Lessons from Hedge Fund Registration

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Abstract

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We find that hedge funds filing form ADV in 2006 had better past performance and had more assets than non-filers – supporting the assertion that filing is a potential signal of quality. Consistent with the intent to provide information relevant to detecting operational risk, we find a strong positive association between potential conflicts and past legal and regulatory problems in the ADV database.

Next, we use capital structure and investment flows to examine the theory that ADV filing may simply provide redundant information already available to lenders, counter-parties, equity investors and share purchasers. Funds with past legal and regulatory problems have a more concentrated management structure and less average leverage than their "non-problem" counterparts, suggesting that some market participants are able to distinguish problem from non-problem funds. On the other hand, there is no evidence in the flow-performance relationship to suggest that hedge fund share investors are able to do so. Thus ADV filing by hedge funds may be useful to some sectors of the market but not to others.

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Abstract

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I. Introduction

One of the most important challenges to U.S. financial market regulators in recent years has been the question of hedge funds. As the scale and influence of hedge funds in the global financial marketplace has grown over the past decade, and fiduciary U.S. institutions such as pensions funds and endowments have turned to them for enhanced returns, regulators have increasingly sought to define and control these investment vehicles.[2] In the on-going dialogue over the pros and cons of hedge fund activity, the U.S. SEC in particular has tried to walk a fine line between allowing the invisible hand of the market establish the level and type of disclosure demanded of investment managers, while at the same time seeking to require a minimum framework of transparency. On December 2, 2004, the SEC passed a resolution requiring a SEC filing by a large portion of the hedge fund industry by February 1st, 2006. A number of hedge funds complied with this requirement by submitting form ADV to the SEC. This is a form that is required of registered investment companies in the United States but previously not required of many hedge funds as they were not previously registered. On June 23, 2006, The U.S. District Court of Appeals in Washington D.C. ruled that the definitions used to require such disclosure were inconsistent with the Commission's own guidelines. As a result, it is unlikely that future filings will take the current form or be as comprehensive as this first – and perhaps only – set of hedge fund disclosures.

As a result, the February 2006 ADV filings by a large number of hedge funds present a rare -- perhaps unique -- opportunity to examine the fundamental question of whether such disclosure is necessary or warranted. They contain a wealth of information

[2] According to Lipper TASS Inc. hedge fund assets have grown to over $1 trillion in 2005.

previously unavailable to the general public about fund characteristics such as potential conflicts of interest and past legal and regulatory problems. Both of these relate directly to the stated purpose of the disclosure which was "deterrence of fraud," "keeping unfit persons from using hedge funds to perpetrate fraud," and "adoption of compliance controls," or more generally the avoidance of operational risk.

In this paper we use the 2006 ADV filings, along with a comprehensive database of hedge fund characteristics and historical performance, to explicitly test the premise of the SEC filing requirement, namely that the information provided by this disclosure is relevant to market participants in avoiding operational risk. The alternative hypothesis is that the marketplace has already effectively disseminated this information through other means -- ranging from networks of informal contacts, to fee-based due-diligence research services. In other words, are ADV filings simply redundant and expensive, or do they provide valuable, otherwise inaccessible information to participants in the market for hedge fund services which allows them to avoid investing in potentially fraudulent firms?

In brief, we find evidence that the information in the form has the potential to add value to the investor decision-making process. Hedge funds filing form ADV in 2006 had better past performance and had more assets than non-filers, suggesting that filing alone is a potential signal of quality. Consistent with the regulatory intent to provide information relevant to detecting operational risk, we find a strong positive association between potential conflicts and past legal and regulatory problems. In addition, this relationship is asymmetric. Measures of potential conflict are associated cross-sectionally with lower historical performance in problem funds but not significantly with non-problem funds.

These results highlight the value in finding an instrument for operational risk that might be used to forecast performance. To this end we use canonical correlation to construct a time-series of operational risk scores for hedge funds in the TASS database over nine one-year intervals by mapping a rotation of the variables reported in the ADV filings to characteristics of hedge funds available in real-time in TASS. We examine the prospective historical performance, conditional on observable instruments for operational risk. Funds with higher values of the operational risk instrument under-performed out-of-sample. This would suggest that the information in the ADV filings, even when projected into the space of observed variables, is valuable to hedge fund investors.

It is important to stress that, in a setting in which investors are willing to pay for information that helps in choosing good funds and avoiding funds with operational risks, one might expect that the demand for (and price of) such information to be endogenous. In fact, one the role of financial intermediaries such as funds-of-funds and external due-diligence consultants is to distinguish among managers according to criteria that include the potential for operational risk. Perhaps, then, the ADV filings provide economically redundant, albeit academically interesting information. What's more, since we identify in this paper an operational risk instrument constructed from observable fund characteristics that can separate good and bad performance, perhaps existing market data alone is sufficient for market purposes.

To test this "redundancy" proposition, we use both hedge fund capital structure and the time-series of investment flows. We hypothesize that equity and debt investors in hedge funds are able to distinguish among funds with differing potential for operational risk given the pre-ADV information available from databases and research services.

Consistent with this theory, we find that funds with past legal and regulatory problems have a more concentrated management structure and less average leverage than their "non-problem" counterparts. This suggests that some market participants, such as equity fund investors and prime brokers extending credit, are able to distinguish problem from non-problem funds.

We next test the proposition that the fund investors themselves are able to distinguish problem from non-problem funds. To do so, we use the well-known flow-performance relationship. All things being equal, the information redundancy hypothesis implies that problem funds with good performance should experience lower net inflows than non-problem funds with good performance. We find no evidence that this is so. Taken together, these results suggest that the marketplace for information about the operational risk characteristics of hedge funds may in fact be segmented. While financial institutions and equity investors may already have the ability to evaluate operational risks, hedge fund share investors may not. As envisioned by regulators, ADV filing by hedge funds may thus help level the informational playing field.

II. Form ADV, Operational Risk and Related Research

The December, 2004 SEC resolution referred to above required that any hedge fund based in the United States with assets over $25 million and a lockup period less than two years,[3] as well as any internationally based fund with at least fourteen U.S. based investors, file form ADV[4] with the SEC, which is the same form used by all investment advisors. The ADV forms themselves contain information with regards to potential

[3] The two year lockup period provision was included for venture capital and private-equity firms; however, hedge fund managers have been lengthening their lockups to two years to avoid the filing requirement. See http://www.businessweek.com/magazine/content/04_52/b3914039_mz011.htm

[4] http://www.sec.gov/rules/final/ia-2333.htm

conflicts of interest, both internal and external, any past regulatory or legal problems of both the hedge fund management company and any of its related advisors and a wealth of specific ownership data. Previously, some hedge funds filed either voluntarily or were required to do so as a result of other specific institutional definitions.[5] The burden of filing the 35 page form is considerable. According the Phil Goldstein, the hedge fund manager who successfully challenged the requirement in court, the ADV form "…asked for everything from 'your last small-pox vaccination to every dirty joke you got on E-mail'"[6]

Although onerous, form ADV requests information potentially highly relevant to assessing the operational risk of the investment manager. The International Association of Financial Engineers defines operational risk as "losses caused by problems with people, processes, technology, or external events."[7] More specifically, these include the risks of failure in the internal operational, control and accounting systems, failure of the compliance and internal audit systems and failure of personnel oversight systems – i.e. employee fraud and misconduct. For example, losses due to rogue traders (e.g. Barings, National Australia Bank and Allied Irish Bank[8]) and failures due to management fraud (e.g. Enron), and reputational injury such as the 2004 mutual fund timing scandal (e.g. Putnam) can all be thought of as operational risk events. These are distinct from market

[5] These limited hedge fund filings have already been used by academic researchers: Brunnermeier and Nagel (2003) use these filings to analyze the actions of hedge funds during the technology bubble.
[6] Eisinger, Jesse, 2006, "Long and Short: A David Toppled Hedge-Fund Rule, But was Goliath Really So Bad?" *New York Times* June 28, 2006, C1.
[7] INTERNATIONAL ASSOCIATION OF FINANCIAL ENGINEERS, Report of the Operational Risk Committee: Evaluating Operational Risk Controls, CONCLUSIONS AND FINDINGS ON THE TOPIC OF: "How should firms determine the effectiveness of their operational risk controls?", November 2001, www.iafe.org
[8] The management failures associated with the rogue trading losses at National Australia Bank are well documented (APRA 2004, PWC 2004). Allied Irish Bank experienced a loss of almost $700 million due to trading losses by one trader. See http://en.wikipedia.org/wiki/AIB_Group.

risk such as, for example, Long Term Capital's failure due to credit exposure. Market risks are presumabl measurable using quantitative risk models while operational risk has no direct numerical proxy.

To the extent that operational risks are not directly quantifiable, their assessment necessarily relies upon intangible variables. Assessing personnel risk is perhaps the most difficult. Historical behavior and current opportunity are both potentially important inputs to this assessment. Past manager behavior may include previous fiduciary decisions, as well as previous legal and regulatory actions taken against the manager, and any other variable that might be correlated to the propensity to make future illegal or unethical decisions in one's own interests at the expense of a client, partner or lender. Such tendencies are, of course, partly manageable within an organization through internal control and external compliance procedures, however the risk of individual fraud is likely to increase with opportunity. In particular, as potential conflicts of interests between manager and investor increase, operational risk increases as well – holding control and compliance constant. Thus, although the questions in form ADV might seem by some to be unduly personal and burdensome, they reflect the fact that measurement and assessment of operational risk, particularly risk centered on human intent and tendencies to act unethically or illegally, is difficult.[9] In particular, form ADV requires disclosure of past criminal charges against management personnel, including the nature, severity and disposition of past charges. It also requires disclosure of past regulatory actions taken

[9] Despite being difficult to quantitatively assess, there is ample evidence that operational risk is considered important in the financial marketplace. Fontnouvelle et al. (2003a, 2003b) find operational losses for banks are large and significant. In fact, the authors find the capital charge for operational risk is often larger than the charge for market risk. Lewis and Lantsman (2005) study the use of unauthorized trading insurance. They find banks and insurance companies value unauthorized trading differently, which has caused a slow adoption of this operational risk insurance product.

against the firm or its personnel, including the regulatory body and the nature of the sanction. It also requires disclosure of past civil judicial action, past bond action and past arbitration relating to the firm. While none of these variables in isolation capture personnel-related operational risk, presumably together they provide document evidence of past adverse behavior by the firm or by those whom it currently employs.

Another key set of variables we study in this paper seek to capture conflicts of interest. This issue has been the subject of considerable research in the setting of investment banking. Dugar and Nathan (1995) and Michaely and Womack (1999) among others have examined how investment banking conflicts affect stock analyst recommendations. They find clients of analysts are more likely to receive positive coverage. In contrast, Lin and McNichols (1998) find no difference between the recommendations of analysis when comparing the clients and non-clients groups. Gompers and Lerner (1997) find little evidence of conflict of interest in the venture capital industry: the investment bank's affiliation to the public offering has no negative impact on the initial offering's performance.

A number of variables relating to potential conflicts of interest are required by form ADV. In particular, the form asks whether any employee or entity controlled by the firm is affiliated with another type of financial institutions such as a broker-dealer, mutual fund or limited partnership. It asks about participation in clients' transactions; including proprietary interest in transactions, sales interest in transactions, brokerage discretion, and custody of client assets. In each of these cases, the potential exists for the manager to influence client decisions, or make decisions on the clients behalf that benefit the manager at the expense of the client.

Another set of variables we examine in this paper relate to the ownership and governance structure of the investment company. Most of the current research on this relationship focuses on the mutual fund industry, where such information is readily accessible. Cremers et. Al. (2005) find that mutual funds with high director share ownership perform better. Ding and Wermers (2006) find that the ratio of independent directors on mutual fund boards predicts out-of-sample performance. Khorana and Servaes (2006) find that out-of-sample performance is correlated with managerial ownership. Although there is widespread belief in the hedge fund industry that the size of the managerial stake in the fund is a potential proxy for good governance, such information is not generally available from hedge fund information vendors and no academic study to our knowledge has been able to empirically examine this issue. Form ADV requires detailed information both about direct ownership of the firm and indirect ownership of the firm.

III. Data

We obtained data for this study from two sources. The first is the Lipper TASS, Inc. database from various time periods. We use the February, 2006 TASS data to match management companies with the SEC ADV filings. The TASS database contains information on 4,019 live hedge funds and 2,491 defunct hedge funds, along with their management companies. Data on individual hedge funds include their returns, assets (in most cases), lock up period, subscription and redemption periods, indication of a high water mark and other characteristic data. TASS files also include the management company name and address. In addition to the February, 2006 TASS dataset, we also use

eight previous TASS datasets. These nine datasets together cover the 1998 to 2006 period, which allow us to capture the changes of fund characteristic data over time.

The second major source of data is the SEC advisor website.[10] Each ADV contains information on an investment management company. The filing consists of twelve items and also includes at least 3 schedules.[11] Items 1 through 6 contain descriptive information on the firm, including its address, structure, number of employees in various positions and a breakdown of investor types. Items 7 and 8 look at potential conflicts of interest of the firm. Item 9 examines the custody of various assets while Item 10 looks at the control persons of the firm. Item 12 is for SEC to look at the regulation's effect on "small businesses."

Item 11 is of particular interest as it identifies any "problems" its management or related advisory affiliates have, including felonies, investment related misdemeanors or any agency, SEC, CFTC, or self-regulatory issues. If the firm answers yes to any of the questions on Item 11, it must also file a DRP, which expands on the problem identified in Item 11. Schedule A includes the direct owners and executive officers of the firm, Schedule B lists the indirect owners of the firm and Schedule D includes a list of other business locations, other locations of records, previously non-listed control persons and a list of the limited partnerships in which the firm participates (see appendix for details).

ADV data was downloaded directly from the SEC website and imported automatically into a useable dataset.[12] To identify ADVs belonging to hedge fund

[10] The SEC advisor website can be found at http://www.adviserinfo.sec.gov/IAPD/Content/IapdMain/iapd_SiteMap.aspx

[11] There are additional forms if the company has a "problem" as defined later in the paper or if the company also filed with a state agency.

[12] Date was downloaded in March and April 2006. It is important to note the ADVs are dynamic in that the SEC will update the information on the Investment Advisor website as soon as new information is available. Thus, the data downloaded in the future will not exactly match the data used in this study.

companies, a two phase search criteria was implemented. Using the management company information in TASS, we first searched for the management company listed for each fund. If that search was unsuccessful, we then searched for any unique names that appeared in the fund's name. In a majority of cases the company was identified using just the management company information.[13] Note since the requirement to register began on February 1, 2006, our searches only encompassed the live database. To insure matches, one fund listed in the TASS dataset had to be matched to a fund listed on the ADV.[14]

After searching, we are able to identify 893 management companies out of 1,697 listed in TASS or 52.3% of the ADV database. Those management companies represent 2272 (56.5%) of the 4,019 live funds in the live TASS database. The unmatched TASS funds were predominantly funds with less than the $25 million in assets and lockups shorter than two years, or foreign companies with less than fourteen or more US investors.[15]

<Insert Table I about here>

Table I provides descriptive statistics on both the matched and live TASS databases as well as their differences. While the returns of the matched dataset are slightly higher and the standard deviation of returns for matched funds slightly lower,

[13] We did not explicitly keep track of this breakdown, but estimate fewer than 15% of all matches were made using the fund name.
[14] Some of the ADV filings did not list any funds. In these cases, the name and address of the ADV was used to verify a match.
[15] As of the beginning of April 2006, we were unable to match around 100 management companies in TASS with US addresses and over $25 million in assets. There are a variety of reasons for these companies not to be registered, including a lockup period charge, a reduction in assets or an error in the TASS database.

neither is significantly different from the other. Skewness and kurtosis are also insignificantly different; however, the autocorrelation of matched funds is significantly higher, perhaps indicating more illiquid portfolios.[16] The average size of the matched funds as well as the average minimum investment amount, is also not significantly different for the matched and total TASS samples.

Several other variables show differences, however. Three liquidity measures – lockup period, subscription frequency period and redemption frequency period – are all significantly longer for the matched funds, which may due to more of the matched funds being onshore, as onshore funds have more share restrictions. The average high water mark level is higher and average leverage is higher for the matched database. Management fees are slightly but significantly lower for the matched fund sample while incentive fees are significantly higher. All of these are consistent with filing funds being of higher quality than non-filing funds.

IV. Tests and Results

A. Defining "Problem" Funds

In order to examine the relationship between conflict of interest variables and legal and regulatory problems, we first need to define funds as "problem" funds and "non-problem" funds. These are reported in Table II.

<Insert Table II about here>

[16] See, for example, Getmansky, Lo and Makarov (2004)

Problem funds are those whose management companies answered yes to any of the questions on Item 11 in form ADV while non-problem funds answered no to all of the same questions. Problems covered on Item 11 of the ADV form include any past felony or financial related misdemeanor changes or convictions. The form also includes questions concerning any SEC, CFTC, federal or state agency or other regulatory disciplinary action as well as civil lawsuits. Of the 2,272 funds in our sample, 358 have management firms that answered yes to at least one question on Item 11 or approximately 15.8% of our sample.[17] The percentage of funds with problems is not being driven by only a few management companies. Of the 893 management companies, 128 companies, or 14.3%, have answered affirmatively to a question on Item 11.

This incidence rate may seem high, but it is actually lower than for the entire ADV sample. Using all ADV data from the SEC website compiled by a third party company, we were able to determine the problem rate for the entire ADV universe.[18] The population of ADVs consists of 10,295 registrations. Of those, 1,526 have indicated some type of problem. This is 14.8% of all ADVs, which is 1% more than the percentage of our hedge fund sample. This is a potentially useful perspective on the relative operational risks in the hedge fund industry compared to the larger investment management universe – it supports the contention by the hedge fund industry that the operational problems are no higher than in other investment management businesses.

Panel A of Table II examines the performance differences and fund characteristics between problem and non-problem funds. There is no significant difference in terms of standard deviation or autocorrelation returns, however both the mean return and the

[17] These results were also run excluding fund of funds as their structure is different than hedge funds. There are no material differences between those results and the reported results.
[18] This data was compiled by the company on March 17th, 2006.

Sharpe ratio are significantly lower for funds with a problem. This performance differential in raw returns is somewhat mitigated when returns are adjusted for TASS style category averages.[19] Once we trim outliers from the data, the performance differential is no longer significant at traditional confidence levels. With regard to size, problem funds are, on average, larger but the difference is not significant. Problem funds are significantly older, and their average incentive fee is lower than non-problem funds. High water marks are also significantly lower for problem funds.

Panel B focuses on external relationships that represent potential conflicts of interest. It reports the frequencies for questions such as whether the manager has a related broker/dealer, investment company, investment advisor commodities broker, bank or insurance company, or is the sponsor of an LLP. The frequency with which problem funds answered yes to these questions is universally higher than for non-problem funds. For example, while 74.7% of problem funds have a related investment advisor, only 41.3% of non-problem funds have the same issue. A similar dispersion exists for whether the firm has a related investment company – 50.4% versus 16.0% for problem and non-problem funds respectively.

Panel C focuses on internal potential conflicts of interest. The variable AgencyGrossTrans for example, asks whether a broker-dealer buys and sells broker clients' securities to advisory clients. Only 2.3% of non-problem funds have this potential conflict of interest while over 31% of problem funds do. Recommending securities to clients in which a related party has some ownership interest

[19] The numbers adjusted by the style average:
Problem funds: Excess Sharpe ratio = -0.047, Excess average monthly return = -0.049
Non-Problem Funds: Excess Sharpe ratio = 0.008, Excess average monthly return = 0.010
p-value: Excess Sharpe ratio = 0.02, Excess average monthly return = 0.15

(RecSecYouOwn) also has a large difference with 25% more problem funds exhibiting this conflict. As in panel B, all of the differences between problem and non-problem funds are statistically significant. The striking result of Panels B and C is the strong relationship between legal and regulatory problems and various measures of internal and external conflicts of interest. "Other Research" for example is a conflict variable in that it represents services obtained from a broker-dealer that the fund uses for its transactions. It is strongly significant. It would suggest that the potential for conflicts of interest can lead to operational risk events, as measured by legal and regulatory problems. This may be due to an actual higher incidence of fraudulent activity by managers of problem funds, or alternatively it could be due to the fact that the simple presence of apparent conflicts of interest attracts more regulatory scrutiny and litigation.

Panel D examines the ownership and capital structure differences between the two groups. The first part of the panel provides information about the equity ownership of the firm. Problem funds have a higher number of direct and controlling owners.[20] Interestingly, the number of direct owners in the form of non-individual domestic entities (directdomestic) is higher for problem funds than it is for non-problem funds. This implies that problem firms are more likely to be structured as a venture or partnership with another institution. It also has the effect of allowing owners to hide their names from the ownership list, although it does not exempt them from reporting. Finally, the percentown75% variable, which is the percentage of owners that own 75% of the company, is larger for problem funds. This means problem funds also have more concentrated management, i.e. there tends to be one large owner as compared to a group of smaller owners.

[20] The definition of a controlling owner is set by the SEC. This is not a flag set by the company itself.

Panel D also provides information about the debt of the firm. Problem firms have lower leverage and less margin than non-problem firms – consistent with the hypothesis that lenders provide less credit to problem firms. We investigate this relationship in more detail below.

<Insert Table III about here>

The frequencies in Table II are interesting, but they are not a direct estimation of the determinants of problem vs. non-problem funds. For example, one important issue in Table II is that the differences between problem and non-problem funds may be driven by differences in style or fund type. For instance, perhaps funds-of-funds attract more regulatory scrutiny, or have a different capital structure simply because their business is different that that of direct managers. Table III reports the results of a probit estimation with the dependent variable being one if the fund is a problem fund and zero if the fund is a non-problem fund. All models in the estimation include style dummies (unreported) to control for style differences. Model 1 includes only the manager and fund characteristic variables. Size is not significant while the lack of a high water mark and lower incentive fees are related to a fund having a problem. The association between past problems and lower incentive fees is interesting in the context of the redundancy hypothesis because it might indicate that that the market rationally incorporates the information about the fund's past problems and requires compensation for future operational risk in the form of lower fees. This relationship is not driven by the fact that funds-of-funds have lower

fees. One of the style categories used for control purposes in the probit is the fund-of-fund classification.

Model 2 adds the first operational risk variable. The relationship variable is one if the fund has one of the external relationship conflicts of interest listed in Table III and zero otherwise. RecSecYouOwn is one if the fund recommends securities in which a related party has an ownership interest, BuySellYourOwn is one if the company buys and sells between itself and clients and OtherResearch is one if the fund uses external research. The coefficients on all of these variables are large, positive and statistically significant, indicating a positive relationship between potential conflicts of interest and legal or regulatory problems.

Model 3 adds two ownership variables to the model and exchanges the AgencyGrossTrans variable for the BuySellYourOwn variable. These two variables are highly correlated and unreported results indicate the AgencyGrossTrans variable dominates the BuySellYourOwn variable. AgencyGrossTrans is one if the fund performs agency cross transactions. Percentowner75 is the percentage of direct owners who own at least 75% of the company. If there is only one owner, the percentage is 100% versus 0% for a company with no large owner. Direct Domestic is the number of domestic entities listed as direct owners.

The AgencyGrossTrans variable is highly significant and positive, which again indicates internal conflicts of interest are related to fund problems. The two ownership variables are also positive and significant. Funds with concentrated management are more likely to be problem funds and funds with higher number of domestic corporations listed as owners are more likely to be problem funds. In the context of the redundancy

hypothesis, this suggests that it may be difficult to find large equity partners to take a significant stake if you have a checkered legal and regulatory past.

One question one might have regarding the results in the table is whether the results are affected by survival bias. Because the filing requirement for the ADV form and the most recent data from TASS are from the same time, only live funds filed ADVs. To overcome this limitation, we supplemented our original dataset with the TASS dataset from February 2005 in the hope some funds filed early or voluntarily. We examine which funds from the Live database in February 2005 moved to the Defunct database in our original dataset from February 2006. After excluding funds with no management information in either dataset, we found 126 funds that died over the nearly one year period. While the sample size is small, and significance levels thus lower, the results for this select sample of "disappeared" funds were substantially the same for the broader sample.[21]

B. Leverage and Operational Risk

One test of the redundancy hypothesis is whether financial institutions such as prime brokers are able to distinguish between funds with higher and lower operational risk. To examine this, we explore whether there are differences in the leverage of problem and non-problem funds. In Table II, we noted a significantly different frequency in the reported use of leverage by problem and non-problem funds. This zero-one

[21] We performed a number of additional robustness checks. First, we considered whether more recent legal and regulatory problems were more relevant than older ones. We found this to be the case: the correlation between conflicts of interest and legal and regulatory problems was lower for funds with problems that occurred before 2002. We also checked to see if a few large firms were driving the results by removing 3 management companies representing 48 of the problem funds, or approximately 15% of the sample. The removal of these three large companies had no meaningful effect.[21] We checked to see if extreme returns were driving results by winsorizing the top and bottom 1% of returns. Results again were unaffected.

variable does not take into account the degree of leverage, however, nor does it control for fund style. Given the wide disparity in the market risk of different hedge fund styles, this control is crucial. In particular, funds-of-funds are less likely to employ leverage, and more likely to be problem funds.

<Insert Table IV about here>

Table IV reports the results of several tests of the relationship between fund leverage and measures of operational risk. Panel A reports tests for mean differences in three leverage measures between problem and non-problem funds. The first [Leveraged] uses a zero-one variable reported in form ADV as the measure of leverage. The second [Avg. Leverage] is the average fund leverage reported by TASS. The third [Maximum Leverage] is the maximum leverage of the fund reported by TASS. The test is applied to all funds in the matched sample, then to a sub-set which excludes funds-of-funds, and finally to a set for which the top 5% in terms of leverage are dropped from the sample. Notice that the difference in the zero-one leverage variable is largely explained by funds-of-funds. Once these are excluded from the analysis, the leveraged variable is insignificant, but differences in average leverage and maximum leverage are both significant at traditional confidence levels. Windsorizing at the 5% level of leverage shows that the significance is not driven by outliers.

Panel B of Table IV reports two multi-variate regressions using different specifications for operations risk. For each year, we use TASS data to construct an operational risk measure (z-score). This independent variable is calculated using the raw

coefficients from the previous canonical analysis. This procedure is described in more detail later in the paper. We then perform cross-sectional regressions to predict leverage, controlling for style differences. Thus, the operational risk score is a function of contemporaneously observable data, rather than of retrospective 2006 ADV-disclosed data. The dependent variable in each regression is the average fund leverage. Both the average leverage and operational risk z-score are updated each year using the each fund's new values. Unreported style dummies, as defined by TASS, and style dummies using a clustering-based style classification procedure are included for to control for style differences.[22] The inclusion of style dummies controls for the average leverage of each hedge fund style. Thus, for example, if fixed income funds typically used more leverage than merger arbitrage funds, this would be captured by the style dummies.

The results in panel B of Table IV clearly show that problem funds and funds with high operational risk scores constructed from database variables observable at the time are correlated to differences in leverage and further that these differences in leverage are not due to fund style differences, defined in various ways. Although the way that style is defined (either self-reported or classified by a clustering algorithm) makes a difference in overall explanatory power, both approaches yield significant coefficients on risk.

C. Returns and Operational Risk

[22] The style classification developed in Brown and Goetzmann (1997) and applied to hedge funds in Brown and Goetzmann (2003)is likely to err on the conservative side by attributing more leverage effects to style than economically justified. To the extent that higher levered funds within a style move more together, this classification will potentially group them as an independent cohort. The advantage is that this approach relies or returns and thus is not biased by any systematic mis-reporting of style.
[24] We have a TASS dataset each year from 1998-2006. We use the 1998 dataset for 1994-1997.

Up to this point we have documented strong cross-sectional relationships among variables disclosed in form ADV by hedge funds, and have modeled the likelihood of legal and regulatory problems as a function of incentives, conflict of interest variables and ownership structure. These tell us little so far about the actual returns to investment.

Table V reports the result of a regression in which the monthly fund return is the dependent variable, and the set of explanatory variables includes the variables identified in the probit as determinants of legal or regulatory problems. As with the probit model, style dummies are included to control for style differences. Returns are the average monthly return of the fund over its entire life. Variables that have been previously found to be related to returns are also used for control purpose: fund size (logassets), the standard deviation of the fund (stdev), and onshore (1 if the fund is based in the US and zero otherwise) are used as controls and a base specification in Model 1. Fund returns are positively related to all of these variables. Model 2 adds management and fund quality variables as well as the relationship variable.

<Insert Table V about here>

We see that the relationship variable, which is indicative of a potential external conflict of interest, is negative and significant at the 1% level. These conflict relationships are related to a 0.080% per month loss of return, or just under 1% per year. The last model adds ownership variables while continuing to use the same set of control variables. The relationship variable, as in Model 2, is positive and significant. The inclusion of ownership characteristics has caused the coefficient to decease slightly to

0.057% per month or 0.68% per year. However, this is still significant at the 10% level and is economically significant.

The addition of a domestic entity as a direct owner reduces returns by 0.074% per month or just under 1% per year. Finally, the more concentrated a fund's management the lower the returns. Both of these variables may indicate a lack of management oversight, an additional layer of protection in case of fraud or the attempt of management to hide the background of certain owners. Overall, operational risk, as measured by conflicts of interest and management structure, has a negative affect on investor returns.

Past studies have been inconsistent on whether conflicts of interest have any effect on the financial industry. One explanation is that conflicts of interest are always only *potential* conflicts of interest. Depending on the sample and situation, these conflicts may be benign in terms of their effect on returns – operational "events" are rare. To analyze this issue, we again split the data into problem and non-problem groups and re-run the third model from Table V. Again, style dummies were included to control for style differences and returns are the average returns over the life of the fund. The results for the combined model are reported for ease of comparison. This allows us to determine if there are any significant differences between the two groups. These results are reported in Table VI.

<Insert Table VI about here>

When comparing the results of problem funds to non-problem funds, we perform a Chow test to determine if the two models provided significantly better results than the

single model. The p-value of the Chow test was less than 0.01, indicating the returns of these two groups react significantly differently to these variables. One of the most significant differences between the groups is the relationship variable. For problem funds, the relationship variable is related to a huge, significant reduction in return. The same is not the case for the non-problem funds. Clearly, while a relationship conflict is either benign in the non-problem sample or is being overshadowed by the ability of other variables to indicate quality management, the relationship variable in the problem group is strongly related to lower returns.

Both problem and non-problem funds react the same to the existence of an owner with more that 75% of firm equity, although the coefficient is only statistically significant for non-problem funds. Concentrated ownership is related to a reduction of returns for both samples. The direct domestic corporate variable is significantly negative for non-problem funds, but is not significant for problem funds. By sorting on the problem funds we have already proxied on fund management quality and thus, this particular variable loses its ability to predict returns with a sample of mostly poor quality funds.

Taken together, these results suggest that a simple model of the effects of potential conflicts of interest may be insufficient – interaction of these conflicts with legal and regulatory problems makes a difference.

D. Observable Proxies for Operational Risk

The results in Tables V and VI indicate ADV proxies for operational risk are negatively related to historical returns. They thus represent an important possible

forecasting variable for investors. Although these variables were not reported in publicly available databases prior to 2006, other variables were. Information such as fund style, size, age, types of investments and so forth could be obtained from leading data vendors such as TASS. In this section, we examine the potential for constructing an instrument for operational risk using these observed variables. This allows us to retrospectively examine the performance of "problem" funds. In addition, given the most recent court decision regarding SEC requirements for hedge funds to file, the instrument based on TASS or other databases may be the only thing available to investors going forward with which to assess operational risk. Finally, the observable instrument allows us to examine the extent to which past publicly available information alone might have been able to capture operational risk.

To construct the instrument, we use a matched data set to perform a canonical analysis using TASS variables that have been observable for years, together with the 2006 ADV data. Canonical correlation finds a rotation (or weighting) of two separate sets of variables which are maximally correlated to each other.

<Insert Table VII about here>

Panel A of Table VII reports the results of the canonical analysis. Average monthly returns from the previous year, monthly standard deviation from the previous year, size at the beginning of the period, fund age and whether or not the fund reports assets are included in the analysis as they have been previously related to fund death (Liang (2000), Brown, Goetzmann and Park (2001), Getmansky (2005)). The reported

asset variable is a binary variable with a value of one if the fund reports assets and zero if it does not. Other characteristic data from TASS, which relate to fund quality, are also included.

The correlation between the rotation of the TASS and rotation of the ADV variables is 0.41 and is significant at 1%. Hence the TASS variables, while not a perfect proxy, do have some correlation with a rotation of the ADV variables. Also reported in Panel A are the correlation between the TASS variables and their canonical representation and the correlation between ADV variables and their canonical representation. The ADV variables are almost all positively correlated with the canonical variable, indicating a higher value has more operational risk. Higher returns, standard deviation and incentive fee are all negatively correlated with the TASS canonical variable, indicating these are negatively correlated with operational risk. Thus, the canonical correlation suggests that, even though the ADV variables were not publicly available in the past, the information they capture about operational risk had at least some observable correlates.

Using the raw coefficients from the canonical analysis, we are able to examine the historical relationship between returns and an operational risk proxy. Instead of assuming the TASS characteristic data was static over time, we utilize nine different TASS datasets[24] over a period of nine years to use the most accurate characteristic data related to each fund at each time period. We use returns from the most recent TASS dataset however, as they are the most complete and accurate.[25]

[25] This procedure would also eliminate much of the backfill bias. If the fund was not included in the TASS dataset for a particular year, the fund will be removed from the analysis even if there are now returns for that particular year in the latest return file.

From 1994 to 2005, we compute the canonical coefficient each year using the raw coefficients from our original analysis on the matched sample. This variable will be related to the operational risk of the fund as defined by the ADV form. We then regress this operational risk variable on fund returns after adjusting the returns by subtracting the average fund return for each fund's particular style.[26] We begin in 1994 as TASS began keeping defunct funds in their dataset that year. Panel B of Table VII reports the results of this analysis.

Over the entire twelve year history, the average coefficient is -1.37, which is significant at the 5% level, and the average r-square is 1.00%. Hence, just as was found in our limited one-year cross-sectional sample for 2006, operational risk is negatively related to fund returns. Of the twelve years, the operational risk variable is negatively related to returns in ten of the years. The two years in which the variable is positive are 1998, which was an extremely difficult year for hedge funds due to the Russian debt crisis and the near collapse of the LTCM, and 2000 when the technology bubble burst. They are also years of great attrition of hedge funds, which would eliminate *ex-post* some of the riskiest funds in the sample – a selection bias that is know to induce a spurious *ex-post* cross-sectional relationship between risk and return.

These results suggest that, while it may be difficult to construct a perfect proxy for ADV conflict variables going forward, in the absence of such filings there may still be some capacity to forecast differences in future hedge fund returns based on observable characteristics. An important caveat is, of course, that return differentials are not adjusted for market risk.

[26] Alternative specifications of the canonical analysis were performed, including specifications including adjusted returns. These alternatives resulted in the same relationship between operational risk and returns.

E. Investor Flows and Operational Risk

In the analysis thus far, we have found evidence that the operational risk variables in ADV filings by hedge funds are potentially relevant to expectations about returns. At the same time we have also found evidence that equity investors and lenders to problem funds are able to differentiate them from no-problem funds. Problem funds are more likely to have less average and maximum leverage, and are more likely to have an owner with an ownership stake greater than 75%. These results are consistent with the redundancy hypothesis i.e. that, absent ADV filings, information exists which would allow major debt and equity investors to separate funds along the dimension of operation risk. Our canonical correlation analysis shows one such separating mechanism that relies upon existing (albeit costly) hedge fund databases. In this section we ask whether individual investors are able to differentiate between problem and non-problem funds absent the ADV filing information. We have already found some evidence consistent with this ability. Problem funds have lower incentive fees, perhaps because they have to compensate for reputational issues. A more powerful test of the redundancy hypothesis, however, is to check whether investor flows respond equally to good performance by problem and non-problem funds.

<Insert Table VIII about here>

Table VIII reports the result of a flow-performance regression applied separately to problem and non-problem funds.[27] Monthly flow is defined as the percentage change in assets in a given month net of asset returns assuming beginning of month investment. This is regressed on the rank for the fund within style, separated into three segments to allow for High, Middle and Low performance. This separation is due to considerable previous evidence in the mutual fund sector that the flow-performance relationship is stronger for higher-ranked funds. Next we include the operation risk score constructed via canonical correlation, and a set of interaction terms taking the product of the operation risk score with the rank. Note that there is no apparent or significant difference between the flow-performance and the operational risk score, nor is there a consistent pattern in the interaction terms.

V. Conclusion

The hedge fund industry has enjoyed tremendous growth over the past several years. This growth led to an in-depth review of hedge fund activities by the SEC that resulted in 2004 in the first significant regulatory filing requirement for hedge funds by the SEC. The ADV forms filed by hedge funds in February, 2006 have provided considerable information about major U.S.-based hedge funds, particularly with respect to operational risks. These include potential conflicts of interest, ownership and capital structure and past legal and regulatory actions involving the management firm or related advisors. In this paper we address the question of whether this mandated disclosure was relevant to market participants. In particular, we test the hypothesis that the disclosures

[27] See, for example, Sirri and Tufano (1998), Chevalier and Ellison (1999) who apply this to mutual funds.

provided redundant information to equity investors, lenders and share investors in hedge funds.

Among our major findings is a strong statistical relationship between Hedge funds with problems tend to have more potential conflicts of interest. This is consistent with the expectation that opportunity for self-interested behavior leads to legal and regulatory violations. We also found evidence that the returns to problem funds were lower than for non-problem funds, once we controlled for a number of other variables. These conclusion should be tempered, however with a consideration of reverse causality: legal and regulatory scrutiny may be higher for funds with institutional connections and multiple lines of business. To address this issue, we split the sample into problem and non-problem funds and found indeed that the relationship between returns and operational risk proxies held only for problem funds and not for non-problem funds.

We tested the redundancy hypothesis in several ways. We examined differences in ownership structure and found that problem funds had a higher likelihood of an owner with a stake greater than 75 percent, and more indirect ownership. This is consistent with less access to equity capital by problem funds. We next examined differences in leverage. Controlling for the effects of style and the issues of retrospective definition of operation risk, we found strong evidence that problem funds and funds with higher operational risk tended to have lower average leverage.

Because the ADV filings by hedge funds were unavailable prior to 2006 and will likely be unavailable in the future, we regard it as important to determine whether correlated instruments can be constructed from observable variables. This allowed us to test return effects over past years and to test whether there is is possible to forecast power

operation risk scores going forward. We find that canonical correlation analysis is a useful tool for both purposes. We find operational risk is significantly negatively related to returns over the 1994-2005 period. These results, however are dependent upon access to databases such as TASS – something that hedge fund share investors might not have access to – at least not at the cost of the ADV filings, which is zero.

Finally we test whether share investors are able to distinguish among problem and non-problem funds. We perform flow-performance regressions to determined whether a positive flow response to good historical performance is any less for problem funds. Presumably it would be if operational risk were an important factor in the investor decision-making process. We find no difference between flow response a stark contrast to the results obtained for equity investors and lenders which suggested that the market had the capacity to distinguish problem and non-problem funds.

Our answer to the question of whether the SEC requirement for hedge funds to file form ADV was useful or not is "yes" and "no." Prior to the ADV filing there is strong evidence suggesting that the marketplace for information about operational risk was working at some level. Indeed the existence of research firms performing due diligence services and the existence of a number proprietary data vendors of hedge fund data amply demonstrates the active marketplace for this information. A deeper question is whether such disclosure should be mandated. Should the informational playing field for hedge fund investors of all types be level?

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Table I: Descriptive Statistics of TASS Data

This table contains basic statistics. Matched funds are those with an ADV for their management companies, which is a total of 2272 funds. Return is the average return over the life of the fund. Autocorr is the 1st order autocorrelation of the fund's returns. Mfee is the management fee reported in percent. Ifee is the incentive fee also reported in percent. Min Invt is the minimum investment of the fund and assets are the assets of the fund in dollars. Leverage, Margin and High water Mark are one if the fund uses leverage, uses margin or has a high water mark, respectively. Lockup Period is measured in months. Sub frequency is the subscription frequency measured in days and red freq is the redemption frequency also measured in days.

	Matched Funds				All TASS Live Funds				
	N	Mean	Median	Std Dev	N	Mean	Median	Std Dev	Diff	p-value
Return	2256	0.96	0.83	0.79	3998	0.93	0.79	0.88	0.03	0.13
Std Dev	2253	2.72	2.00	2.28	3992	2.78	2.06	2.38	-0.06	0.29
Skewness	2244	0.01	-0.04	1.14	3975	0.01	-0.06	1.11	0.00	0.90
Kurtosis	2235	2.63	1.05	6.58	3958	2.57	0.97	6.21	0.06	0.74
Autocorr	2216	0.14	0.14	0.20	3919	0.12	0.13	0.20	0.02	0.00***
Sharpe Ratio	2253	0.39	0.30	0.72	3992	0.34	0.28	0.59	0.05	0.02**
Mfee	2272	1.38	1.50	0.51	4019	1.44	1.50	0.58	-0.06	0.00***
Ifee	2272	17.16	20.00	6.19	4019	16.27	20.00	6.87	0.89	0.00***
Min Invt	2269	1.25	0.50	8.06	4012	3.84	0.40	112.93	-2.59	0.15
Assets	1974	186.89	54.73	428.47	3503	181.11	48.00	439.36	5.78	0.63
Leverage	2272	0.57	1.00	0.50	4019	0.56	1.00	0.50	0.01	0.06*
Margin	1724	0.47	0.00	0.50	2938	0.44	0.00	0.50	0.03	0.12
High water Mark	2272	0.80	1.00	0.40	4019	0.76	1.00	0.43	0.04	0.00***
Lockup Period	2272	4.42	0.00	6.65	4019	3.55	0.00	7.00	0.87	0.00***
Sub Freq	2253	36.19	30.00	25.51	3972	34.43	30.00	25.22	1.76	0.00***
Red Freq	2258	83.55	90.00	86.17	4001	69.21	30.00	75.76	14.34	0.00***

***, **, * Significant at 1%, 5% and 10% respectively

Table II: Comparison of "Problem" and "Non-Problem" Funds

This table reports averages, medians and t-test values for various data. "Problem" funds are any fund whose management company answered "Yes" to any of the questions on Item 11 of the ADV form. "Non-Problem" funds are all other matched funds. Panel A reports results for performance statistics. Avg Return, std dev, 1st order AC and Sharpe ratio are the average return of the fund, the standard deviation, the first order autocorrelation and Sharpe Ratio of fund over its life. Panel B reports results for external conflicts of interest, while Panel C breaks down internal conflict data. Broker/Dealer is one if the fund has a related broker/dealer. Investment Comp is one if the fund has a related Investment Company. Investment Advisor, Commodities Broker, Bank, Insurance and Sponsor of LLP are one if the fund is related to one of these companies respectively. BuySellYourOwn is one if the company buys and sells between itself and clients. BuySellYourselfClients is one if a related party buys/sells securities also recommened to the fund. RecSecYouOwn is one if the fund recommends securities in which a related party has an ownership interest. AgencyGrossTrans is one if the fund performs agency cross transactions. RecUnderwriter is one if a related party recommends securities to clients in which they are the underwriter. RecSalesInterest is one if a related party recommends securities with a sales interest. OtherResearch is one if the fund uses external research. Panels D and E look at fund/manager characteristics and governance/ownership variables respectively. High water Mark, leveraged and margin are one if the fund has a high water mark, uses leverage or uses margin. Diect Owners is the number of direct owners. Controlling is the number of controlling owners. Percent own 75% is the percentage of owners that own at least 75% of the fund. Domestic Direct Corp is the number of domestic corporations listed as direct owners. Indirect owners is the number of indirect owners.

Panel A: Performance Statistics and Fund/Manager Characteristics

	"Problem" Funds			"Non-Problem" Funds				
	N	Mean	Median	N	Mean	Median	Diff	p-value
Avg Return	356	0.89	0.80	1898	0.98	0.84	-0.09	0.05**
Std Dev	354	2.60	1.79	1897	2.74	2.08	-0.14	0.28
1st order AC	349	0.14	0.15	1863	0.14	0.14	0.00	0.82
Sharpe Ratio	354	0.33	0.29	1897	0.39	0.30	-0.06	0.01**
AUM ($mm)	325	218.23	58.74	1647	180.23	54.00	38.00	0.20
Age (Years)	358	5.65	4.50	1912	4.99	3.92	0.66	0.01***
Min Investment ($mm)	358	0.98	0.50	1909	1.30	0.50	-0.32	0.35
Management Fee (%)	358	1.37	1.25	1912	1.38	1.50	-0.01	0.63
Incentive Fee (%)	358	15.23	20.00	1912	17.52	20.00	-2.29	0.00***
High Water Mark	358	0.69	1.00	1912	0.82	1.00	-0.13	0.00***
Lockup Period (months)	358	4.07	0.00	1912	4.48	0.00	-0.41	0.24

Panel B: External Conflicting Relationships

With:	"Problem" Funds N	% Yes	"Non-Problem" Funds N	% Yes	Diff	p-value
Broker/Dealer	359	73.8	1912	24.8	49.0	0.00***
Investment Comp	359	50.4	1912	16.0	34.4	0.00***
Investment Advisor	359	74.7	1912	41.3	33.4	0.00***
Commodities Broker	359	53.5	1912	20.3	33.2	0.00***
Bank	359	40.4	1912	9.8	30.6	0.00***
Insurance	359	39.8	1912	9.4	30.4	0.00***
Sponsor of LLP	359	56.8	1912	22.2	34.6	0.00***

Panel C: Internal Conflicts

	"Problem" Funds N	% Yes	"Non-Problem" Funds N	% Yes	Diff	p-value
BuySellYourOwn	359	30.1	1912	8.4	21.7	0.00***
BuySellYourselfClients	359	85.2	1912	69.6	15.6	0.00***
RecSecYouOwn	359	74.9	1912	50.8	24.1	0.00***
AgencyGrossTrans	359	31.2	1912	2.3	28.9	0.00***
RecUnderwriter	359	69.4	1912	46.8	22.6	0.00***
RecSalesInterest	359	22.6	1912	15.7	6.9	0.00***
RecBrokers	359	45.7	1912	38.4	7.3	0.01***
OtherResearch	359	81.3	1912	69.9	11.4	0.00***

Panel D: Ownership/Capital Structure

	"Problem" Funds N	Mean	Median	"Non-Problem" Funds N	Mean	Median	Diff	p-value
Direct Owners	359	7.85	7.00	1912	6.44	5.00	1.41	0.00***
Controlling	359	8.47	7.00	1912	6.46	5.00	2.01	0.00***
Percent own 75%	357	0.73	1.00	1912	0.50	0.50	0.23	0.00***
Domestic Direct Corp	359	0.80	1.00	1912	0.50	0.00	0.30	0.00***
Indirect Owners	359	2.26	1.00	1912	1.38	0.00	0.88	0.00***
Leveraged	358	0.51	1.00	1912	0.58	1.00	-0.07	0.03**
Margin	273	0.36	0.00	1449	0.49	0.00	-0.13	0.00***
Personal Capital ($mm)	104	1.18	0.00	622	2.64	0.00	-1.46	0.02**

***, **, * Significant at 1%, 5% and 10% respectively

Table III: Probit Model Analysis on the "Problem" Variable

Probit results are reported in this table. The dependent variable in all Models is one if the fund has a "problem," while it is zero if the fund does not have a "problem." The model is modeled such that the results aim to fit the "problem" set of data (ie. 1) . Log(Assets) is the log of the assets under management in dollars. High water mark is a one if the fund has a high water mark. The mean return is the average return over the life of the fund. Incentive fee is the fund's incentive fee in percent. Relationship is one if the fund has any external conflict of interest listed in Table 3. AgencyGrossTrans is one if the fund performs agency cross transactions. RecSecYouOwn is one if the fund recommends securities in which a related party has an ownership interest. BuySellYourOwn is one if the company buys and sells between itself and clients. OtherResearch is one if the fund uses external research. Percentowner75 is the percentage of direct owners who own at least 75% of the company. Direct Domestic is the number of domestic corporations listed as direct owners. Unreported style dummies were included to control for style differences.

	Model 1		Model 2		Model 3	
	coefficient	Chi-Sq	coefficient	Chi-Sq	coefficient	Chi-Sq
Log(Assets)	0.012	0.37	-0.023	1.18	-0.005	0.05
High Water Mark	-0.193	4.99**	-0.111	1.39	-0.140	2.01
Mean Return					0.063	1.39
Incentive Fee	-0.039	22.82***	-0.039	21.16***	-0.038	18.58***
Relationship			0.790	68.88***	0.682	46.43***
AgencyGrossTrans					1.418	123.73***
RecSecYouOwn			0.313	14.32***	0.333	15.03***
BuySellYourOwn			0.679	45.91***		
OtherResearch			0.321	10.03***	0.256	5.78**
Percentowner75					0.554	37.59***
Direct Domestic					0.128	8.74***
Pseudo R-squared	3.97%		16.62%		25.73%	
Num Obs	1971		1971		1954	

***, **, * Significant at 1%, 5% and 10% respectively

Table IV: Operational Risk and Leverage

Table IV reports the results of several tests of the relationship between fund leverage and measures of operational risk. Panel A reports tests for mean differences in three leverage measures between problem and non-problem funds. The three measures are "Leveraged" which is a zero-one variable reported in form ADV. The second [Avg. Leverage] is the average fund leverage reported by TASS. The third [Maximum Leverage] is the maximum leverage of the fund reported by TASS. The test is applied to all funds in the match sample, then to a sub-set which excludes funds-of-funds and finally to a set for which the top 5% in terms of leverage are dropped from the sample. Panel B reports two multi-variate regressions using different specifications for operations risk. The dependent variable in each is the average leverage of each fund as reported by TASS. The independent variable is calculated using the raw coefficients from the previous canonical analysis. Both the average leverage and operational risk z-score are updated each year using the each fund's new values. Unreported style dummies, as defined by TASS, and style dummies using the Brown Goetzmann style classification procedure are included for to control for style differences.

Panel A: Univariate Tests

All Funds in Matched Sample	**Problem**		**Non-Problem**		**Diff**	**P-val.**
	N	Mean	N	Mean		
Leveraged	358	0.51	1912	0.58	-0.07	0.029
Avg. Leverage	273	53.53	1449	85.49	-31.96	0.009
Maximum Leverage	273	98.21	1449	141.02	-42.81	0.002
Only Hedge Funds	**Problem**		**Non-Problem**		**Diff**	**P-val**
	N	Mean	N	Mean		
Leveraged	266	0.61	1532	0.61	-0.005	0.877
Avg. Leverage	220	64.81	1201	95.65	-30.84	0.015
Maximum Leverage	220	119.59	1201	159.18	-39.59	0.045
All Funds in Matched Sample						
Winsorized top 5%	**Problem**		**Non-Problem**		**Diff**	**P-val.**
	N	Mean	N	Mean		
AvgLeverage	273	44.54	1449	65.31	-20.77	0.000
MaxLeverage	273	82.45	1449	108.63	-26.18	0.003

Panel B: Multi-variate Tests
Canonical Risk Measure Predicting Leverage

Year	**TASS style Dummies**		**B-G Style Dummies**	
2005	-18.04	***	-6.39	***
2004	-28.87	***	-35.16	***
2003	-24.76	***	-33.38	***
2002	-17.36	***	-26.96	***
2001	-21.75	***	-27.21	***
		***		***
Average	-22.16		-25.82	
Avg Adj, R-squared	13.74%		2.61%	
Avg, Obs.	2279		2279	

Table V: Conflicts, Ownership and Fund Returns

This table reports regression results with a fund's monthly mean return as the dependent variable. Log(Assets) is the log of the assets under management in dollars. Std Dev is the standard deviation of a fund's returns over the life of the fund. Onshore is one if the fund is based in the United States. Incentive fee is the fund's incentive fee in percent. High water Mark is a one if the fund has a high water mark. Relationship is one if the fund has any external conflicts of interest. Direct Domestic is the number of domestic corporations listed as direct owners. Percentowner75 is the percentage of direct owners who own at least 75% of the company. Unreported style dummies were included to control for style differences.

	Model 1		Model 2		Model 3	
	coefficient	t-value	coefficient	t-value	coefficient	t-value
Log(Assets)	0.093	11.57***	0.095	11.84***	0.095	11.85***
Std Dev	0.167	24.29***	0.167	24.17***	0.166	24.26***
Onshore	0.079	2.75***	0.069	2.34**	0.077	2.67***
Lockup Period			0.003	1.46		
Incentive Fee			0.004	1.17		
High Water Mark			0.054	1.45	0.074	2.13**
Relationship			-0.080	-2.66***	-0.057	-1.87*
Direct Domestic					-0.074	-4.65***
Percentowner75					-0.103	-3.38***
Adjusted R-squared	35.40%		35.83%		36.71%	
Num Obs	1958		1958		1954	

***, **, * Significant at 1%, 5% and 10% respectively

Table VI: Conflicts, Ownership and Returns: Problem vs. non-Problem Funds

This table reports results with "Problem" funds and "Non-Problem" treated separately. As in Table 5, the fund's mean return is the dependent variable. Log(Assets) is the log of the assets under management in dollars. Std Dev is the standard deviation of a fund's returns over the life of the fund. Onshore is one if the fund is based in the United States. Incentive fee is the fund's incentive fee in percent. High water Mark is a one if the fund has a high water mark. Relationship is one if the fund has any external conflicts of interest. Direct Domestic is the number of domestic corporations listed as direct owners. Percentowner75 is the percentage of direct owners who own at least 75% of the company. Unreported style dummies were included to control for style differences.

	"Problem" Funds		"Non-Problem" Funds		Combined	
	coefficient	t-value	coefficient	t-value	coefficient	t-value
Log(Assets)	0.107	4.71***	0.103	11.44***	0.105	12.61***
Fund Age (Years)	-0.027	-2.78***	-0.018	-4.06***	-0.020	-4.91***
Std Dev	0.160	7.99***	0.178	23.18***	0.176	24.49***
Onshore	0.057	0.80	0.110	3.43***	0.103	3.50***
Incentive Fee	-0.005	-0.65	0.007	1.73*	0.004	1.09
High Water Mark	-0.033	-0.35	-0.008	-0.19	-0.009	-0.24
Relationship	-0.668	-5.41***	-0.023	-0.72	-0.064	-2.07**
Internal Conflict	-0.049	-0.65	0.105	2.65***	0.053	1.52
Direct Domestic	0.010	0.19	-0.082	-4.94***	-0.073	-4.51***
Percentowner75	-0.146	-1.58	-0.090	-2.68***	-0.100	-3.25***
Chow test p-value	<0.01					
Adjusted R-squared	38.12%		38.76%		37.40%	
Num Obs	321		1618		1939	

***, **, * Significant at 1%, 5% and 10% respectively

Table VII: Canonical and Time Series Analysis of TASS and ADV Data

This table reports the results of a canonical analysis relating operational risk ADV data to the observable TASS data. Panel A reported the results of the canonical analysis using 2,279 matched funds. Panel B reports regression results from 1994 to 2005 using 9 different TASS datasets. The dependent variable is the yearly return of each fund minus the average return for each fund's respective style. The independent variable is calculated using the raw coefficients from the canonical analysis. This value is updated each year using the each fund's new values. Returns, are the average monthly returns from the previous year and standard deviation is the monthly standard deviation from the previous year. Age and size are the values from the end of the previous period. Other characteristic data is from the same period as the analysis. Reports Assets is a binary variable with a value of one if the fund reports assets and zero if they do not.

Panel A: Canonical Correlation Results

TASS Variables		ADV Variables	
Previous Returns	-0.27	AgencyGrossTrans	0.06
Previous Std. Dev.	-0.36	RelBrokerDealer	0.24
Fund Age	-0.10	RelInvestComp	0.25
Log of Assets	0.09	RelInvAdvisor	0.24
Reports Assets	0.07	RelCommod	0.44
Incentive Fee	-0.89	RelBank	0.39
Margin	-0.29	RelInsur	0.42
Audited	-0.21	RelPartSponser	0.27
Personal Capital	-0.26	BuySellYourOwn	0.06
Onshore	-0.11	BuySellYourselfClient	-0.12
Open to Inv.	0.04	RecSecYouOwn	0.32
Accepts Managed Accts	-0.13	RecUnderwriter	0.24
		RecSalesInterest	0.28
		RecBrokers	-0.35
		OtherResearch	-0.69
Correlation Between		PercentOwner75	0.17
TASS and ADV Panels	0.41	DirectDomestic	0.28

Panel B: Regression Results

Year	Operational Risk Coefficient
1994	-2.261
1995	-0.710
1996	-1.524
1997	-4.094
1998	2.159
1999	-2.838
2000	2.593
2001	-1.338
2002	-2.298
2003	-4.279
2004	-1.233
2005	-0.638
Average Value	-1.372**
Average Adjusted R-squared	1.00%
Average Observations	1338

***, **, * Significant at 1%, 5% and 10% respectively

Table VIII: Operational Risk and Flow Analysis

Table VIII reports flow results using data from 1994-2005. Flows are computed annually using the following formula:

$$Flow_t = \frac{(Assets_t - Assets_{t-1} * Return_t)}{Assets_{t-1}}$$

Assets and returns are computed in the fund's native currency to avoid exchange rate affects. Low Rank, Mid Rank and High Rank are computed as $Min(Rank_{t-1},0)$, $Min(Rank_{t-1} – Low\ Rank, 0)$ and $Min(Rank_{t-1} – Mid\ Rank – Low\ Rank, 0)$ respectively, where $Rank_{t-1}$ is the percentile level of the previous year's performance in the fund's TASS style. Std. Dev. is the previous year's monthly standard deviation. Flows to Category is the average flow to that fund's particular style in year t. Log Assets is the log of the previous end of period's assets and Management fee is the current management fee level. Operational Risk z-score is computed each year per the previous specification. Model A includes the operational risk z-score only whereas Model B also includes three interaction terms. Both models are run using the Fama and MacBeth (1973) framework.

	Model A				Model B		
	Coefficient	T-Value			Coefficient	T-Value	
Low Rank	0.603	5.23	***		0.639	6.28	***
Mid Rank	0.978	6.01	***		0.982	6.31	***
High Rank	0.911	6.13	***		0.894	4.75	***
Std. Dev. of monthly returns	-0.022	-5.43	***		-0.023	-6.17	***
Flows to Category	0.687	8.49	***		0.688	8.35	***
Log Assets	-0.118	-6.66	***		-0.118	-6.75	***
Management Fees	-0.045	-3.71	***		-0.044	-3.52	***
Operational Risk Z-score	-0.006	-0.85			0.027	1.06	
Low Rank/Z-score interaction					-0.015	-0.12	
Mid Rank/Z-score interaction					-0.194	-1.80	*
High Rank/Z-score interaction					0.085	0.70	
Adjusted R-squared	14.00%				14.16%		
Number of Observations	966				966		

Appendix A: Variable Definitions

Variable Name	Num		Question on ADV
RelBrokerDealer	739	7.A.1	You have a *related person* that is a broker-dealer, municipal securities dealer, or government securities broker or dealer
RelInvestComp	486	7.A.2	You have a *related person* that is an investment company (including mutual funds)
RelInvAdvisor	1057	7.A.3	You have a *related person* that is an other investment adviser (including financial planners)
RelCommod	581	7.A.4	You have a *related person* that is a futures commission merchant, commodity pool operator, or commodity trading advisor
RelBank	332	7.A.5	You have a *related person* that is a banking or thrift institution
RelAcct	72	7.A.6	You have a *related person* that is an accountant or accounting firm
Rellawyer	122	7.A.7	You have a *related person* that is a lawyer or law firm
RelInsur	323	7.A.8	You have a *related person* that is an insurance company or agency
RelPension	95	7.A.9	You have a *related person* that is a pension consultant
RelRealEst	146	7.A.10	You have a *related person* that is a real estate broker or dealer
RelPartSponsor	628	7.A.11	You have a *related person* that is a sponsor or syndicator of limited partnerships
BuySellYourOwn	268	8.A.1	Do you or any *related person* buy securities for yourself from advisory *clients,* or sell securities you own to advisory *clients* (principal transactions)?
BuySellYourselfClients	1637	8.A.2	Do you or any *related person* buy or sell for yourself securities (other than shares of mutual funds) that you also recommend to advisory *clients*?
RecSecYouOwn	1240	8.A.3	Do you or any *related person* recommend securities (or other investment products) to advisory *clients* in which you or any *related person* has some other proprietary (ownership) interest (other than those mentioned in Items 8.A(1) or (2))?
AgencyGrossTrans	156	8.B.1	Do you or any *related person* as a broker-dealer or registered representative of a broker-dealer, execute securities trades for brokerage customers in which advisory *client* securities are sold to or bought from the brokerage customer (agency cross transactions)?
RecUnderwriter	1144	8.B.2	Do you or any *related person* recommend purchase of securities to advisory *clients* for which you or any *related person* serves as

			underwriter, general or managing partner, or purchaser representative?
RecSalesInterest	382	8.B.3	Do you or any *related person* recommend purchase or sale of securities to advisory *clients* for which you or any *related person* has any other sales interest (other than the receipt of sales commissions as a broker or registered representative of a broker-dealer)?
RecBrokers	899	8.D	Do you or any *related person* recommend brokers or dealers to *clients*?
OtherResearch	1629	8.E	Do you or any *related person* receive research or other products or services other than execution from a broker-dealer or a third party in connection with *client* securities transactions?
ReferalComp	1664	8.F	Do you or any *related person*, directly or indirectly, compensate any *person* for *client* referrals?
ConvictedFelony	6	11.A.1	In the past ten years, have you or any *advisory affiliate* been convicted of or plead guilty or nolo contendere ("no contest") in a domestic, foreign, or military court to any *felony*?
ChargedFelony	8	11.A.2	In the past ten years, have you or any *advisory affiliate* been *charged* with any *felony*?
ConvictedInvMisd	1	11.B.1	In the past ten years, have you or any *advisory affiliate* been convicted of or plead guilty or nolo contendere ("no contest") in a domestic, foreign, or military court to a *misdemeanor* involving: investments or an *investment-related* business, or any fraud, false statements, or omissions, wrongful taking of property, bribery, perjury, forgery, counterfeiting, extortion, or a conspiracy to commit any of these offenses?
ChargedInvMisd	0	11.B.2	In the past ten years, have you or any *advisory affiliate* been *charged* with a *misdemeanor* listed in 11.B(1)? (Question above)
SECFalseStat	24	11.C.1	Has the SEC or the Commodity Futures Trading Commission (CFTC) ever *found* you or any *advisory affiliate* to have made a false statement or omission
SECViolation	64	11.C.2	Has the SEC or the Commodity Futures Trading Commission (CFTC) ever *found* you or any *advisory affiliate* to have been *involved* in a violation of SEC or CFTC regulations or statutes?
SECCausedDenyAuth	2	11.C.3	Has the SEC or the Commodity Futures Trading Commission (CFTC) ever *found* you or any *advisory affiliate* to have been a cause of an *investment-related* business having its

			authorization to do business denied, suspended, revoked, or restricted?
SECOrderAgainst	38	11.C.4	Has the SEC or the Commodity Futures Trading Commission (CFTC) ever entered an *order* against you or any *advisory affiliate* in connection with *investment-related* activity?
SECCivilMoneyPenalty	64	11.C.5	Has the SEC or the Commodity Futures Trading Commission (CFTC) ever imposed a civil money penalty on you or any *advisory affiliate*, or *ordered* you or any *advisory affiliate* to cease and desist from any activity?
AgencyFalseStat	34	11.D.1	Has any other federal regulatory agency, any state regulatory agency, or any *foreign financial regulatory authority* ever *found* you or any *advisory affiliate* to have made a false statement or omission, or been dishonest, unfair, or unethical?
AgencyViolation	162	11.D.2	Has any other federal regulatory agency, any state regulatory agency, or any *foreign financial regulatory authority* ever *found* you or any *advisory affiliate* to have been *involved* in a violation of *investment-related* regulations or statutes?
AgencyCausedDenyAuth	7	11.D.3	Has any other federal regulatory agency, any state regulatory agency, or any *foreign financial regulatory authority* ever *found* you or any *advisory affiliate* to have been a cause of an *investment-related* business having its authorization to do business denied, suspended, revoked, or restricted?
AgencyOrderAgainst	160	11.D.4	Has any other federal regulatory agency, any state regulatory agency, or any *foreign financial regulatory authority* in the past ten years, entered an *order* against you or any *advisory affiliate* in connection with an *investment-related* activity?
AgencyRevokeLicense	12	11.D.5	Has any other federal regulatory agency, any state regulatory agency, or any *foreign financial regulatory authority* ever denied, suspended, or revoked your or any *advisory affiliate's* registration or license, or otherwise prevented you or any *advisory affiliate*, by *order*, from associating with an *investment-related* business or restricted your or any *advisory affiliate's* activity?
SelfFalseStat	10	11.E.1	Has any *self-regulatory organization* or commodities exchange ever *found* you or any *advisory affiliate* to have made a false statement or omission?
SelfViolation	98	11.E.2	Has any *self-regulatory organization* or commodities exchange ever *found* you or any *advisory affiliate* to have been *involved* in a violation of its rules (other than a violation

			designated as a *"minor rule violation"* under a plan approved by the SEC)?
SelfCausedDenyAuth	11	11.E.3	Has any *self-regulatory organization* or commodities exchange ever *found* you or any *advisory affiliate* to have been the cause of an *investment-related* business having its authorization to do business denied, suspended, revoked, or restricted?
SelfRevokeLicense	27	11.E.4	Has any *self-regulatory organization* or commodities exchange ever disciplined you or any *advisory affiliate* by expelling or suspending you or the *advisory affiliate* from membership, barring or suspending you or the *advisory affiliate* from association with other members, or otherwise restricting your or the *advisory affiliate's* activities?
OtherProfRevoked	0	11.F	Has an authorization to act as an attorney, accountant, or federal contractor granted to you or any *advisory affiliate* ever been revoked or suspended?
Ongoing	58	11.G	Are you or any *advisory affiliate* now the subject of any regulatory *proceeding* that could result in a "yes" answer to any part of Item 11.C., 11.D., or 11.E.?
CourtEnjoined	17	11.H.1A	Has any domestic or foreign court in the past ten years, *enjoined* you or any *advisory affiliate* in connection with any *investment-related* activity?
CourtViolation	28	11.H.1B	Has any domestic or foreign court ever *found* that you or any *advisory affiliate* were *involved* in a violation of *investment-related* statutes or regulations?
CourtDismissed	5	11.H.1C	Has any domestic or foreign court ever dismissed, pursuant to a settlement agreement, an *investment-related* civil action brought against you or any *advisory affiliate* by a state or *foreign financial regulatory authority*?
CountOngoing	75	11.H.2	Are you or any *advisory affiliate* now the subject of any civil *proceeding* that could result in a "yes" answer to any part of Item 11.H(1)?