extant literature has provided other reasons for some mutual funds choosing greater investment flexibility. Koski and Pontiff (1999) and Deli and Varma (2002) provide a transaction-cost-based argument while Almazan et al (2004) provide a monitoring-based argument. We discuss these motives later in the section on related literature.

To summarize, we predict that due to differences in regulation and incentives (the *Regulation and Incentives Hypothesis*), HMFs should underperform HFs. Further, due to differences in investment flexibility (the *Flexibility Hypothesis*), we predict that HMFs should outperform TMFs and also exhibit lower risk than TMFs. We test these predictions and document several interesting findings.

First, consistent with the Regulation and Incentives Hypothesis, we show that HMFs underperform HFs. Second, HMFs have higher risk than HFs. This finding implies that the career concerns and managerial co-investment effects seem to dominate the risk-seeking effect related to the option-like incentive fee contracts in HFs. Third, somewhat surprisingly, we find that HMFs do not outperform TMFs, a result inconsistent with the Flexibility Hypothesis. However, HMFs do exhibit lower risk, as predicted by the Flexibility Hypothesis. Although the risk of HMFs is lower, it is not low enough to compensate for the lower returns. For example, using risk-adjusted performance measures such as the Sharpe ratio, Sortino ratio, and alphas from multifactor models, HMFs either underperform or fail to outperform TMFs. Our results are robust to a wide range of performance and risk measures computed using both net-of-fee and gross-of-fee returns. Our results are also generally robust to different econometric methodologies that control for fund-specific and management-company-specific fixed-effects and random-effects.

Since the underperformance of HMFs relative to TMFs is at odds with the flexibility hypothesis, we test an alternative hypothesis based on skill (the *Skill Hypothesis*) to further investigate this finding. To test this hypothesis, we gather information regarding the management and organizational structure of the 102 HMFs in our sample. This information enables us to segregate HMFs into two groups – 27 HMFs that are run by HF management

companies and 75 that are not. Arguably, HF management companies have unique skills in executing HF-like strategies. Therefore, we predict that HMFs run by HF management companies will outperform and have lower risk than the TMFs. In addition, we also expect them to perform better than the remaining HMFs.

Our findings support the *Skill Hypothesis*. Using a number of performance measures, we show that although HMFs as a group underperform TMFs, those HMFs that are run by HF management companies either outperform or do as well as TMFs. Further, HMFs run by HF management companies also outperform the remaining HMFs. With respect to risk-taking, our original finding was that HMFs are *unconditionally* less risky than TMFs. In our tests of the *Skill Hypothesis*, we show that this lower risk for HMFs as a group is driven by HMFs run by HF management companies. These findings provide evidence that strategy-related skill is an important determinant of performance when employing HF-like strategies. These results also suggest that a fund needs flexibility as well as skill/expertise to deliver superior performance.

We also compare the performance and risk of HMFs run by HF management companies with HFs. We find that this subset of HMFs continues to underperform HFs though to a lesser extent than the remaining HMFs. This result suggests that although the skill of HF management companies helps the performance of these HMFs, it is not sufficient to overcome the differences in regulations and incentives between HMFs and HFs. These differences in regulation are significant, and include restrictions on leverage, the requirement to cover short positions, and daily pricing and liquidity requirements. Thus, it is not surprising that even HMFs benefiting from the skill of HF management companies cannot outperform HFs. This result might also be explained by potential conflicts of interest and moral hazard issues arising from HF management companies offering both HFs and HMFs.

The results on risk-taking are even more interesting. We show that HMFs run by HF management companies display risks similar to HFs, although they operate in a much more onerous regulatory environment. These results contrast with our earlier finding that HMFs collectively exhibit higher risk than HFs, indicating that this finding is driven by HMFs not run by HF management companies. Our findings also indicate that HMFs run by HF management companies have lower risk than the remaining HMFs.

The rest of the paper is organized as follows. Section II presents the related literature and testable hypotheses. Section III describes the data and construction of the variables. Section IV tests the two main hypotheses while Section V tests the third hypothesis by exploring a skill-based explanation for the underperformance of HMFs. Section VI offers concluding remarks.

II. Related literature and testable hypotheses

II.1. Related literature

There is a large literature on HFs examining risk and return characteristics, performance, and compensation structure, but relatively scant literature comparing HFs and mutual funds directly.[5] One of the likely reasons for this is that there are significant differences in regulation, incentives, and investment flexibility between HFs and mutual funds, which makes it difficult to isolate the impact of each of these factors on performance and risk-taking behavior. Our paper fills this gap by taking advantage of the unique features of HMFs to disentangle the confounding effects of regulation and incentives from that of flexibility. For this purpose, we compare HMFs with HFs to examine the role of regulation and incentives, and compare HMFs with TMFs to shed light on the

[5] 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, 2001, 2004), Getmansky, Lo, and Makarov (2003), Goetzmann, Ingersoll, and Ross (2003), Jagannathan, Malakhov, and Novikov (2006), Kosowski, Naik, and Teo (2006), Liang (1999), and Mitchell and Pulvino (2001).

role of flexibility. In the process, we contribute to the existing literature on fund performance and risk-taking behavior in mutual funds.[6]

Our paper is also related to another strand of the literature that studies the costs and benefits associated with restricting funds' investment flexibility by imposing constraints on their use of derivatives, short-selling, leverage, etc. One reason for restricting flexibility is to minimize agency costs by preventing the manager from strategically altering his fund's risk to increase his own compensation.[7] Koski and Pontiff (1999) and Deli and Varma (2002) document that a small fraction of mutual funds are allowed to use derivatives, a fact that they attribute to agency costs being outweighed by transaction-cost-related benefits. Almazan et al (2004) argue that imposing constraints is a way of monitoring the fund manager. They show that when alternative monitoring mechanisms (such as board independence, manager reputation, membership of a fund complex, and team management) exist, mutual funds are more likely to be awarded greater investment flexibility. To the extent that HMFs enjoy the greatest flexibility among mutual funds, our findings contribute to this strand of literature as well.[8]

It is important to note how the focus of our paper differs from previous literature. While prior literature has focused on mutual funds' use of derivative securities in general, we concentrate on a carefully-chosen subset of these mutual funds: those that claim to use HF-like trading strategies. Our paper is the first comprehensive study of this group of mutual funds. By identifying mutual funds that use HF-like strategies, we are able to compare these funds directly to both HFs

[6] See, for example, Brown and Goetzmann (1995), Carhart (1997), Chevalier and Ellison (1999), Daniel, Grinblatt, Elton, Gruber, and Blake (1996a&b), Titman, and Wermers (1997), Jegadeesh and Titman (1993), Jensen (1968), and Wermers (2000). This is only an indicative and not representative list from a vast mutual fund literature.

[7] For example, the tournaments literature (Brown, Harlow, and Starks, 1996; and 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.

[8] In order to compare the degree of flexibility in HMFs versus the unconstrained funds in Almazan et al (2004), we follow their procedure to compute "score" based on funds being permitted to use derivatives, short selling, etc. and find that the score for HMFs is substantially lower than that for their sample of unconstrained funds – 0.22 versus 0.36 – suggesting that our sample of HMFs have greater investment flexibility.

and to TMFs. Further, by using information on the management company running these HMFs, we are able to examine the existence of skill or expertise in executing HF-like strategies.

II.2. Development of hypotheses

Our paper tests two hypotheses related to differences in performance and risks between TMFs and HMFs on one hand, and HFs and HMFs on the other. The formulation of our hypotheses is driven by differences in regulation, incentives, and flexibility across the three types of managed portfolios (TMFs, HMFs, and HFs), which we discuss below.

First, in terms of regulation, HFs are largely unregulated investment vehicles.[9] By contrast, mutual funds are heavily 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 a number of constraints on mutual funds. For example, the Investment Company Act of 1940 restricts a mutual fund's ability to use leverage or borrow against the value of securities in its portfolio. The SEC requires that funds engaging in certain investment techniques, including the use of options, futures, forwards and short selling, to cover their positions. With respect to pricing and liquidity, mutual funds are required to provide daily net asset values (NAVs) and must allow shareholders to redeem their shares at any time.[10] These regulations apply equally to both TMFs and HMFs, and are far more burdensome than those faced by HFs.

Second, in the context of incentives, fee structures of mutual funds are regulated by the SEC. One unique feature of mutual fund fees is that they must be symmetric in nature if they are

[9] Under the Investment Advisers Act, HF advisers are now 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 must comply with these requirements, which are still much less onerous than for mutual fund managers.

[10] See ICI (Investment Company Institute) website (www.ici.org) for more details.

performance-based. As a result, very few mutual funds use incentive fees.[11] By contrast, asymmetric performance-based incentive fees are the norm in HFs where the manager receives a fraction of the profits (usually 20%) but does not participate in the losses. Since both HMFs and TMFs typically do not use performance-based compensation while HFs do, the direct incentives to perform better are stronger in HFs than in HMFs and TMFs.

Finally, in the context of investment flexibility, TMFs have less flexibility than HMFs and HFs as their use of derivatives, short-selling, and leverage is restricted. By contrast, HMFs choose greater flexibility in order to implement HF-like trading strategies. Therefore, although the regulatory requirements for both HMFs and TMFs are identical, HMFs elect to have more investment flexibility than TMFs. They also attempt to have similar flexibility, at least in spirit, to that enjoyed by HFs.

We summarize these differences in regulation, incentives, and flexibility across the three investment vehicles as follows:

	TMFs and HMFs	**HFs and HMFs**
Regulation	Same	HMFs > HFs
Incentives	Same	HMFs < HFs
Flexibility	HMFs > TMFs	Similar[12]

Since HMFs and HFs have similar investment flexibility, comparing them enables us to focus on the role of regulation and incentives. Lighter regulation (unconstrained use of leverage

[11] Elton, Gruber, and Blake (2003) report that only 108 mutual funds used performance-based fee during 1999. In our sample of 102 HMFs, only 5 funds use such fees. Our results are robust to the exclusion of these HMFs.

[12] We consider flexibility to be similar in spirit since HMFs are attempting to follow HF-like strategies, and as such, choose to maximize their flexibility within the regulatory environment of mutual funds. Therefore, in our empirical analysis, we focus more on the differences in regulation and incentives as driving the differences in performance and risk of HMFs and HFs. Although differences in flexibility are also likely to play a role, we believe these are likely to be less important than those in regulation and incentives. Without data on complete holdings (both long and short positions in various securities) for HFs and HMFs, it is impossible to assess the relative importance of these different attributes.

and derivatives and a longer-term approach to investing) and stronger incentives should result in HFs performing better than HMFs. However, the implication for differences in risk-taking behavior is not as clear-cut. On one hand, a lenient regulatory environment and convex compensation contracts in HFs can potentially lead to more risk-taking. On the other hand, career concerns, risk aversion, and co-investment by the manager should ameliorate the temptation to increase risk.[13] Therefore, our first hypothesis focuses solely on differences in performance between HMFs and HFs:

Hypothesis 1 (Regulation and Incentives Hypothesis): *Controlling for fund characteristics, HFs should outperform HMFs.*

Turning to the comparison of HMFs and TMFs, since they operate in the same regulatory environment and have similar incentives, we focus on the role of investment flexibility in comparing their performance and risks. The choice of higher flexibility provides HMFs with greater latitude in trading strategies, which should result in better performance. In addition, it allows the use of derivatives and short-selling for hedging and risk management. Of course, it is conceivable that derivatives and leverage can be used by some funds to speculate and thereby increase risk. Overall, however, we believe that the risk-reduction effect should dominate and therefore predict that HMFs will have lower risk than TMFs. This leads to our second hypothesis:

Hypothesis 2 (Flexibility Hypothesis): *Controlling for fund characteristics, HMFs should have better performance and lower risk than TMFs.*

[13] There is mixed evidence on option-like incentive-fee contracts leading to higher risk-taking. Das and Sundaram (2002) predict higher risk-taking for convex contracts. However, Basak, Pavlova, and Shapiro (2006) show that the tendency to increase risk is determined by the fund's performance relative to its benchmark. Further, Carpenter (2000) and Ross (2004) show that risk-taking depends on the agent's utility function. Brown, Goetzmann, and Park (2001) argue that HFs care more about surviving in the industry than earning incentive fees for one period. Boyson (2005) shows that HFs reduce risk as their careers progress, and that this reduction in risk is related to survival-based incentives.

III. Data and variable construction

III.1 HMF data and sample selection

We use several sources to compile a comprehensive sample of HMFs while ensuring its accuracy. For our sample, we identify mutual funds that use HF-like trading strategies such as long-short, market-neutral, short-only, and arbitrage. It is important to note that our sample selection methodology excludes mutual funds that occasionally use derivative securities (or hedging strategies) but for the most part follow a typical mutual fund strategy, and that this is the key difference between our sample and that of previous literature. Currently, none of the independent fund reporting companies, including Morningstar, Lipper, and CRSP, separately categorize mutual funds as HMFs.[14] Without "official" categorization from any external firm, we use the following steps to select our sample.

First, we search the CRSP and Morningstar databases using the terms: "long/short", "short", "option", "market neutral", "arbitrage", "merger", "bull", "bear", "distressed", "hedged", and "alternative". Additionally, we use the internet (www.google.com) and the Lexis/Nexus database to search popular press articles for the terms "hybrid mutual fund" and "hedged mutual fund." From this initial search, we obtain 320 potential HMFs. Next, we obtain the prospectuses and annual reports for each of these funds, either from their websites or from the SEC's EDGAR database. After reviewing these documents, we make a preliminary decision about including these funds in our sample of HMFs. Our general criterion is that the prospectus must explicitly state that the fund is following a strategy that we would commonly identify with

[14] Recently, Morningstar has announced that they will be creating a new category for these funds. See "Hedge-like Mutual Funds to be Ranked by Morningstar", *Philadelphia Enquirer*, 1/17/06.

a HF strategy. Representative categories include: long/short equity, market neutral, short only (or "bear market" fund), and event driven.

After compiling our initial list, we obtain corroboration from two industry experts. The first is Dennis Bein, a portfolio manager at Analytic Investors, a firm managing HMFs for nearly 30 years. The second industry expert is Ryan Tagal at Morningstar, who has also compiled a list of HMFs, which will be available on the most recent (March, 2006) Morningstar Principia Pro CD. Over 95% of the HMFs in our list match with those identified by Morningstar. We also include the data on the unmatched funds to create a more comprehensive sample of HMFs.

Additionally, we search the SEC EDGAR database and collect the NSAR-A and NSAR-B annual and semi-annual reports that mutual funds are required to file. We gather answers to a number of questions from these reports to verify that the funds in our sample are indeed using securities consistent with their stated strategies. The first question is number 70, which asks about the firm's investment practices; specifically whether it is permitted to invest in certain instruments, and if permitted, whether then firm invested in these instruments in the most recent reporting period. The instruments include: options on equity, options on debt, options on stock indices, interest rate futures, stock index futures, options on futures, commodity futures, currency exchange transactions, borrowing of money, margin purchases, and short selling.

Additionally, we gather data from question number 74, which asks for condensed balance sheet data in dollars for the following securities: options on equities, options on futures, short sales, and written options. We use the answers to these questions to verify if HMFs that we include in our sample are indeed investing in securities consistent with their stated objectives (e.g., long-short, market neutral). In choosing this sample, we also review the published annual

reports which list actual holdings, and verify that these funds held securities generally consistent with their investment strategies.

As the final step in the fund selection process, we investigate funds that the NSAR-A and B reports identify as using a large amount of options, futures, and short sales by gathering prospectuses for these funds and investigating whether their strategy fits our categories. By "large amount" we mean an average exceeding 10% of net assets. We believe that our multidimensional selection criteria identifies majority of HMFs in existence during our sample period, 1994-2004.[15]

After selecting HMFs, we exclude all funds whose primary investment strategy does not include equities. This removes less than five funds from our sample, indicating that the majority of HMFs focus on equity-based strategies. We remove duplicate share classes and take size-weighted averages of the expenses, turnover, loads and fees using the approach of Kacperczyk, Sialm, and Zheng (2006). We then match the list of HMFs with the CRSP survivorship-bias-free database and the Morningstar Principia CDs, using either fund name, unique five-letter ticker symbol, or a combination of the two methods, resulting in a final list of 102 HMFs.

For the analysis of HMFs and TMFs in Section III, following Pástor and Stambaugh (2002) and Huij and Verbeek (2004), we categorize all mutual funds into six groups, which are: Aggressive Growth, Growth, Income, Growth and Income, Sector, and Other (See Section III.2 for details of the TMF data). For the analysis of HMFs and HFs in Section IV, we categorize HMFs into the five equity-focused HF categories of Lipper/Tremont Advisory Shareholder

[15] One of the issues with using only NSAR data is that it only identifies funds that are currently in existence. However, since we do not solely rely on NSAR and use multiple search methods to identify HMFs, we are able to uncover 11 defunct funds including 9 liquidated and 2 merged funds. Examining the distribution of these funds each year, we find that 2 were liquidated in each year between 2000 and 2002, and 3 were liquidated in 2003. In addition, 2 HMFs were merged into other funds in 2002. This translates into an average attrition rate of roughly 1.5% each year, a rate similar to that for mutual funds but lower than that for HFs (see Elton, Gruber, and Blake, 1996a and Carhart, 1997 for mutual funds, and Brown, Goetzmann, and Ibbotson, 1999; Liang, 1999; Agarwal and Naik, 2000 for hedge funds).

Services (hereafter, TASS), our HF database provider. (See Section III.3 for details of the HF data). These five categories include: Long-Short Equity, Equity Market Neutral, Event Driven, Dedicated Short Bias, and Other/Multi-Strategy. We categorize these HMFs based on information from their prospectuses and annual reports. To provide further insight into the nature of the investment strategies used by HMFs from each of the five HF categories, we provide excerpts from the prospectus of one fund from each category in Appendix A.

We select the period 1994-2004 for our analysis for two reasons. First, the sample of HMFs prior to 1994 is very small (less than 10 funds). Second, HF data prior to 1994 suffers from various biases and is not reliable (see Fung and Hsieh, 2000).

III.2 TMF data

For selecting the sample of TMFs, we use equity funds from the CRSP Survivorship-bias-free Mutual Fund database. Consistent with the sample of HMFs, we select the period 1994-2004 for our analysis, and we require that funds have at least 12 months of consecutive returns. Finally, as with the HMF data, we remove duplicate share classes and take asset-weighted averages of the expenses, turnover, loads and fees. The total number of TMFs in our sample is 5,373.

III.3. HF data

We use HF data from TASS database, which includes monthly net-of-fee returns, as well as expenses, fees, size, terms, 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.[16] We control for survivorship bias by including defunct funds until they disappear from the

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

database and mitigate the backfilling bias by excluding the fund's "incubation period" from the time-series of returns.[17] The final sample includes 1,834 HFs.

Table I reports summary statistics for TMFs, HMFs, and HFs. Panel A reports the number of funds every year during the sample period. All three types of funds have grown in number over the sample period. However, compared to TMFs, the growth has been more dramatic for HMFs and HFs consistent with the growing popularity of alternative investment vehicles. In particular, the number of HMFs grew from a minimum of 10 in 1994 to a maximum of 89 in 2003. The number of HFs also increased dramatically over the sample period, from a low of 275 HFs in 1994 to a high of 1,246 HFs in 2003.

Panel B reports the number of TMFs and HMFs by mutual fund style category. In the mutual fund categories, fund style is permitted to change each year, so the number of funds by style category will sum to more than the total number of funds in the sample. About half of the HMFs are categorized as Aggressive Growth while the TMFs are more evenly distributed, with most funds being classified as Growth. Panel C reports the number of HFs and HMFs by style category, reporting the total number of funds per style. Of the 102 HMFs in the sample, about half are classified as Long-Short Equity, which is also by far the most popular HF style. To be consistent with the analysis of HMFs and TMFs, we only include HF strategies that are primarily equity-based, namely Equity Market Neutral, Event Driven, Long-Short Equity, Other/Multi-Strategy, and Dedicated Short Bias.

Finally, Panel D of Table I compares fund characteristics of the three types of funds. Comparing HMFs with HFs, HMFs are older on average (this result is likely due to the high

[17] Since TASS provides the incubation period for each fund, to control for this bias, we drop the data for the actual incubation period for each fund. Fung and Hsieh (2000) actually drop the first 12 months of fund returns, as this is close to the average incubation period for their sample. Since the actual incubation period is provided by TASS, we use the actual period for each fund rather than using the average. For those familiar with the TASS database, we calculate the incubation period as the "PerformanceStartDate" less the "InceptionDate".

attrition rate in HFs), and have higher expenses than HFs.[18] However, the differences in size and fund flows between HMFs and HFs is not statistically significant. Comparing HMFs with TMFs, on average, HMFs are smaller, younger, have lower loads, and have higher expenses, fund inflows, and turnover than TMFs. High inflows confirm the popularity of HMFs among investors. High turnover indicates that HMFs engage in more "active" investment strategies than their traditional counterparts (TMFs).

Having described the data, we now explain the key variables used in our analysis.

III.4. Key variables

III.4.a Measures of performance

We consider a wide range of performance measures including annual returns, intercepts (alphas) from multifactor models, the Sharpe ratio, the Sortino ratio (returns in excess of risk-free rate divided by the downside deviation), annual returns in excess of style-median returns, and Sharpe ratios in excess of style-medians computed using both net-of-fee and gross-of-fee fund returns.[19] For computing alphas, we consider two multifactor models. The first model is based on the Carhart (1997) four-factor model widely used in mutual fund studies. We estimate alphas individually for each fund using the prior 24 months of data.[20] The four factors include the CRSP value-weighted market return, the Fama and French (1993) Size factor - SMB (small minus big), and book-to-market factor - HML (high minus low), and the Jegadeesh and Titman (1993) UMD (momentum) factor.

[18] We winsorize all the variables in our study at the 1% level to mitigate the effect of outliers.
[19] For the HFs, we calculate the gross performance measures accounting for the option-like incentive-fee contract as in Agarwal, Daniel, and Naik (2005). For the mutual funds, to compute gross-of-fee returns, following Gaspar, Massa, and Matos (2006) and others, we 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.
[20] For robustness, we also estimate alphas using 12 months and 36 months of return data. Our results remain qualitatively similar.

The second model is based on the Fung and Hsieh (2004) 7-factor model that includes option-based factors to control for nonlinearities in HF returns. We estimate alphas from the 7-factor for each fund using 24 months of data. This model uses factors that mimic a number of HF risks, including an equity market factor (the S&P 500 return), a size-spread factor (the Wilshire Small Cap 1750 minus Wilshire Large Cap 750), two fixed income factors: the bond market factor (the monthly change in the 10-year treasury constant maturity yield) and the credit spread factor (the monthly change in the Moody's Baa yield less the 10-year treasury constant maturity yield), and three option-based factors for bonds, currencies, and commodities.[21] We compute the Sharpe ratio of a fund as the excess monthly return divided by the standard deviation of excess monthly returns each year. We calculate the Sortino ratio in a similar manner except that the denominator is "downside deviation" or the standard deviation of returns less than zero (i.e., negative returns).

III.4.b Measures of risk

For robustness, we use several risk measures in our tests, including market betas from 24-month four-factor model regressions, downside risk, idiosyncratic risk measured using four and seven-factor models, maximum drawdown, skewness, and standard deviation.[22] We compute idiosyncratic risk as the annual standard deviation of the residuals from four and seven-factor model regressions. Downside risk is the standard deviation of all returns in a year that are less than zero. Maximum drawdown is the biggest monthly decline in returns after reaching a peak return or the minimum cumulative returns from any beginning point over a certain time period.

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

[22] Instead of idiosyncratic risk, we also use tracking error variance (TEV) as a risk measure. We compute TEV as the standard deviation of the residuals from regressing fund returns on the average returns of all funds following the same style. Our results are qualitatively similar to those from idiosyncratic risk (results not reported for brevity).

These last two measures are commonly used by HF practitioners. We calculate all risk measures using a full year of return data using both net-of-fee and gross-of-fee returns.

We report the averages of various performance and risk measures for the three types of funds in Panels E and F of Table I. We also report the results from t-tests comparing the averages between HMFs and TMFs and between HMFs and HFs. Our univariate results suggest that HMFs generally underperform both TMFs and HFs. Further, HMFs exhibit lower systematic risk (market beta) and lower tail risk (or higher skewness) compared to TMFs but higher risk using the other four measures (downside risk, idiosyncratic risk, maximum drawdown, and standard deviation). When compared to HFs, HMFs exhibit higher risk for six of the seven risk measures (all but idiosyncratic risk).

These univariate results are consistent with our *Regulation and Incentives Hypothesis* but not with the *Flexibility Hypothesis*. Clearly, some of these findings may be driven by differences in investment styles and other fund characteristics including expenses, size, turnover, and money flows over time. Hence, in the following sections, we conduct multivariate analysis to test these hypotheses.

IV. Hypothesis tests

IV.1 Comparison of HMFs and HFs – Role of regulation and incentives

Our *Regulation and Incentives Hypothesis* posits that HFs will outperform HMFs due to lighter regulation and better incentives of HFs. With respect to risk-taking, there exist competing explanations that predict opposite effects on risk. Thus, we perform the risk analysis without specific predictions. To begin, we examine performance differences between HMFs and HFs by estimating the following OLS regression model that controls for fund characteristics, styles, and time trends:

$$Perf_{i,t} = \lambda_0 + \lambda_1 HMF + \lambda_2 Perf_{i,t-1} + \lambda_3 \sigma_{i,t-1} + \lambda_4 Size_{i,t-1} + \lambda_5 Age_{i,t-1} + \lambda_6 Expense_{i,t-1} + \lambda_7 Flow_{i,t-1} + \sum_{s=1}^{4} \lambda_8^s I(HFStyle_{i,s}) + \sum_{t=1}^{10} \lambda_9^s I(Year_t) + \xi_{i,t} \quad \textbf{(1)}$$

where $Perf_{i,t}$ and $Perf_{i,t-1}$ are the performance measures of fund *i* in years *t* and *t-1* respectively, HMF is an indicator variable that equals 1 if fund is a HMF and 0 otherwise, $\sigma_{i,t-1}$ is the standard deviation of the monthly returns of fund *i* during year *t-1*, $Size_{i,t-1}$ is the size of the fund measured as the natural logarithm of the assets under management for fund *i* during year *t-1*, $Age_{i,t-1}$ is the logarithm of age of fund *i* at the end of year *t-1*, $Expense_{i,t-1}$ is the expense ratio of fund *i* during year *t-1*, $Flow_{i,t-1}$ is the percentage money flows in fund *i* in year *t-1*, $I(HFStyle_{i,s})$ are HF style dummies that take a value of 1 if fund *i* has HF 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 HF style dummies correspond to the five HF styles - Equity Market Neutral, Event Driven, Long-Short Equity, Other/Multi-Strategy, and Dedicated Short Bias.[23] The t-statistics are adjusted for heteroskedasticity, using White's (1980) correction.[24]

We report the results from the regressions in equation (1) in Table II for various performance measures computed using net-of-fee returns. The results for Models 1 to 7 indicate that for 5 of the 7 performance measures, HMFs significantly underperform HFs. For example, the annual returns of HMFs are lower than those of HFs by 3.41% (Model 1) while the 7-factor alphas of HMFs are lower than those of HFs by 48 basis points per month or about 6% per year (Model 4). We obtain similar results (not reported) using performance measures using gross-of-

[23] We do not include style dummies when the performance measure is calculated relative to the style median.
[24] We use pooled regressions for all our analyses. For robustness, we also use the Fama-Macbeth (1973) approach and find that our results are qualitatively similar, although the statistical significance is some what lower, due to the small sample size in the early years.

fee returns. Overall, these results lend strong support to the *Regulation and Incentives Hypothesis*, which posits that due to less regulation and better incentives, HFs should outperform HMFs.[25]

Next, we compare the risks of HMFs and HFs. Due to the offsetting effects of convex compensation schemes and career concerns, risk aversion, and co-investment by the manager, we are agnostic about risk differences between these two types of funds. To shed light on the risk differences using various risk measures, we estimate the following regression:

$$Risk_{i,t} = \beta_0 + \beta_1 HMF + \beta_2 Perf_{i,t-1} + \beta_3 Risk_{i,t-1} + \beta_4 Size_{i,t-1} + \beta_5 Age_{i,t-1} + \beta_6 Expense_{i,t-1} + \beta_7 Flow_{i,t-1} + \sum_{s=1}^{4} \beta_8^s I(HFStyle_{i,s}) + \sum_{t=1}^{10} \beta_9^s I(Year_t) + \varepsilon_{i,t} \quad \textbf{(2)}$$

where $Risk_{i,t}$ and $Risk_{i,t-1}$ are the risk measures of fund *i* in years *t* and *t-1* respectively, and $\varepsilon_{i,t}$ is the error term. All the other variables are as defined for the regression in equation (1).

We report the results from the regressions of equation (2) in Table III. The results are striking. With the exception of idiosyncratic risk, risk-taking is significantly higher for HMFs than for HFs. For example, the results in Model 1 indicate that the market beta from the four-factor model is higher for HMFs than HFs by 0.07. In the results for Model 4, the slope coefficient on HMF is negative (coefficient =-0.14) when skewness is the risk measure. Since negative skewness implies left-tail risk, this result also confirms that HMFs are more risky than HFs. The results are nearly identical (not reported) using these risk measures computed from gross-of-fee returns. The result that HFs take on less risk implies that the career concerns and managerial co-investment effect dominates the risk-seeking effect from the option-like incentive fee contract.

[25] HFs may also outperform HMFs since they do not have to provide daily liquidity as do HMFs. Hence, to some extent, the differences in their performance could be construed as an illiquidity premium earned by HF investors (see Aragon, 2004).

In order to control for fund-specific and management-company-specific effects, we test the robustness of our results for the HMF-HF comparison to different econometric methodologies, including 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 our analyses collectively in Table VII. For the ease of comparison, the first row of this table repeats the findings from our main tables (II to VI). We notice from Panel A of Table VII that our finding of HMFs underperforming HFs and taking higher risk is robust to use of a wide range of econometric specifications.

Next, we test the *Flexibility Hypothesis* by comparing HMFs with TMFs.

IV.2 Comparison of HMFs and TMFs - Role of investment flexibility

Our Flexibility Hypothesis argues that HMFs should outperform TMFs due to greater investment freedom. We test this hypothesis by estimating an OLS regression similar to that in equation (1) except that it also includes two additional independent variables – total load and turnover – which are available for mutual funds but not for HFs:

$$\begin{aligned} Perf_{i,t} = {} & \delta_0 + \delta_1 HMF + \delta_2 Perf_{i,t-1} + \delta_3 \sigma_{i,t-1} + \delta_4 Size_{i,t-1} + \delta_5 Age_{i,t-1} \\ & + \delta_6 Expense_{i,t-1} + \delta_7 Load_{i,t-1} + \delta_8 Turnover_{i,t-1} + \delta_9 Flow_{i,t-1} \\ & + \sum_{s=1}^{5} \delta_{10}^{s} I(MFStyle_{i,s}) + \sum_{t=1}^{10} \delta_{11}^{s} I(Year_t) + \psi_{i,t} \end{aligned} \qquad \textbf{(3)}$$

where $Load_{i,t-1}$ 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*, $I(MFStyle_{i,s})$ are MF style dummies that take a value of 1 if fund *i* has MF style *s* and 0 otherwise, and $\psi_{i,t}$ is the error term. The MF style dummies are Aggressive Growth, Growth, Income, Growth and Income, Sector, and Other. All other variables are as defined earlier in equation (1).

We estimate the OLS regression in equation (3) using annual data and report our results in Table IV. For 5 of the 7 models, the coefficient on the HMF indicator variable is negative and statistically significant indicating that HMFs underperform TMFs. Results for Models 1 and 2 indicate that in terms of annual returns in excess of the risk-free rate and style median respectively, HMFs underperform TMFs by 2.95% and 3.52% per year. Further, for the Sharpe ratio (Model 5), the Sharpe ratio in excess of style median (Model 6), and the Sortino ratio (Model 7), HMFs underperform TMFs by 0.26, 0.28, and 0.11 respectively. For Models 3 and 4 which use alphas from multifactor models, the coefficients on HMF are statistically indistinguishable from zero.[26] These results indicate that using a variety of performance measures, HMFs at best fail to outperform TMFs or at worst underperform TMFs, a result *inconsistent* with the *Flexibility Hypothesis*, which argues that due to greater flexibility, HMFs should outperform TMFs.

One possible explanation for the relative underperformance of HMFs may be their higher expense ratios. We repeat the analysis with gross-of-fee performance measures. The results (not reported for brevity) continue to show that HMFs fail to outperform TMFs, though the results are slightly weaker than those with net-of-fee performance measures. For example, using gross returns instead of net returns causes no difference in the coefficient on the HMF indicator variable for annual returns, 4- and 7-factor alphas, or returns in excess of the style median. For the Sharpe ratio, the coefficient on the HMF variable using gross returns is -0.1622 as compared to a coefficient of -0.2563 using net returns. For the Sortino ratio, the coefficient in the HMF variable using gross returns is -0.0645 as compared to a coefficient of -0.1104 using net returns. For both the Sharpe and Sortino ratio, the coefficient is not statistically significant at traditional

[26] Using a different sample of unconstrained mutual funds, Almazan et al (2004) find similar results using different risk-adjusted performance measure, namely alphas from a Fama-French's (1993) three-factor model.

levels when we use gross returns. Thus, for these two measures, HMFs underperform TMFs when using net returns, and fail to outperform TMFs when using gross returns. Overall, regardless of the measure used, HMFs never outperform TMFs, indicating that they do not earn back their higher expenses.

It is possible that HMFs perform differently than TMFs in down markets (when market returns lower than the median during our sample period). Since HFs are often publicized for providing downside protection in falling markets, it might be the case that HMFs also provide similar protection. We examine this conjecture by dividing our sample period into up market and down market years based on median returns. We find that (results not reported) HMFs underperform TMFs in up markets but do as well as TMFs in down markets. However, they do not outperform, and thus, are unable to provide downside protection.

We next examine whether there are differences in risk-taking behavior between HMFs and TMFs. The *Flexibility Hypothesis* posits that the increased flexibility of HMFs should give managers the opportunity to better control the risk of their portfolios. We test this hypothesis by estimating the following OLS regression:

$$Risk_{i,t} = \rho_0 + \rho_1 HMF + \rho_2 Return_{i,t-1} + \rho_3 Risk_{i,t-1} + \rho_4 Size_{i,t-1} + \rho_5 Age_{i,t-1} + \rho_6 Expense_{i,t-1} + \rho_7 Load_{i,t-1} + \rho_8 Turnover_{i,t-1} + \rho_9 Flow_{i,t-1} + \sum_{s=1}^{5} \rho_{10}^{s} I(MFStyle_{i,s}) + \sum_{t=1}^{10} \rho_{11}^{s} I(Year_t) + \vartheta_{i,t} \quad \textbf{(4)}$$

where all variables are as defined earlier for regressions in equations (2) and (3).

We report results from these regressions in Table V. For 6 out of the 7 models, we find that the slope coefficients on the HMF indicator variable are negative and significant, indicating that HMFs are less risky than TMFs. Specifically, in Model 1, the market beta from the Carhart

four-factor model for HMFs is significantly lower than TMFs by 0.15 indicating that HMFs carry less systematic risk than TMFs. In models 3 and 4, the idiosyncratic risk is lower by 0.18% and 0.15% per annum for the four and seven-factor models. These are economically meaningful figures, given that the average idiosyncratic risk for HMFs is 2.56% per annum (see Panel F of Table I). Similarly, from Models 2 and 7, the downside risk and standard deviation of HMFs is lower than TMFs by 1.20% and 0.45% per annum (compared to average of 14.02% and 6.20% per annum for the overall sample of HMFs), respectively. The coefficient on HMF from Model 5, Maximum Drawdown, is also negative but only significant at the 15% level. Finally, the positive coefficient (coefficient=0.16) on the HMF indicator variable for Model 6, when skewness is the risk measure, is also consistent with HMFs being less risky since investors prefer positive skewness. The inferences are the same when we use risk measures computed from gross-of-fee returns. Overall, these results provide strong support to the risk implications of the Flexibility Hypothesis.

Based on these findings, it is tempting to conclude that lower risk could make HMFs attractive to investors. However, the earlier performance results in Models 5, 6 and 7 of Table IV show that HMFs underperform TMFs on the basis of Sharpe and Sortino ratios, which explicitly control for total and downside risk. This indicates that the reduction in risk does not compensate for the reduction in returns.

As before, we conduct a series of robustness checks while comparing HMFs with TMFs. In particular, we control for fund-specific and management-company-specific effects by estimating regressions (3) and (4) after including management-company fixed effects, management-company random effects, fund random effects, management-company between effects, and fund between effects. Our results in Panel B of Table VII confirm that our finding of

HMFs underperforming TMFs but taking on lower risk is robust to different econometric methodologies.

Our finding that HMFs fail to outperform TMFs despite greater investment flexibility is puzzling. Hence, we investigate an alternative skill/expertise-based explanation in the following section.

V. Can differences in skill explain the underperformance of hedged mutual funds?

One factor that we have not yet addressed is the existence of skill/expertise in executing HF-like trading strategies. HFs routinely employ trading strategies involving leverage (through the use of derivatives and short positions). Such strategies are less common among mutual funds. To the extent that some HMFs may not have sufficient expertise in using these types of trading strategies, it may hamper their performance. To shed light on this idea, we obtain information on the management companies running HMFs. In particular, we identify HMFs that are run by management companies that also offer HFs, which we refer to as *HF management companies*. In our sample of 102 HMFs, we find that 27 are run by HF management companies.[27] For example, Analytic Investors offers both HMFs and HFs, as do Robeco Boston Partners and Gabelli Asset Management.

Presumably, if a fund management company has HFs in their product portfolio, they are more likely to possess in-house expertise to implement HF-like trading strategies. By comparing the performance of HMFs run by HF management companies with other HMFs, we can isolate the role of skill/expertise in performance and risk-taking behavior. For this purpose, we create

[27] This includes 3 HMFs for which the management is subcontracted to HF management companies. For example, the Lindner Bulwark Fund is not part of a HF company, but its manager also manages a HF. Since our goal is to capture strategy-specific skills, we treat these 3 HMFs as run by HF management companies.

two indicator variables to segregate HMFs based on whether or not they are run by HF management companies: YES-HFMC and NOT-HFMC. YES-HFMC is set to 1 if the HMF is run by a HF management company and 0 otherwise, and vice-versa for NOT-HFMC. We replace the HMF indicator variable in equations (1) to (4) by these two variables and re-perform our analyses.

Since we conduct our analysis using a pooled sample of HMFs and TMFs (HFs), the coefficients on YES-HFMC and NOT-HFMC capture the differences in performance and risk relative to the excluded category – TMFs (HFs). In the performance regressions, a positive coefficient on the YES-HFMC variable implies that the subset of HMFs run by HF management companies have better performance than TMFs (HFs). In the risk regressions, a positive coefficient on the YES-HFMC variable implies that the subset of HMFs run by HF management companies have higher risk than TMFs (HFs). In addition, significant differences in the YES-HFMC and NOT-HFMC coefficients indicate differences in performance or risk between HMFs that are run by HF management companies and other HMFs.

Before performing our multivariate analysis using the two subsets of HMFs, we examine their differences in fund characteristics (results not reported). The statistically significant results indicate that HMFs run by HF management companies are older (about 9 years versus 5 years), charge higher expenses (1.94% versus 1.78%), and have lower turnover (about 400% versus 900%). Differences in flows, size, and loads are not statistically significant.

Table VI reports results from the performance and risk regressions in equations (3) and (4) after replacing HMF indicator variable with YES-HFMC and NOT-HFMC variables. For brevity, we only report the coefficients on the YES-HFMC and NOT-HFMC variables for each of the models. In addition, the table also reports whether the slope coefficients on the two

indicator variables differ significantly from each other using an F-test. Panel A of Table VI compares the performance of the two subsets of HMFs with TMFs. The coefficients on the YES-HFMC for Models 3 and 4 (alphas from the 4-factor and 7-factor models) are positive and statistically significant, indicating that for these risk-adjusted performance measures, HMFs offered by HF management companies significantly outperform TMFs. This is in stark contrast to our earlier results (Models 3 and 4 in Table IV) where alphas of HMFs as a whole were statistically indistinguishable from those of TMFs. These results suggest that HF management companies which also run HMFs have unique expertise that provides them a comparative advantage over their counterparts. In other words, it seems that the greater flexibility of HMFs relative to TMFs helps only if the management company has expertise in using this flexibility. Further, comparing the slope coefficients of the YES-HFMC and NOT-HFMC variables, we find that the difference is positive and statistically significant in 5 of the 7 models, providing strong evidence that HMFs run by HF management companies outperform those that are not.

Panel B of Table VI compares risk-taking of the two subsets of HMFs (those offered by HF management companies and those that are not) with TMFs. The difference in the slope coefficients of the YES-HFMC and NOT-HFMC variables is negative and significant in 3 of the 7 models. In the other four models, it is not statistically different from zero. In addition, the coefficient on the YES-HFMC variable is statistically different from zero for 6 of the 7 risk measures, indicating that these funds carry less risk than TMFs. By contrast, the coefficient on the NOT-HFMC variable is statistically different from zero for only 3 of the 7 risk measures, implying that the lower risk of HMFs compared to TMFs documented earlier (in Table V) is driven primarily by HF management companies that also run HMFs.

Next, we compare the two subsets of HMFs with HFs. Since HMFs face stricter regulation and weaker incentives relative to HFs, it is possible that the subset of HMFs run by HF management companies continue to underperform HFs if advantages from higher skill fail to dominate the potential disadvantages of greater regulation and weaker incentives. Panel C of Table VI compares the performance between the two subsets of HMFs as well as their performance relative to HFs. The coefficients on both YES-HFMC and NOT-HFMC are negative and statistically significant in 4 of the 7 cases for YES-HFMC and in 5 of the 7 cases for NOT-HFMC. Since HMFs not run by HF management companies (NOT-HFMC) may not possess HF expertise, their underperformance relative to HFs is expected. In addition, the fact that YES-HFMC funds also underperform HFs indicates that their skill is not sufficient to overcome the handicap of stronger regulation and weaker incentives of HMFs relative to HFs. Moreover, tests of the differences in the slope coefficients of YES-HFMC and NOT-HFMC indicate that the performance of HMFs run by HF management companies is significantly better than their counterparts in 2 of the 7 cases. This provides further support to the notion that HF management companies are more skilled in executing HF-like trading strategies.

An alternative explanation for the underperformance of HMFs run by HF management companies relative to HFs are potential conflicts-of-interest and moral hazard issues that arise when the same management company offers two similar products. For example, in the case of mutual fund families, Gaspar, Massa, and Matos (2006) provide evidence of cross-subsidization and favoritism towards funds charging higher fees. If such practices are prevalent in the highly regulated mutual fund industry, it is not inconceivable that similar practices could also occur in the less-regulated HF industry.

Panel D of Table VI compares the risk of the two subsets of HMFs with HFs. In all 7 of the cases, the risk taken by HMFs not run by HF management companies is greater than that of HFs, and this result is statistically significant for all but the idiosyncratic risk measures. By contrast, in all but one of the 7 cases, the risk taken by HMFs run by HF management companies is indistinguishable from that of HFs (evidenced by the statistically insignificant slope coefficients on YES-HFMC). The exception is idiosyncratic risk measured using a 4-factor model, in which HMFs have risk that is *lower* than HFs. Finally, in 3 of the 7 cases, HMFs run by HF management companies have significantly lower risk than other HMFs, as can be seen from the last row of Panel D in Table VI. These results provide strong evidence that YES-HFMC funds are more skilled in managing risk than their counterparts.

As before, we report the robustness of these performance and risk-related results (using HFMC variables) to various econometric methodologies in Panels C and D of Table VII. Our results continue to hold using different specifications. Overall, the findings in this section highlight the important role played by strategy-specific skill in determining the performance and risk-taking behavior of HMFs.

VI. Concluding Remarks

In this paper, we investigate the performance and risk-taking behavior of hedged mutual funds to shed light on the role of regulation, incentives and flexibility in the asset management industry. Hedged mutual funds are mutual funds that follow hedge-fund-like strategies, such as long-short and market-neutral. These funds are fairly recent phenomena in the mutual fund industry, with most starting after 1997.

To examine the role of regulation and incentives, we first compare hedged mutual funds with hedge funds. As expected, we find that hedge funds outperform hedged mutual funds, a result we attribute to lighter regulation and stronger incentives in hedge funds. To examine the role of flexibility, we compare hedged mutual funds with traditional mutual funds. Given the greater flexibility in their investment strategies, we expect hedged mutual funds to outperform their traditional counterparts as well as take on less risk. Although we observe that hedged mutual funds exhibit lower risk, surprisingly, we find that they fail to outperform traditional mutual funds. The existence of lower risk, higher fees, and higher turnover among hedged mutual funds can not explain away this result. We can, however, explain this result based on differences in skill (needed to implement hedge-fund-like strategies) across hedged mutual funds. Specifically, we note that those hedged mutual funds that are run by hedge fund management companies often outperform both traditional mutual funds and other hedged mutual funds. This subgroup of hedged mutual funds also displays lower risk. We interpret these results as evidence that hedge fund management companies possess strategy-specific skills that are transferable to mutual fund products with hedge-fund-like characteristics. Overall, our findings suggest that flexibility leads to better performance only in the presence of skill.

Our results have a number of interesting interpretations and implications. First, it may be that these hedged mutual funds are generally unsuccessful because of lack of strong incentives to exert great effort as they do not have explicit performance-based incentive fees, unlike hedge funds. Second, the need for liquidity and daily pricing may limit the investment flexibility of hedged mutual funds. Although these funds choose more flexibility than traditional mutual funds, they are not nearly as flexible as hedge funds. This constraint is due to SEC restrictions on derivative use, which effectively limit them to equity-based products and futures contracts.

In addition, hedge funds often impose constraints on subscription and capital withdrawals, thereby offering less liquidity than hedged mutual funds. The combination of these factors can explain the underperformance of hedged mutual funds relative to hedge funds.

From an investor's perspective, our results suggest that investing in hedged mutual funds should be undertaken with care. Specifically, investors interested in attaining hedge-fund-like exposure through mutual funds should focus on those funds that are run by hedge fund management companies. These funds have often outperformed other hedged mutual funds as well as traditional mutual funds while carrying lower risk. Of course, as mentioned earlier, there are conflicts of interest associated with the same management company offering hedged mutual funds alongside hedge funds. Only time will tell whether, after accounting for such concerns, selecting hedged mutual funds run by hedge fund management companies, is beneficial for investors.

Finally, looking at the evolution of hedge fund industry, hedged mutual fund offerings seem to be part of a trend towards commoditization of the "hedge fund" product, similar to what happened in the leveraged buyout (LBO) industry in the mid-eighties. However, given the underperformance of hedged mutual funds relative to hedge funds, there is still some way to go before hedge funds are commoditized and made accessible to retail investors. It seems that, for the time being at least, hedged mutual funds remain "poor" man's hedge funds!

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Table I: Summary Statistics for Traditional Mutual Funds, Hedged Mutual Funds, and Hedge Funds

Panel A of this table reports the number of traditional mutual funds (TMFs), hedged mutual funds (HMFs), and hedge funds (HFs) each year during our sample period, 1994-2004. Panel B (Panel C) reports the maximum number of TMFs and HMFs (HFs and HMFs) classified in different mutual fund (hedge fund) styles during any year of our sample period. Panel D reports the average fund age, size (based on the assets under management (AUM) at the beginning of the year), expense ratio, fund flows (AUM in year *t* minus AUM in year *t-1* divided by the returns between year *t* and *t-1*), total load, and turnover for TMFs, HMFs, and HFs. Total load and turnover are not applicable (NA) for HFs. Panel D also reports the results of a t-test comparing the means between HMFs and TMFs, and those between HMFs and HFs for the various fund characteristics. Figures 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 TMFs	Number of HMFs	Number of HFs
1994	2,182	10	275
1995	2,370	13	349
1996	2,511	15	450
1997	2,770	18	585
1998	3,123	30	708
1999	3,411	41	824
2000	3,540	51	981
2001	3,747	72	1,090
2002	3,773	80	1,203
2003	3,728	89	1,246
2004	3,024	83	1,132

Panel B: Number of funds by mutual fund style

Style	Total number of TMFs	Total number of HMFs
Aggressive growth	994	62
Growth	1,680	23
Income	521	4
Growth and income	836	9
Sector	678	22
Other	1,669	24

Panel C: Number of funds by hedge fund style

Style	Number of HFs	Number of HMFs
Equity mkt. neutral	205	16
Event driven	332	6
Long-short equity	1,165	57
Other/Multi-Strategy	106	7
Dedicated short bias	26	16

Panel D: Fund characteristics

Fund Characteristic	Mean: TMF	Mean: HMF	Mean: HF	Diff. (HMF - HF)	Diff. (HMF - TMF)
Fund age (years)	9.95	5.97	4.86	1.11***	-3.98***
Size ($ millions)	$841.09	$246.22	$207.98	38.24	-594.87***
Expenses (% of assets)	1.18%	1.83%	1.19%	0.64%***	0.65%***
Annual fund flows (% of assets)	23.21%	145.51%	40.54%	104.97%	122.30%*
Total load (% of assets)	1.80%	0.82%	NA	NA	-0.98%***
Turnover	107.62%	748.16%	NA	NA	640.54%***

Table I (contd.): Summary Statistics for Traditional Mutual Funds, Hedged Mutual Funds, and Hedge Funds

Panel E (Panel F) of this table provides the averages of performance (risk) measures for hedged mutual funds (HMFs), traditional mutual funds (TMFs), and hedge funds (HFs). We compute each statistic first for each fund and then average it across all funds. Panels E and F also report the results of a t-test comparing the means between HMFs and TMFs, and those between HMFs and HFs for various performance and risk measures. Figures marked with ***, **, and * are significant at the 1%, 5%, and 10% levels, respectively.

Panel E: Performance Measures

Performance measure	Mean: HMF	Mean: TMF	Mean: HF	Diff. (HMF-TMF)	Diff. (HMF-HF)
Measured monthly					
4-factor alpha	-0.14%	-0.03%	0.60%	-0.11%*	-0.74%***
7-factor alpha	-0.18%	-0.26%	0.56%	0.08%	-0.74%***
Measured annually					
Annual return	6.01%	8.83%	14.44%	-2.82%*	-8.43%***
Annual return: excess of style median	-4.03%	0.63%	1.99%	-4.66%***	-6.02%***
Sortino ratio	0.11	0.28	0.80	-0.17***	-0.69***
Sharpe ratio	0.29	0.65	1.76	-0.36***	-1.47***
Sharpe ratio: excess of style median	-0.44	0.03	0.22	-0.47***	-0.66***

Panel F: Risk measures

Risk measure	Mean: HMF	Mean: TMF	Mean: HF	Diff. (HMF-TMF)	Diff. (HMF-HF)
4-factor market beta	0.42	0.70	0.32	-0.28***	0.10
Downside risk	14.02%	9.36%	8.38%	4.66%***	5.64%***
Idiosyncratic risk: 4-factor model	2.56%	1.61%	3.00%	0.95%***	-0.44***
Idiosyncratic risk: 7-factor model	3.02%	1.90%	3.33%	1.12%***	-0.31%*
Maximum drawdown	20.08%	11.19%	8.71%	8.89%***	11.37%***
Skewness	0.04	-0.19	0.08	0.23***	-0.04
Standard deviation	6.20%	4.00%	3.69%	2.20%***	2.51%***

Table II: Performance of Hedged Mutual Funds and Hedge Funds

This table reports the results from the following OLS regression:

$$Perf_{i,t} = \lambda_0 + \lambda_1 HMF + \lambda_2 Perf_{i,t-1} + \lambda_3 \sigma_{i,t-1} + \lambda_4 Size_{i,t-1} + \lambda_5 Age_{i,t-1} + \lambda_6 Expense_{i,t-1} + \lambda_7 Flow_{i,t-1} + \sum_{s=1}^{4} \lambda_8^s I(HFStyle_{i,s}) + \sum_{t=1}^{10} \lambda_9^s I(Year_t) + \xi_{i,t}$$

where $Perf_{i,t}$ and $Perf_{i,t-1}$ are the performance measures of fund *i* in years *t* and *t-1* respectively, *HMF* is an indicator variable that equals 1 if fund is a HMF and 0 otherwise, $\sigma_{i,t-1}$ is the standard deviation of the monthly returns of fund *i* during year *t-1*, $Size_{i,t-1}$ is the size of the fund measured as the natural logarithm of the assets under management for fund *i* during year *t-1*, $Age_{i,t-1}$ is the logarithm of age of fund *i* at the end of year *t-1*, $Expense_{i,t-1}$ is the expense ratio of fund *i* during year *t-1*, $Flow_{i,t-1}$ is the percentage money flows in fund *i* in year *t-1*, $I(HFStyle_{i,s})$ are the HF style dummies that take a value of 1 if fund *i* has HF 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. The t-statistics are adjusted for heteroskedasticity, and are below the coefficients in parentheses. Figures marked with ***, **, and * are significant at the 1%, 5%, and 10% levels, respectively.

	Model 1 Performance= Annual return	**Model 2** Performance=Annual return in excess of style median	**Model 3** Performance = 4-factor alpha	**Model 4** Performance = 7-factor alpha	**Model 5** Performance = Sharpe ratio	**Model 6** Performance=Sharpe ratio in excess of style median	**Model 7** Performance = Sortino ratio
Intercept	0.0431	0.0554	0.0024*	0.0018	-0.2593	0.4262	-0.0946
	(0.76)	(1.30)	(1.72)	(1.65)	(-0.81)	(1.42)	(-0.65)
HMF indicator	-0.0341**	0.0048	-0.0041***	-0.0048***	-0.5715***	-0.0178	-0.2806***
	(-1.98)	(0.28)	(-6.71)	(-3.02)	(-4.97)	(-0.16)	(-5.56)
Lagged performance	0.0277	0.0352	0.4600***	0.4353	0.3348***	0.3397***	0.3452***
	(1.16)	(1.45)	(23.45)	(-1.38)	(15.69)	(16.76)	(15.40)
Lagged std. deviation	0.2474	0.1261	0.0319***	0.0211***	-5.9894***	-6.2626***	-2.5847***
	(1.24)	(0.74)	(3.81)	(-3.72)	(-6.34)	(-7.31)	(-6.00)
Lagged log (size)	-0.0156***	-0.0146***	0.0003***	0.0003	0.0045	-0.0045	0.0026
	(-6.74)	(-6.50)	(2.75)	(1.15)	(0.24)	(-0.25)	(0.30)
Lagged fund age	0.0012	0.0006	-0.0002	-0.0001***	-0.0506**	-0.0267	-0.0280***
	(0.42)	(0.22)	(-1.49)	(2.64)	(-2.11)	(-1.16)	(-2.49)
Lagged expense ratio	-0.1123	-0.3242	0.0117	0.0504***	2.0289	-1.1076	2.6027
	(-0.17)	(-0.50)	(0.37)	(-5.59)	(0.33)	(-0.19)	(0.91)
Lagged annual flow	0.0000	-0.0004	0.0012***	0.0016***	-0.0018	-0.0030	-0.0015
	(-0.03)	(-0.48)	(6.90)	(-5.32)	(-0.21)	(-0.40)	(-0.34)
Adjusted R^2	0.2065	0.0295	0.3977	0.3302	0.3690	0.1614	0.3726
Inc. time-trend dummies?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Inc. style dummies?	Yes	No	Yes	Yes	Yes	No	Yes
Number of fund-years	4,591	4,591	3,497	3,478	4,591	4,591	4,591

Table III: Risk-taking of Hedged Mutual Funds and Hedge Funds

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

$$Risk_{i,t} = \beta_0 + \beta_1 HMF + \beta_2 Perf_{i,t-1} + \beta_3 Risk_{i,t-1} + \beta_4 Size_{i,t-1} + \beta_5 Age_{i,t-1} + \beta_6 Expense_{i,t-1} + \beta_7 Flow_{i,t-1} + \sum_{s=1}^{4} \beta_8^s I(HFStyle_{i,s}) + \sum_{t=1}^{10} \beta_9^s I(Year_t) + \varepsilon_{i,t}$$

where $Risk_{i,t}$ and $Risk_{i,t-1}$ are the risk measures of fund *i* in years *t* and *t-1* respectively, *HMF* is an indicator variable that equals 1 if fund is a HMF and 0 otherwise, $Perf_{i,t-1}$ is the performance measure of fund *i* during year *t-1*, $Size_{i,t-1}$ is the size of the fund measured as the natural logarithm of the assets under management for fund *i* during year *t-1*, $Age_{i,t-1}$ is the logarithm of age of fund *i* at the end of year *t-1*, $Expense_{i,t-1}$ is the expense ratio of fund *i* during year *t-1*, $Flow_{i,t-1}$ is the percentage money flows in fund *i* in year *t-1*, $I(HFStyle_{i,s})$ are the HF style dummies that take a value of 1 if fund *i* has HF 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 $\varepsilon_{i,t}$ is the error term. The t-statistics are adjusted for heteroskedasticity, and are below the coefficients in parentheses. Figures marked with ***, **, and * are significant at the 1%, 5%, and 10% levels, respectively.

	Model 1 Risk = 4-factor market beta	**Model 2** Risk = Downside risk	**Model 3** Risk=Idiosyncratic risk, 4-factor model	**Model 4** Risk=Idiosyncratic risk, 7-factor model	**Model 5** Risk = Maximum drawdown	**Model 6** Risk= Skewness	**Model 7** Risk = Std. deviation
Intercept	-0.0044	0.0201	0.0047*	0.0036***	0.0206	-0.0780	0.0092
	(-0.04)	(2.44)	(1.94)	(3.00)	(0.51)	(-0.35)	(2.82)
HMF indicator	0.0726***	0.0077**	-0.0011*	-0.0003	0.0203***	-0.1374***	0.0029*
	(2.98)	(2.05)	(-1.70)	(-0.40)	(2.42)	(-2.51)	(1.76)
Lagged annual return	-0.0605**	0.0314***	0.0045***	0.0051***	0.1990***	-0.0118	0.0127***
	(-1.99)	(5.97)	(3.40)	(3.51)	(15.73)	(-0.24)	(4.86)
Lagged risk measure	0.7489***	0.6437***	0.7870***	0.7885***	0.6152***	0.0789***	0.6344***
	(49.01)	(30.95)	(45.11)	(47.43)	(18.47)	(4.93)	(27.31)
Lagged log (size)	-0.0033	-0.0014***	-0.0005***	-0.0005***	0.0027***	0.0118	-0.0006***
	(-0.94)	(-2.76)	(-4.06)	(-3.80)	(2.65)	(1.38)	(-2.98)
Lagged fund age	0.0037	0.0017***	0.0007*	0.0005	0.0016	-0.0198	0.0008**
	(0.76)	(2.35)	(1.80)	(1.54)	(1.30)	(-1.46)	(2.29)
Lagged expense ratio	-1.6288*	-0.1715	-0.0112	-0.0020	-0.2183	6.3217**	-0.0750
	(-1.79)	(-1.15)	(-0.28)	(-0.05)	(-0.72)	(2.16)	(-1.11)
Lagged annual flow	-0.0081**	0.0000	0.0000	-0.0001	-0.0003**	-0.0028	-0.0001
	(-2.26)	(-0.35)	(-0.28)	(-0.76)	(-2.07)	(-1.32)	(-1.03)
Adjusted R^2	0.7405	0.6313	0.7683	0.7762	0.4768	0.1158	0.6221
Inc. time-trend dummies?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Inc. style dummies?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of fund-years	3,497	4,591	3,497	3,478	4,591	4,591	4,591

Table IV: Performance of Hedged Mutual Funds and Traditional Mutual Funds

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

$$Perf_{i,t} = \delta_0 + \delta_1 HMF + \delta_2 Perf_{i,t-1} + \delta_3 \sigma_{i,t-1} + \delta_4 Size_{i,t-1} + \delta_5 Age_{i,t-1} + \delta_6 Expense_{i,t-1} + \delta_7 Load_{i,t-1} + \delta_8 Turnover_{i,t-1} + \delta_9 Flow_{i,t-1} + \sum_{s=1}^{6} \delta_{10}^{s} I(MFStyle_{i,s}) + \sum_{t=1}^{10} \delta_{11}^{s} I(Year_t) + \psi_{i,t}$$

where $Perf_{i,t}$ and $Perf_{i,t-1}$ are the performance measures of fund *i* in years *t* and *t-1* respectively, HMF is a dummy that equals 1 if fund is a HMF and 0 otherwise, $\sigma_{i,t-1}$ is the standard deviation of the monthly returns of fund *i* during year *t-1*, $Size_{i,t-1}$ and $Age_{i,t-1}$ are fund's size and age measured as the log of the assets under management 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 $\psi_{i,t}$ is the error. t-statistics adjusted for heteroskedasticity are shown in parentheses. Figures marked with ***, **, and * are significant at the 1%, 5%, and 10% levels, respectively.

	Model 1 Performance= Annual return	**Model 2** Performance=Annual return in excess of style median	**Model 3** Performance = 4-factor alpha	**Model 4** Performance = 7-factor alpha	**Model 5** Performance = Sharpe ratio	**Model 6** Performance=Sharpe ratio in excess of style median	**Model 7** Performance = Sortino ratio
Intercept	-0.0343***	0.0220***	-0.0009***	0.0023***	-0.6370***	0.1590***	-0.2363***
	(-7.36)	(5.60)	(-3.77)	(6.39)	(-13.27)	(5.26)	(-11.58)
HMF indicator	-0.0295*	-0.0352**	-0.0006	0.0002	-0.2564***	-0.2771***	-0.1104***
	(-1.64)	(-1.95)	(-1.16)	(0.27)	(-2.42)	(-2.60)	(-2.39)
Lagged performance	0.0500***	0.0834***	0.4061***	0.4201***	0.0293***	0.0933***	-0.0113*
	(4.76)	(6.24)	(40.21)	(43.20)	(4.21)	(10.01)	(-1.67)
Lagged std. deviation	-0.9221***	-0.1359***	0.0189***	-0.0559***	-4.1749***	-0.3104	-1.6462***
	(-10.63)	(-2.57)	(6.31)	(-12.52)	(-11.74)	(-1.36)	(-10.63)
Lagged log (size)	-0.0041***	-0.0021***	0.0001***	0.0001***	-0.0132***	0.0035	-0.0061***
	(-6.69)	(-4.12)	(5.37)	(3.40)	(-2.98)	(0.99)	(-3.25)
Lagged fund age	0.0001	-0.0046***	0.0001***	0.0000	0.0053	-0.0466***	-0.0005
	(0.07)	(-3.32)	(2.35)	(0.07)	(0.52)	(-5.44)	(-0.10)
Lagged expense ratio	-1.0588***	-0.5696***	-0.0647***	-0.0036	-17.4886***	-13.4550***	-7.3451***
	(-4.22)	(-2.62)	(-7.09)	(-0.26)	(-9.79)	(-9.20)	(-9.57)
Lagged total load	0.0002	0.0002	-0.0001***	-0.0001***	0.0004	0.0013	0.0007
	(0.31)	(0.47)	(-3.05)	(-3.86)	(0.11)	(0.46)	(0.49)
Lagged turnover	0.0012	0.0007	-0.0000*	-0.0001***	-0.0013	-0.0008	-0.0004
	(1.18)	(0.89)	(-1.78)	(-2.41)	(-0.46)	(-0.35)	(-0.32)
Lagged annual flow	-0.0015	-0.0013	0.0013***	0.0014***	0.0015	0.0020	0.0010
	(-0.81)	(-0.63)	(19.60)	(16.38)	(0.47)	(0.43)	(0.83)
Adjusted R^2	0.4426	0.0236	0.3085	0.3123	0.5031	0.0315	0.5168
Inc. time-trend dummies?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Inc. style dummies?	Yes	No	Yes	Yes	Yes	No	Yes
Number of fund-years	25,570	25,570	22,810	18,004	25,567	25,567	25,567

Table V: Risk-taking of Hedged Mutual Funds and Traditional Mutual Funds

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

$$Risk_{i,t} = \rho_0 + \rho_1 HMF + \rho_2 Perf_{i,t-1} + \rho_3 Risk_{i,t-1} + \rho_4 Size_{i,t-1} + \rho_5 Age_{i,t-1} + \rho_6 Expense_{i,t-1} + \rho_7 Load_{i,t-1} + \rho_8 Turonver_{i,t-1} + \rho_9 Flow_{i,t-1} + \sum_{s=1}^{6} \rho_{10}^{s} I(MFStyle_{i,s}) + \sum_{t=1}^{10} \rho_{11}^{s} I(Year_t) + \vartheta_{i,t}$$

where $Risk_{i,t}$ and $Risk_{i,t-1}$ are the risk measures of fund *i* in years *t* and *t-1*, *HMF* is an indicator variable that equals 1 if fund is a HMF and 0 otherwise, $I(MFStyle_{i,s})$ are the MF style dummies that take a value of 1 if fund *i* has MF style *s* and 0 otherwise, $\vartheta_{i,t}$ is the error term, and other variables are as defined in Table IV. t-statistics adjusted for heteroskedasticity are in parentheses. Figures marked with ***, **, and * are significant at the 1%, 5%, and 10% levels, respectively.

	Model 1 Risk = 4-factor market beta	**Model 2** Risk = Downside risk	**Model 3** Risk=Idiosyncratic risk, 4-factor model	**Model 4** Risk=Idiosyncratic risk, 7-factor model	**Model 5** Risk = Maximum drawdown	**Model 6** Risk= Skewness	**Model 7** Risk = Std. deviation
Intercept	0.2183***	0.0271***	0.0002	-0.0046***	0.0222***	0.0620***	0.0089***
	(19.96)	(17.85)	(0.96)	(-13.08)	(6.58)	(2.51)	(13.76)
HMF indicator	-0.1547***	-0.0120***	-0.0018***	-0.0015***	-0.0135	0.1601***	-0.0045***
	(-6.88)	(-3.29)	(-3.41)	(-2.02)	(-1.59)	(3.20)	(-2.75)
Lagged annual return	-0.1061***	0.0694***	0.0013***	0.0055***	0.2234***	-0.6106***	0.0331***
	(-10.93)	(34.17)	(3.74)	(12.39)	(34.36)	(-20.54)	(33.09)
Lagged risk measure	0.7931***	0.6115***	0.8349***	0.8498***	0.6302***	0.0812***	0.6694***
	(100.31)	(69.60)	(121.95)	(119.50)	(45.91)	(11.95)	(70.45)
Lagged log (size)	0.0052***	0.0008***	0.0000	0.0000	0.0036***	0.0032	0.0003***
	(7.49)	(6.04)	(-0.74)	(-0.06)	(10.94)	(1.27)	(5.27)
Lagged fund age	-0.0118***	-0.0004	0.0003***	0.0004***	-0.0022***	-0.0473***	-0.0001
	(-6.73)	(-1.13)	(6.08)	(5.03)	(-2.94)	(-8.10)	(-0.53)
Lagged expense ratio	1.3762***	0.5975***	0.1014***	0.1298***	1.3490***	3.6964***	0.2251***
	(4.41)	(10.85)	(10.52)	(9.03)	(10.71)	(3.79)	(9.65)
Lagged total load	0.0005	-0.0002	-0.0001***	-0.0001***	-0.0004	0.0041**	0.0000
	(0.92)	(-1.44)	(-4.03)	(-4.03)	(-1.44)	(1.99)	(-0.96)
Lagged turnover	0.0013	0.0006***	0.0000	0.0000	0.0011***	0.0005	0.0002***
	(1.27)	(3.34)	(1.51)	(0.75)	(3.73)	(0.23)	(3.31)
Lagged annual flow	-0.0007	0.0000	0.0002***	0.0000	0.0004	-0.0022*	-0.0001
	(-0.44)	(0.06)	(2.95)	(0.56)	(0.63)	(-1.74)	(-1.04)
Adjusted R^2	0.8964	0.7784	0.8446	0.8609	0.6613	0.2356	0.8020
Inc. time-trend dummies?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Inc. style dummies?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of fund-years	22,810	25,570	22,810	18,004	25,570	25,567	25,570

Table VI: Performance and Risk including NOT-HFMC and YES-HFMC variables: Hedged Mutual Funds versus Hedge Funds

Panel A of this table reports results from performance regressions that include hedged mutual funds (HMFs) and traditional mutual funds (TMFs) while Panel B reports results from risk regressions for these funds. The regressions include all the variables specified in Tables IV and V but separate the HMF indicator variable into two variables. The first is NOT-HFMC which is set to 1 if the HMF is not run by a HF management company and 0 otherwise. The second is YES-HFMC which is set to 1 if the HMF is run by a HF management company and 0 otherwise. Hence, the missing indicator variable represents TMFs in Panels A and B. We estimate the regressions using annual data for the period 1994 to 2004. For brevity, we do not report coefficients on variables other than those on NOT-HFMC and YES-HFMC variables. We also report the results from a t-test for whether the coefficients on NOT-HFMC and YES-HFMC are equal. The t-statistics are adjusted for heteroskedasticity, and are shown below the coefficients in parentheses. Figures marked with ***, **, and * are significant at the 1%, 5%, and 10% levels, respectively.

Panel A: Performance of Hedged Mutual Funds and Traditional Mutual Funds

	Model 1 Performance= Annual return	**Model 2** Performance=Annual return in excess of style median	**Model 3** Performance = 4-factor alpha	**Model 4** Performance = 7-factor alpha	**Model 5** Performance = Sharpe ratio	**Model 6** Performance =Sharpe ratio in excess of style median	**Model 7** Performance = Sortino ratio
YES-HFMC	-0.0453**	-0.0343	0.0025***	0.0017*	-0.0037	0.0209	0.0114
	(-2.05)	(-1.44)	(3.68)	(1.75)	(-0.02)	(0.12)	(0.14)
NOT-HFMC	-0.0210	-0.0357	-0.0024***	-0.0006	-0.3934***	-0.4397***	-0.1765**
	(-0.86)	(-1.46)	(-3.72)	(-0.72)	(-3.09)	(-3.34)	(-3.17)
Adjusted R^2	0.4427	0.0236	0.3100	0.3125	0.5032	0.0321	0.5169
Diff (YES-HFMC - NOT-HFMC)	-0.0243	0.0014	0.0049***	0.0023*	0.3897*	0.4606**	0.1879**

Panel B: Risk of Hedged Mutual Funds and Traditional Mutual Funds

	Model 1 Risk = 4-factor market beta	**Model 2** Risk = Downside risk	**Model 3** Risk=Idiosyncratic risk, 4-factor model	**Model 4** Risk=Idiosyncratic risk, 7-factor model	**Model 5** Risk = Maximum drawdown	**Model 6** Risk= Skewness	**Model 7** Risk = Std. deviation
YES-HFMC	-0.1816***	-0.0264***	-0.0015*	-0.0014	-0.0317***	0.1848*	-0.0088***
	(-7.71)	(-6.80)	(-1.88)	(-1.53)	(-3.92)	(1.85)	(-4.96)
NOT-HFMC	-0.1395***	-0.0043	-0.0013**	-0.0009	-0.0037	0.1467***	-0.0021
	(-4.26)	(-0.85)	(-2.17)	(-1.07)	(-0.30)	(2.70)	(-0.95)
Adjusted R^2	0.8964	0.7787	0.8446	0.8606	0.6614	0.2356	0.8021
Diff (YES-HFMC -NOT-HFMC)	-0.0421	-0.0221***	0.0002	-0.0005	-0.0280**	-0.0381	-0.0067**

Table VI (contd.): Performance and Risk including NOT-HFMC and YES-HFMC variables: Hedged Mutual Funds versus Traditional Mutual Funds

Panel C of this table reports results from performance regressions that include hedged mutual funds (HMFs) and hedge funds (TMFs), while Panel D reports the results from risk for these funds. The regressions include all the variables specified in Tables II and III after segregating the HMF indicator variable into two indicator variables. The first is NOT-HFMC which is set to 1 if the HMF is not run by a HF management company and 0 otherwise. The second is YES-HFMC which is set to 1 if the HMF is run by a HF management company and 0 otherwise. Hence, the missing indicator variable represents HFs. We estimate the regressions using annual data for the period 1994 to 2004. For brevity, we do not report coefficients on variables other than those on NOT-HFMC and YES-HFMC variables. We also report the results from a t-test for whether the coefficients on NOT-HFMC and YES-HFMC are equal. The t-statistics are adjusted for heteroskedasticity, and are shown below the coefficients in parentheses. Figures marked with ***, **, and * are significant at the 1%, 5%, and 10% levels respectively.

Panel C: Performance of Hedged Mutual Funds and Hedge Funds

	Model 1 Performance= Annual return	**Model 2** Performance= Annual return in excess of style median	**Model 3** Performance = 4-factor alpha	**Model 4** Performance = 7-factor alpha	**Model 5** Performance = Sharpe ratio	**Model 6** Performance =Sharpe ratio in excess of style median	**Model 7** Performance = Sortino ratio
YES-HFMC	-0.0088	0.0329	-0.0020***	-0.0032***	-0.6953***	0.0759	-0.3403***
	(-0.41)	(1.32)	(-2.57)	(-3.55)	(-3.75)	(0.39)	(-4.29)
NOT-HFMC	-0.0447**	-0.0069	-0.0070***	-0.0076***	-0.5196***	-0.0567	-0.2556***
	(-2.01)	(-0.32)	(-9.31)	(-8.51)	(-3.77)	(-0.44)	(-4.18)
Adjusted R^2	0.2068	0.0299	0.4402	0.3676	0.3691	0.1615	0.3727
Diff (YES-HFMC - NOT-HFMC)	0.0359	0.0398	0.0050***	0.0044***	-0.1757	0.1326	-0.0847

Panel D: Risk of Hedged Mutual Funds and Hedge Funds

	Model 1 Risk = 4-factor market beta	**Model 2** Risk = Downside risk	**Model 3** Risk=Idiosyncratic risk, 4-factor model	**Model 4** Risk=Idiosyncratic risk, 7-factor model	**Model 5** Risk = Maximum drawdown	**Model 6** Risk= Skewness	**Model 7** Risk = Std. deviation
YES-HFMC	0.0374	-0.0010	-0.0017*	-0.0006	0.0003	-0.1003	-0.0002
	(1.61)	(-0.25)	(-1.72)	(-0.59)	(0.04)	(-0.96)	(-0.12)
NOT-HFMC	0.0902***	0.0113***	-0.0009	-0.0002	0.0289***	-0.1525***	0.0042**
	(2.82)	(2.35)	(-1.15)	(-0.20)	(2.62)	(-2.49)	(1.99)
Adjusted R^2	0.7411	0.6316	0.7683	0.7762	0.4774	0.1159	0.6223
Diff (YES-HFMC -NOT-HFMC)	-0.0528	-0.0123**	-0.0008	-0.0004	-0.0286**	0.0522	-0.0044*

Table VII: Robustness Tests

Robustness of the HMF, YES-HFMC, and NO-HFMC variables to various econometric techniques is tested. For ease of comparison, we also report in the first row, the results from Tables II to VI. We use the following alternative econometric techniques: management-company (MC) level fixed effects, random effects, and between effects, and fund-level random effects and between effects. For brevity, only the coefficients on the HMF variable (from Tables II-V) and on the YES-HFMC and NO-HFMC variables (from Table VI) are reported. Panel A reports the performance and risk-related results for HMF vs HF (Tables II and III). Panel B reports the performance and risk-related results for HMF vs. TMF (Tables IV and V). Panels C and D report the performance and risk-related results including the YES-HFMC and NO-HFMC variables (Table VI). t-statistics are reported below the coefficients in parentheses. Figures marked with ***, **, and * are significant at the 1%, 5%, and 10% levels, respectively.

Panel A: Coefficients on the HMF variable in HMF-HF regressions

	Performance Regressions							Risk Regressions						
Specification	**Model 1:** Annual return	**Model 2:** Ann. return in excess of style median	**Model 3:** 4- factor alpha	**Model 4:** 7- factor alpha	**Model 5:** Sharpe ratio	**Model 6:** Sharpe in excess of style median	**Model 7:** Sortino ratio	**Model 1:** 4-factor market beta	**Model 2:** Downside risk	**Model 3** Risk=Idio. risk, 4-factor model	**Model 4** Risk=Idio. risk, 7-factor model	**Model 5:** Maximum drawdown	**Model 6:** Skewness	**Model 7:** Standard deviation
From Tables II & III	-0.0341**	0.0048	-0.0041***	-0.0048***	-0.5715***	-0.0178	-0.2806***	0.0726***	0.0077**	-0.0011*	-0.0003	0.0203***	-0.1374***	0.0029*
	(-1.98)	(0.28)	(-6.71)	(-3.02)	(-4.97)	(-0.16)	(-5.56)	(2.98)	(2.05)	(-1.70)	(-0.40)	(2.42)	(-2.51)	(1.76)
1. Mgmt. Co. fixed	0.00183	0.1328***	-0.0027*	-0.0037**	-1.1651***	0.5499	-0.4910***	-0.0467	0.0146*	-0.0026*	-0.0003	0.0206	0.2250	0.0069
	(0.45)	(2.89)	(-1.72)	(-2.02)	(-2.81)	(1.29)	(-2.85)	(-0.87)	(1.92)	(-1.69)	(-0.71)	(1.14)	(1.48)	(2.03)**
2. Family random	-0.0331*	0.0142	-0.0036***	-0.0017	-0.7479***	-0.0518	-0.3742***	0.0071***	0.0080***	-0.0012	0.0013	0.0213***	-0.1224*	0.0031**
	(-1.86)	(0.81)	(-4.39)	(-1.41)	(-5.03)	(-0.36)	(-5.25)	(3.41)	(2.57)	(-1.14)	(0.87)	(3.33)	(-1.68)	(2.21)
3. Fund random	-0.0341	0.0048	-0.0043***	-0.0048***	-0.5715***	-0.0194	-0.2806***	0.0810***	0.0076***	-0.0013	-0.0004	0.0203***	-0.1383***	0.0029**
	(-2.34)***	(0.35)	(-5.88)	(-6.44)	(-4.70)	(-0.17)	(-5.01)	(3.70)	(2.46)	(-1.42)	(-0.41)	(3.17)	(-2.45)	(2.07)
4. Mgmt. Co. between	-0.0404	-0.0269	-0.0004	-0.0017	-0.5058***	-0.2513	-0.2419***	0.0456	0.0040	0.0009	0.0013	0.0146	-0.1902*	0.0006
	(-1.49)	(-1.03)	(-0.35)	(-1.41)	(-2.38)	(-1.25)	(-2.44)	(1.35)	(0.83)	(0.59)	(0.87)	(1.48)	(-1.80)	(0.31)
5. Fund between	-0.0177	-0.0074	-0.0033***	-0.0032***	-0.2258	-0.0689	-0.1246*	0.0796***	-0.0028	-0.0016	-0.0017	-0.0065	-0.2068***	-0.0029*
	(-0.96)	(-0.42)	(-3.58)	(-3.45)	(-1.50)	(-0.48)	(-1.82)	(3.02)	(-0.79)	(-1.50)	(-1.50)	(-0.85)	(-2.85)	(-1.80)

Panel B: Coefficients on the HMF variable in HMF-TMF regressions

	Performance Regressions							Risk Regressions						
Specification	**Model 1:** Annual return	**Model 2:** Ann. return in excess of style median	**Model 3:** 4- factor alpha	**Model 4:** 7- factor alpha	**Model 5:** Sharpe ratio	**Model 6:** Sharpe in excess of style median	**Model 7:** Sortino ratio	**Model 1:** 4-factor market beta	**Model 2:** Downside risk	**Model 3** Risk=Idio. risk, 4-factor model	**Model 4** Risk=Idio. risk, 7-factor model	**Model 5:** Maximum drawdown	**Model 6:** Skewness	**Model 7:** Standard deviation
From Tables IV & V	-0.0295*	-0.0352**	-0.0006	0.0002	-0.2564***	-0.2771***	-0.1104***	-0.1547***	-0.0120***	-0.0018***	-0.0015***	-0.0135	0.1601***	-0.0045***
	(-1.64)	(-1.95)	(-1.16)	(0.27)	(-2.42)	(-2.60)	(-2.39)	(-6.88)	(-3.29)	(-3.41)	(-2.02)	(-1.59)	(3.20)	(-2.75)
1. Mgmt. Co. fixed	-0.0337**	-0.0382**	-0.0002	-0.0006	-0.3630***	-0.3768***	-0.1549***	-0.1793***	-0.0107***	-.0009212	-0.0013	-0.0117	0.1242*	-0.0039***
	(-1.96)	(-2.20)	(-0.46)	(-0.87)	(-3.11)	(-3.32)	(-3.03)	(-7.67)	(-2.96)	(-1.32)	(-1.33)	(-1.49)	(1.91)	(-2.54)
2. Family random	-0.0316***	-0.0378***	-0.0002	-0.0001	-0.2596***	-0.2835***	-0.1118***	-0.1713***	-0.0115***	-0.0012***	-0.0012**	-0.0114*	0.1631***	-0.0040***
	(-3.14)	(-4.17)	(-0.49)	(-0.05)	(-3.51)	(-4.91)	(-3.57)	(-13.70)	(-5.44)	(-3.01)	(-2.22)	(-2.23)	(3.85)	(-4.54)
3. Fund random	-0.0295***	-0.0352***	-0.0006	0.0002	-0.2563***	-0.2771***	-0.1103***	-0.1865***	-0.0120***	-0.0020***	-0.0016***	-0.014***	0.1601***	-0.0044***
	(-2.95)	(-4.24)	(-1.70)*	(0.40)	(-3.50)	(-4.83)	(-3.55)	(-13.69)	(-5.73)	(-4.65)	(-3.09)	(-2.73)	(3.81)	(-5.22)
4. Mgmt. Co. between	-0.0601***	-0.0411**	0.0034	0.0033***	-0.5332***	-0.4323***	-0.2276***	-0.0184	0.0013	0.0009	0.0018	-0.0036	0.0864	-0.0003
	(-2.77)	(-2.00)	(3.73)***	(2.52)	(-4.02)	(-3.71)	(-3.95)	(-0.63)	(0.28)	(0.92)	(1.42)	(-0.32)	(1.13)	(-0.15)
5. Fund between	-0.0325***	-0.0282***	0.0005	0.0004	-0.3381***	-0.2265***	-0.1572***	-0.0586***	-0.0050***	-0.0013***	-.0011**	-0.0144***	0.1477***	-0.0021***
	(-3.62)	(-3.59)	(1.29)	(0.89)	(-5.33)	(-3.94)	(-5.80)	(-4.21)	(-2.55)	(-3.17)	(-2.14)	(-2.95)	(3.73)	(-2.50)

Table VII: Robustness Tests, continued

Robustness of the HMF, YES-HFMC, and NO-HFMC variables to various econometric techniques is tested. For ease of comparison, we also report in the first row, the results from Tables II to VI. We use the following alternative econometric techniques: management-company (MC) level fixed effects, random effects, and between effects, and fund-level random effects and between effects. For brevity, only the coefficients on the HMF variable (from Tables II-V) and on the YES-HFMC and NO-HFMC variables (from Table VI) are reported. Panel A reports the performance and risk-related results for HMF vs HF (Tables II and III). Panel B reports the performance and risk-related results for HMF vs. TMF (Tables IV and V). Panels C and D report the performance and risk-related results including the YES-HFMC and NO-HFMC variables (Table VI). t-statistics are reported below the coefficients in parentheses. Figures marked with ***, **, and * are significant at the 1%, 5%, and 10% levels, respectively.

Panel C: Coefficients on the YES-HFMC and NO-HFMC variables in HMF-HF regressions

Performance Regressions

Specification	**Model 1:** Annual return		**Model 2:** Ann. return in excess of style median		**Model 3:** 4- factor alpha		**Model 4:** 7- factor alpha		**Model 5:** Sharpe ratio		**Model 6:** Sharpe ratio in excess of style median		**Model 7:** Sortino ratio	
Yes or No-HFMC	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
From Table VI -Panel C	-0.0088	-0.0447**	0.0329	-0.0069	-0.0020***	-0.0070***	-0.0032***	-0.0076***	-0.6953***	-0.5196***	0.0759	-0.0567	-0.3403***	-0.2556***
	(-0.41)	(-2.01)	(1.32)	(-0.32)	(-2.57)	(-9.31)	(-3.55)	(-8.51)	(-3.75)	(-3.77)	(0.39)	(-0.44)	(-4.29)	(-4.18)
1. Mgmt. Co. fixed	0.0545	-0.2544***	0.1571***	-0.0576	-0.0049***	-0.0089	-0.0052***	-0.016***	-0.9159***	-3.054***	0.8523**	-1.810***	-0.3795**	-1.337***
	1.36	(-6.68)	(3.22)	(-1.31)	(-3.25)	(-1.19)	(-2.91)	(-4.81)	(-2.09)	(-6.62)	(1.96)	(4.51)	(-2.11)	(-6.61)
2. Family random	-0.0256	-0.0387*	0.0333	-0.0011	-0.0031***	-0.0067***	-0.0040***	-0.0075***	-1.003***	-0.5473***	-0.0055	-0.0896	-0.4783***	-0.2848***
	(-0.99)	(-1.71)	(1.32)	(-0.05)	(-2.57)	(-6.30)	(-3.14)	(-7.13)	(-4.69)	(-2.88)	(-0.03)	(-0.48)	(-4.77)	(-3.06)
3. Fund random	-0.0282	-0.0370**	0.0263	-0.0055	-0.0028***	-0.0071***	-0.0037***	-0.0077***	-0.8905***	-0.4167***	0.0064	-0.0315	-0.4233***	-0.2114***
	(-1.18)	(-2.14)	(1.14)	(-0.34)	(-2.36)	(-8.11)	(-3.01)	(-8.40)	(-4.49)	(-2.91)	(0.03)	(-0.23)	(-4.64)	(-3.21)
4. Mgmt. Co. between	-0.0733	-0.0121	-0.0524	-0.0047	0.0002	-0.0012	-0.0030	-0.0016	-0.8953***	-0.1762	-0.5633**	0.0224	-0.4189***	-0.0923
	(-1.96)	(-0.35)	(-1.45)	(-0.14)	(0.08)	(-0.82)	(-1.65)	(-1.03)	(-3.06)	(-0.65)	(-2.03)	(0.09)	(-3.07)	(-0.73)
5. Fund between	-0.0343	-0.0131	-0.0159	-0.0050	-0.0008	-0.0044***	-0.0030*	-0.0039***	-0.6426**	-0.1102	-0.3351	0.0052	-0.3079***	-0.0737
	(-0.99)	(-0.65)	(-0.47)	(-0.26)	(-0.43)	(-4.29)	(-1.67)	(-3.68)	(-2.28)	(-0.67)	(-1.23)	(0.03)	(-2.40)	(-0.98)

Risk Regressions

Specification	**Model 1:** 4-factor market beta		**Model 2:** Downside risk		**Model 3** Risk=Idiosyncratic risk, 4-factor model		**Model 4** Risk=Idiosyncratic risk, 7-factor model		**Model 5:** Maximum drawdown		**Model 6:** Skewness		**Model 7:** Standard deviation	
Yes or No-HFMC	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
From Table VI-Panel D	0.0374	0.0902***	-0.0010	0.0113***	-0.0017*	-0.0009	-0.0006	-0.0002	0.0003	0.0289***	-0.1003	-0.1525***	-0.0002	0.0042**
	(1.61)	(2.82)	(-0.25)	(2.35)	(-1.72)	(-1.15)	(-0.59)	(-0.20)	(0.04)	(2.62)	(-0.96)	(-2.49)	(-0.12)	(1.99)
1. Mgmt. Co. fixed	-0.0754	0.2864*	0.0113	0.0398**	-0.0027	-0.0020	-0.0006	0.0018	0.0051	0.1386***	0.2263	0.2157	0.0055	0.0176***
	(-1.59)	(1.69)	(1.43)	(2.26)	(-1.60)	(-0.68)	(-0.28)	(0.74)	(0.31)	(2.58)	(1.35)	(0.71)	(1.53)	(3.07)
2. Family random	-0.0126	0.1177***	0.0014	0.0113***	-0.0013	-0.0012	0.0005	0.0019	0.0114	0.0262***	-0.0085	-0.2196**	0.0009	0.0043***
	(-0.38)	(4.73)	(0.28)	(3.06)	(-0.84)	(-0.83)	(0.21)	(0.99)	(1.10)	(3.45)	(-0.08)	(-2.30)	(0.39)	(2.53)
3. Fund random	-0.0124	0.1292***	0.0014	0.0108***	-0.0012	-0.0017	-0.0004	-0.0004	0.0113	0.0248***	-0.0395	-0.1845***	0.0009	0.0039***
	(-0.35)	(4.97)	(0.28)	(2.92)	(-0.53)	(-1.47)	(-0.23)	(-0.36)	(1.08)	(3.27)	(-0.42)	(-2.78)	(0.39)	(2.34)
4. Mgmt. Co. between	0.0160	0.0686*	0.0024	0.0053	0.0001	0.0014	0.0005	0.0019	0.0243*	0.0063	-0.1394	-0.2330*	0.0003	0.0009
	(0.32)	(1.64)	(0.37)	(0.86)	(0.04)	(0.75)	(0.21)	(0.99)	(1.78)	(0.49)	(-0.95)	(-1.71)	(0.09)	(0.36)
5. Fund between	0.0419	0.0879***	-0.0006	-0.0035	-0.0014	-0.0016	-0.0006	-0.0019	0.0058	-0.0101	-0.0938	-0.2354***	-0.0011	-0.0035*
	(0.79)	(3.11)	(-0.08)	(-0.88)	(-0.64)	(-1.43)	(-0.26)	(-1.59)	(0.40)	(-1.19)	(-0.67)	(-2.99)	(-0.36)	(-1.94)

Table VII: Robustness Tests, continued

Robustness of the HMF, YES-HFMC, and NO-HFMC variables to various econometric techniques is tested. For ease of comparison, we also report in the first row, the results from Tables II to VI. We use the following alternative econometric techniques: management-company (MC) level fixed effects, random effects, and between effects, and fund-level random effects and between effects. For brevity, only the coefficients on the HMF variable (from Tables II-V) and on the YES-HFMC and NO-HFMC variables (from Table VI) are reported. Panel A reports the performance and risk-related results for HMF vs HF (Tables II and III). Panel B reports the performance and risk-related results for HMF vs. TMF (Tables IV and V). Panels C and D report the performance and risk-related results including the YES-HFMC and NO-HFMC variables (Table VI). t-statistics are reported below the coefficients in parentheses. Figures marked with ***, **, and * are significant at the 1%, 5%, and 10% levels, respectively.

Panel D: Coefficients on the YES-HFMC and NO-HFMC variables in HMF-TMF regressions

Performance Regressions

Specification	**Model 1**: Annual return		**Model 2**: Ann. return in excess of style median		**Model 3:** 4- factor alpha		**Model 4:** 7- factor alpha		**Model 5**: Sharpe ratio		**Model 6:** Sharpe ratio in excess of style median		**Model 7**: Sortino ratio	
Yes or No-HFMC	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
From Table VI-Panel A	-0.0453**	-0.0210	-0.0343	-0.0357	-0.0005	-0.0057	-0.0015	-0.0062	-0.0037	-0.3934***	0.0209	-0.4397***	0.0114	-0.1765**
	(-2.05)	(-0.86)	(-1.44)	(-1.46)	(-0.60)	(-7.90)***	(-1.63)	(-7.23)***	(-0.02)	(-3.09)	(0.12)	(-3.34)	(0.14)	(-3.17)
1. Mgmt. Co. fixed	-0.0590**	-0.0104	-0.0554*	-0.0191	0.0009	-0.0012	-0.0002	-0.0009	-0.3947*	-0.2670***	-0.4051*	-0.2400**	-0.1567	-0.1135**
	(-2.02)	(-0.48)	(-1.75)	(-0.92)	(0.99)	(-1.44)	(-0.22)	(-0.95)	(-1.67)	(-2.47)	(-1.72)	(-2.03)	(-1.49)	(-2.26)
2. Family random	-0.0483***	-0.0163	-0.0384***	-0.0318***	0.0017	-0.0017***	0.0010	-0.0008	-0.0712	-0.3120***	-0.0527	-0.3678***	-0.0234	-0.1394***
	(-3.02)	(-1.27)	(-2.73)	(-2.67)	(2.85)	(-3.22)	(1.17)	(-1.08)	(-0.61)	(-3.31)	(-0.57)	(-4.98)	(-0.47)	(-3.49)
3. Fund random	-0.0482***	-0.0134	-0.0385***	-0.028***	0.0019	-0.0023***	0.0016**	-0.0007	-0.0709	-0.3053***	-0.0520	-0.3552***	-0.0232	-0.1363***
	(-3.01)	(-1.06)	(-2.90)	(-2.69)	(3.66)	(-5.28)	(2.21)	(-1.19)	(-0.60)	(-3.29)	(-0.57)	(-4.87)	(-0.47)	(-3.46)
4. Mgmt. Co. between	-0.0370	-0.1214***	-0.0225	-0.0904***	0.0035	0.0033**	0.0020	0.0057***	-0.4081***	-0.8436***	-0.4015***	-0.5057***	-0.1732***	-0.3637***
	(-1.55)	(-3.53)	(-0.99)	(-2.75)	(3.25)	(2.24)	(1.31)	(2.84)	(-2.78)	(-4.00)	(-3.09)	(-2.72)	(-2.72)	(-3.98)
5. Fund between	-0.0396***	-0.0279***	-0.0377***	-0.0219***	0.0020	-0.0001	0.0000	0.0057	-0.4251***	-0.2816***	-0.3641***	-0.1462**	-0.1839***	-0.1375***
	(-2.46)	(-2.67)	(-2.67)	(-2.39)	(2.92)	(-0.18)	(0.03)	(1.05)	(-3.75)	(-3.81)	(-3.55)	(-2.18)	(-3.80)	(-4.35)

Risk Regressions

Specification	**Model 1:** 4-factor market beta		**Model 2:** Downside risk		**Model 3** Risk=Idiosyncratic risk, 4-factor model		**Model 4** Risk=Idiosyncratic risk, 7-factor model		**Model 5:** Maximum drawdown		**Model 6:** Skewness		**Model 7:** Standard deviation	
Yes or No-HFMC	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
From Table VI-Panel B	-0.1816***	-0.1395***	-0.0264***	-0.0043	-0.0014*	-0.0014**	-0.0014	-0.0009	-0.0317***	-0.0037	-0.1003	-0.1525***	-0.0002	0.0042**
	(-7.71)	(-4.26)	(-6.80)	(-0.85)	(-1.79)	(-2.30)	(-1.53)	(-1.07)	(-3.92)	(-0.30)	(-0.96)	(-2.49)	(-0.12)	(1.99)
1. Mgmt. Co. fixed	-0.2471***	-0.1251***	-0.0215***	-0.0030	-0.0014	-0.0001	-0.0019*	-0.0010	-0.0133	-0.0112	0.2263	0.2157	0.0055	0.0176***
	(-8.25)	(-3.63)	(-3.93)	(-0.59)	(-1.53)	(-0.76)	(-1.70)	(-0.72)	(-0.96)	(-1.13)	(1.35)	(0.71)	(1.53)	(3.07)
2. Family random	-0.2278***	-0.1269***	-0.0222***	-0.0042	0.0006	0.0016	-0.0015*	-0.0011	-0.0209***	-0.0055	-0.0085	-0.2196**	0.0009	0.0043***
	(-12.09)	(-7.69)	(-6.60)	(-1.57)	(0.51)	(1.05)	(-1.82)	(-1.51)	(-2.59)	(-0.82)	(-0.08)	(-2.30)	(0.39)	(2.53)
3. Fund random	-0.2733***	-0.1418***	-0.0222***	-0.0053**	-0.0017***	-0.0022***	-0.0017*	-0.0016***	-0.0214***	-0.0091	-0.0395	-0.1845***	0.0009	0.0039***
	(-11.84)	(-8.55)	(-6.60)	(-1.98)	(-2.36)	(-4.26)	(-1.92)	(-2.52)	(-2.70)	(-1.44)	(-0.42)	(-2.78)	(0.39)	(2.34)
4. Mgmt. Co. between	-0.0467	0.0375	0.0397	-0.0055	-0.0014***	-0.0012***	0.0018	0.0017	-0.0088	0.0101	-0.1394	-0.2330*	0.0003	0.0009
	(-1.39)	(0.85)	(0.75)	(-0.72)	(-2.34)	(-2.30)	(1.24)	(0.88)	(-0.70)	(0.55)	(-0.95)	(-1.71)	(0.09)	(0.36)
5. Fund between	-0.0946***	-0.0451***	-0.0058	-0.0044*	-0.0011	-0.0015***	-0.0004	-0.0014**	-0.0105	-0.0163***	-0.0938	-0.2354***	-0.0011	-0.0035*
	(-3.69)	(-2.82)	(-1.63)	(-1.91)	(-1.38)	(-3.03)	(-0.45)	(-2.28)	(-1.21)	(-2.86)	(-0.67)	(-2.99)	(-0.36)	(-1.94)

Appendix A
Excerpts from hedged mutual fund prospectuses

This appendix provides additional detail regarding the strategies of a number of hedged mutual funds from our sample of 102 funds. These descriptions are taken directly from fund prospectuses and are organized into the five hedge fund style categories represented in the sample. The prospectuses are obtained either from the fund companies' websites or from SEC's EDGAR database.

Category: Equity Market Neutral
Fund: Lindner Market Neutral

"The Market Neutral Fund attempts to achieve minimal exposure to market risk by always having both long and short positions in equity securities issued by U.S. companies or foreign companies whose securities are traded on U.S. markets (ADRs)...By taking both long and short positions in different securities with similar characteristics, the Fund attempts to cancel out the effect of general stock market movements on the Fund's performance. The Fund seeks to construct a diversified portfolio that has minimal net exposure to the U.S. equity market generally and certain other risk factors. The Fund's performance objective is to achieve a total return in excess of the total returns on the 3-month Treasury Bill. Its performance is not expected to correlate with the direction of any major U.S. stock market or any general stock market index."

Category: Event Driven
Fund: Arbitrage Fund

"The Fund seeks to achieve capital growth by engaging in merger arbitrage...In attempting to achieve its objective, the Fund plans to invest at least 80% of its net assets in equity securities of companies that are involved in publicly announced mergers, takeovers, tender offers, leveraged buyouts, spin-offs, liquidations and other corporate reorganizations...The Adviser uses investment strategies designed to minimize market exposure including short selling and purchasing and selling options. The most common arbitrage activity, and the approach the Fund generally will use, involves purchasing the shares of an announced acquisition target company at a discount to their expected value upon completion of the acquisition. The Adviser may engage in selling securities short when the terms of a proposed acquisition call for the exchange of common stock and/or other securities. In such a case, the common stock of the company to be acquired may be purchased and, at approximately the same time, an equivalent amount of the acquiring company's common stock and/or other securities may be sold short."

Category: Long Short Equity
Fund: Laudus Rosenberg Value Long/Short Equity I

"The Fund seeks to increase the value of your investment in bull markets and in bear markets through strategies that are designed to limit exposure to general equity market risk...The Fund attempts to achieve its objective by taking long positions in stocks of certain capitalization ranges...principally traded in the markets of the United States that AXA Rosenberg has identified as undervalued and short positions in such stocks that it has identified as overvalued. Under normal circumstances, the Fund will invest at least 80% of its net assets (including, for this purpose, any borrowings for investment purposes) in equity securities. When AXA Rosenberg believes that a security is undervalued relative to its peers, it may buy the security for the Fund's long portfolio. When AXA Rosenberg believes that a security is overvalued relative to its peers, it may sell the security short by borrowing it from a third party and selling it at the then-current market price. AXA Rosenberg's quantitative investment process is designed to maintain continually approximately equal dollar amounts invested in long and short positions...AXA Rosenberg will determine the size of each long or short position by analyzing the tradeoff between the attractiveness of each position and its impact on the risk characteristics of the overall portfolio."

Appendix A (contd.)
Excerpts from hedged mutual fund prospectuses

Category: Other (Multi-Strategy)
Fund: Comstock Capital Value Fund A

"The Fund seeks to maximize total return, consisting of capital appreciation and current income...The Fund invests in, and may shift frequently among, a wide range of asset classes and market sectors. These include foreign and domestic equity and debt securities, money market instruments and derivatives. The Fund is classified as a diversified portfolio, but is not managed as a balanced portfolio...The Fund may use either long or short positions in pursuit of its objective. The Fund's investment performance will depend in large part on the asset allocation selected by the portfolio managers...The Fund may make short sales...with the expectation that the security's value will decline...The Fund intends to invest in derivatives...The Fund may use derivatives to hedge various market risks. Derivative strategies the Fund may use include writing covered call or put options or purchasing put and call options on securities, foreign currencies or stock indices. The Fund may also purchase or sell stock index futures contracts or interest rate futures contracts and may enter into interest rate or forward currency transactions. In addition, the Fund may purchase futures and options on futures and may purchase options on securities or securities indices for speculative purposes in order to increase the Fund's income or gain."

Category: Dedicated Short Bias
Fund: Leuthold Grizzly Short Fund

"The Grizzly Short Fund sells stocks short...The aggregate amount of its outstanding short positions typically will be approximately equal to, or slightly less than, its net assets. When the Fund's outstanding short positions equal its net assets it is "100% short."...the Grizzly Short Fund utilizes a disciplined, unemotional, quantitative investment approach. The Grizzly Short Fund believes that in all market conditions there will exist some companies whose stocks are overvalued by the market and that capital appreciation can be realized by selling short those stocks. However, the best overall results typically will be achieved in declining stock markets. In rising stock markets the risk of loss is likely.