

Determinants of Hedge Fund Internal Controls and Fees*

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ABSTRACT

We investigate the determinants of hedge fund internal controls and their association with the fees that funds charge investors. Unlike other investment vehicles, hedge funds are subject to minimal regulation, allowing fund managers to voluntarily choose and implement internal controls, and managers and investors to freely contract on investor fees and manager compensation. Using a proprietary database of due diligence reports, we find that funds domiciled offshore are more likely to adopt stronger control mechanisms that decrease the likelihood of fraud and financial misstatements, and are more likely to use reputable outside service providers and incorporate stricter authority over the transfer of funds. We also find that internal controls vary systematically by fund leverage and fund age, and whether the fund pursues a short selling investment strategy; consistent with agency costs and the protection of proprietary information explanations, respectively. With respect to internal control outcomes, managers of funds that have restated performance receive lower management fees. Further, we find a positive association between internal controls and performance based fees, which is consistent with investors protecting against manipulated reported returns due to inadequate internal controls. Overall, this study contributes to the literature by investigating the demand and implications of internal controls in an unregulated setting.

Keywords: hedge funds, internal controls, investor fees, restatements.

Data Availability: The data used in this study are obtained from Lipper TASS and through agreement with HedgeFundDueDiligence.com. This agreement prohibits the authors from making the data available to other parties.

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I. INTRODUCTION

We investigate internal controls used in hedge funds. While there is some evidence on the determinants and consequences of internal controls use for publicly traded firms (e.g., Kinney 2000; Ge and McVay 2005; Ogneva, Raghunandan, and Subramanyam 2007), their internal controls are often mandated by the Securities and Exchange Commission (SEC) and/or by the stock exchanges on which they are listed. In contrast, hedge funds are typically not exchange traded and not registered with the SEC. Therefore, hedge funds are exempt from the regulations that other investment vehicles face, and hedge fund managers can voluntarily choose the extent of internal controls employed. Further, exemptions from these regulations provide managers and investors substantial discretion to negotiate over fees. Therefore, hedge funds provide a setting to investigate ex ante how investment contract parameters vary with an investment vehicle's internal controls.

In this study, we examine the determinants of hedge fund internal controls and the association between internal controls and the fees that funds charge investors. We use a broad definition of internal controls that encompasses mechanisms designed to decrease the likelihood of fraud and to increase the accuracy of asset valuations and performance disclosed to investors. Some examples are independent pricing of investment positions and the use of reputable service providers, such as auditors and administrators.

Although better internal controls should decrease the likelihood of fraud and the manipulation of reported performance, not all hedge funds are likely to invest in internal controls because they are costly. We predict that managers of younger funds and offshore funds are more likely to adopt stronger internal controls and reporting mechanisms, as these funds are riskier along the dimensions of fraud and financial misstatements and therefore should obtain greater benefits. Further, we posit that internal controls designed to decrease the likelihood of

misreported performance vary with the costs arising from the disclosure of proprietary information about the fund's investment strategy and positions, with funds that employ a short selling strategy being less likely to use independent pricing sources to reduce the likelihood of any outsiders knowing their short positions or strategies.

To investigate the use of internal controls in hedge funds we utilize a proprietary database of due diligence reports prepared by HedgeFundDueDiligence.com (HFDD). These reports provide an extensive array of detail regarding fund characteristics and internal controls, investment contract terms and provisions, investment style and portfolio characteristics, and fund and manager backgrounds. These due diligence investigations were commissioned by investors evaluating whether to invest in the funds. Therefore, the sample represents a set of hedge funds that were actively seeking investors and for which investors initiated due diligence to evaluate the backgrounds, contract terms, and internal controls of the funds.

We observe substantial variation in the use of internal controls. Offshore funds are more likely to use control mechanisms that decrease the likelihood of fraud and financial misstatements, to incorporate stricter signature authority for the transfer of funds, to use independent pricing mechanisms, and to employ more reputable outside service providers. These findings are consistent with investors demanding greater internal controls for funds that are not subject to the U.S. legal systems. Also, consistent with agency cost arguments we find evidence that younger funds and levered funds employ stronger internal control mechanisms. Further, consistent with higher costs associated with proprietary information about investment strategies and positions, we observe that funds with a short bias investment style are less likely to utilize external parties to price their portfolios.

We argue that when considering an investment in a hedge fund, investors estimate the probability of fraud and financial misstatements, and this probability decreases in the quality of a

fund's internal controls. Consequently, we posit that managers of funds with more stringent internal controls can charge higher fees and have greater sensitivity between their fees and the fund's reported performance. Consistent with these arguments, we observe internal controls that reduce managers' opportunities to manipulate reported performance are positively associated with the percentage of investment profits received by the manager. This finding is consistent with investors mitigating moral hazard costs from manipulated reported returns when managers have greater discretion, thereby protecting against potential financial misstatements and fraud.

Further, we supplement the above analysis by examining the association between restatements and fees. Prior research considers restatements an outcome of weak internal controls (Abbott, Parker, and Peters 2004; Doyle, Ge, and MacVay 2007). Relevant to our setting, restatements are not chosen by hedge funds at the time of due diligence, making them predetermined at the point of contracting. We find funds that have restated performance receive a significantly lower percentage of assets under management for managing the fund. This result is consistent with investors protecting against the risk of future misstatements by paying lower fees.

We make several contributions. First, we contribute to understanding the costs and benefits of internal controls by investigating a broad range of internal controls and their association with fees in an unregulated setting. Present evidence on internal controls is generally based on public firms and public finance markets (Ashbaugh-Skaife, Collins, and Kinney 2007; Ashbaugh-Skaife, Collins, Kinney, and LaFond 2007; Doyle, Ge, and McVay 2007; Ge and McVay 2005; Hammersley, Myers, and Shakespeare 2008; Kim, Song, and Zhang 2008; Ogneva, et al. 2007). The limited non-public firm evidence is primarily based on the use of auditors and its affect on cost of debt financing (Allee and Yohn 2009; Blackwell, Noland, and Winters 1998; Fortin and Pittman 2007). This study differs from previous research on internal

controls in that it focuses on an unregulated setting, free from SEC requirements that can affect internal operations and investor fees. Further, hedge funds are opaque and risky investment vehicles, thereby providing a powerful setting in investigate internal control determinants and outcomes. Indeed, the operational risks, which internal controls attempt to monitor and reduce, may be more important than financial risks in determining fund performance (Lo 2001, 30–31).

Second, we extend the literature on hedge funds by examining their internal operations. In doing so, we contribute to the debate on the regulation hedge funds. In general, the SEC regards internal controls as a critical element in the protection of investors. And, it recently increased its regulatory focus on hedge funds and proposed hedge fund regulations that include the mandatory disclosures and other investor protections (Smith 2006a; Smith 2006b; Oesterle 2006). Hedge fund advocacy groups responded to these proposals by suggesting that funds follow ‘best practice’ standards determined by the funds themselves given consideration to the particular characteristics and circumstances of each fund (e.g. MFA 2005). We show predictable differences in cross-sectional use of internal controls within hedge funds in a voluntary setting, suggesting that funds systematically vary their internal controls by fund characteristics. Further, we show that internal control use by hedge funds is associated with investor fees.

The following section provides an overview of hedge funds. Section three develops the empirical predictions. Section four details the sample and its characteristics. Section five reports the results. Section six concludes.

II. HEDGE FUND SETTING

A hedge fund is a private, managed investment vehicle. Some stylistic features of hedge funds include they are often privately-held, generally comprised of wealthy individuals and institutional investors, and typically organized in the U.S. as limited partnerships and offshore as

corporations (Fung and Hsieh 1999).¹ There has been substantial growth in the hedge fund industry, both in the number of funds and assets under management (Brown, Goetzmann, and Ibbotson 1999; Fung and Hsieh 1999; Lo 2007). As of the first quarter of 2008 hedge funds held over \$2.8 trillion in assets under management (HFN 2008). Although hedge funds have grown tremendously and are under intense scrutiny regarding their operations and potential contribution to systemic risk, because of their opaqueness little is known about how they operate (Lo 2001; Chan, Getmansky, Haas, and Lo 2006).

Unlike other investment vehicles, hedge funds are structured to be exempt from public offering requirements of the Securities Act of 1933, the periodic reporting obligations of the Securities Exchange Act of 1934, and the registration requirements of the Investment Company Act of 1940 (Oesterle 2006).² For example, Section 5 of the Securities Act of 1933 requires registration of the sale of securities unless the issue qualifies for a ‘private placement’ exemption.³ Rule 506 of Regulation D provides exemption for hedge funds if they restrict their offering to only accredited investors, namely investment companies, or individuals with more than \$1 million or income exceeding \$200,000 in the two most recent years or joint income with spouse over \$300,000; and up to 35 other US purchasers.⁴ Additionally, to qualify for exemption all non-accredited investors must be determined by the fund to be sophisticated, with knowledge and experience to evaluate the prospective investment. Therefore, a more descriptive definition of a hedge fund is an investment fund exempt from a list of specific federal acts regulating investment vehicles (Oesterle 2006).⁵ To ensure exemptions from SEC regulation, hedge funds

¹ Although the early hedge funds generally held offsetting long and short positions (leading to the title “hedge funds”), hedge funds are not limited to strict long-short positions.

² For a more detailed discussion of the regulation of hedge funds see Lhabitant (2008, 37–84) and ABA (2005).

³ While issuers of private placements are required to file a Form D with SEC within 15 days after the first sale, this form contains very little detailed information about the issuance (Lhabitant 2008, 41).

⁴ Regulation S provides detailed exemptions related to issuances to non-US investors.

⁵ Providing a definition of a hedge fund based on operating characteristics is problematic given their wide variation in investment asset class, sector, duration, region, and organizational structure (ABA 2005, 1; Lhabitant 2008, 1).

cannot undertake any form of general solicitation or general advertising for their services or sale of securities to the general public, and therefore must solicit investments through private placements only to those who are sophisticated enough to evaluate the investment and have sufficient wealth to bear the risk of the investment (ABA 2005, 214–215; Lhabitant 2008).⁶

This minimal regulatory environment provides hedge funds substantially more flexibility in their operations. For example, hedge funds have greater discretion regarding valuation and reporting of their investments (McVea 2008; SEA 2003). Unlike other investment vehicles that are registered under the Investment Company Act of 1940, hedge funds have greater discretion to use leverage to finance their investment positions and can undertake substantial short-selling (Lhabitant 2008, 46).⁷ In addition, hedge funds can charge fees based on performance, whereas other investment vehicles, such as mutual funds, are restricted to fees based solely on assets under management (Fung and Hsieh 1999).⁸

When evaluating an investment in a hedge fund, investment advisors or accredited investors solicit information about the fund, with the investment terms laid out in an offering circular or “private placement memorandum” (PPM). The PPM, and the subsequent executable limited partnership agreements and subscription agreements, lay out the fund’s operations and the investor’s contractual rights: the fund’s investment strategy, the fees agreed to be paid, the

⁶ Violation of this solicitation rule may evoke registration of the sale of securities under the Securities Act of 1933, registration as a mutual fund under the Investment Company Act of 1940, and registration as an investment advisor under the Investment Advisers Act of 1940.

⁷ For example, open-end investment companies are restricted to bank sourced leverage only, with this amount capped at 300% of the asset coverage (Section 18(f)(1) Investment Company Act of 1940).

⁸ While there is a general prohibition of performance-based fees by investment vehicles under the Investment Advisers Act of 1940 section 205(a)(1), there are some exemptions provided by the Performance Fee Rule (Investment Advisers Act of 1940 Rule 205-3). Specifically, an SEC registered investment adviser or offshore fund with US investors may charge performance fees if one of the following conditions is met by the investor at the time of investment: 1) the investor has at least \$750,000 under the management of the adviser; 2) the investor has net worth in excess of \$1.5 million; or 3) the investor is a “qualified purchaser” as defined in Company Act section 2(a)(51)(A), which includes individuals who hold at least \$5 million in investments or other corporate entities and trusts that meet sufficient wealth thresholds. The Performance Fee Rule is motivated by the SEC’s belief that wealthy investors can fend themselves against potential fee abuses related to hedge fund performance (ABA 2005, 331–334).

terms that which the investor can invest and withdraw funds, the investor's ability to monitor the fund, the manner and frequency in which the fund will estimate and report performance, and the investor's remedy rights in the case of a dispute (ABA 2005, 96–98). Because hedge funds are substantively exempt from securities regulations, the terms laid out in the PPM, and subsequent executable agreements, represent the virtually all of the mechanisms in place to protect the investor's investment. Consequently, hedge funds provide a setting to examine investment fund structure and financial contracting in an unregulated environment.

III. EMPIRICAL PREDICTIONS

Hedge funds are opaque due to the limited mandatory disclosure requirements and the proprietary nature of their operations. Consequently, there is the potential for substantial agency costs between investors and fund managers. In addition, hedge funds often engage in complex trading strategies that involve large numbers of securities and/or trades thereby increasing the potential for fraud on the part of employees. Therefore, in this setting there are strong incentives to implement internal controls that increase the monitoring of managers, reduce the likelihood of fraud, and increase the accuracy of asset valuations and the performance disclosures made to investors.⁹ Consistent with the importance of hedge fund internal controls, Kundro and Feffer (2003) find that the breakdown of internal systems was a major determinant of failure for over 50% of the 100 failed funds they investigate.

The fund manager is the residual claimant on the fund. By implementing internal controls to reduce the agency costs between investors and the fund, managers can increase the value of their residual claim if the benefits of implementation, such as obtaining greater fees, are greater than the costs of implementing and maintaining internal controls. While there may be benefits to

having particular internal controls in place, not all hedge fund managers will invest or commit to using internal controls as they are costly to use and in many cases have a large fixed component (SEC 2003).

Managers of established, higher quality funds have valuable reputations and potentially superior investing technologies, implying that they hold more valuable residual claims from operating their funds than managers of lower quality funds. Therefore, managers of higher quality funds have greater incentives to prevent fraud and to provide investors with more accurate performance reports, thereby reducing the benefit for explicit internal controls. Fund quality can be signaled by past investment performance and capital flows (Fung and Hsieh 1997). Therefore, for new funds there is greater uncertainty about the quality of the manager and the likelihood that the manager will commit fraud or misstate performance. This uncertainty should increase the benefit to new funds from enacting more stringent internal controls and using reputable outside service providers. For example, Mansi, Maxwell, and Miller (2004) find that auditor quality and tenure are negatively related with the cost of debt financing, especially for firms with riskier grades of debt. Consequently, *ceteris paribus* we predict a negative association between internal controls and fund age.^{10, 11}

Although onshore and offshore funds are generally exempt from US securities regulations, investors in onshore funds can use the US legal system to redress fraud and financial misstatements. While many offshore funds are domiciled in countries that regulate investment

⁹ Note that even in the absence of agency problems internal controls can increase the precision of asset values disclosed to investors and therefore reduce uncertainty about the cash flows that investors expect to receive.

¹⁰ Smaller funds are also indicative of these features as they have had less capital inflows; however, counteracting this quality effect is the greater demand for better internal controls as the magnitude of agency costs increases. For example, research has consistently shown a positive association between better internal controls and organization size (Chow 1982; Doyle, Ge, and McVay 2007). Therefore, *ex-ante* it is unclear what the association between fund size and better internal controls will be.

¹¹ Note that this prediction is based on the assumption that either that internal control technology has improved over time and older funds find it too costly to implement newer technologies or that over time funds receive decreasing benefits from internal controls and therefore unravel internal controls over time.

vehicles and provide investors with legal regress, US legal contract enforcement mechanisms are generally considered superior (Djankov, La Porta, Lopez-de-Silanes, and Shleifer 2008).

Therefore, *ceteris paribus* we predict that funds domiciled offshore will have better internal controls because investors have reduced legal recourse to redress fraud and financial misstatements.

Some funds use leverage to increase their invested assets. Funds generally obtain leverage from investment banks and their prime brokers (Lhabitant 2008). Leverage creates another stakeholder in the fund's performance and operations. Therefore, leverage providers may demand that funds implement strong internal controls as precondition for providing credit, leading to positive relation between leverage and internal controls. However, the extent that the leverage provider has an incentive and the ability to monitor the fund manager may dampen this hypothesized association, given potential substitutability between formal internal control mechanisms and monitoring on the part of debt holders.

Finally, investment style can affect a fund's internal control choices. It is generally accepted that a hedge fund investment is essentially a bet on the fund manager's investing skill and/or proprietary investment strategies (Edwards and Caglayan 2001; Lo 2007). Therefore, a fund can incur substantial costs if outsiders acquire proprietary information about the fund's investment strategies and positions.¹² These costs are particularly relevant for funds that employ a short bias investment style. Outsiders who learn a fund's short positions can profit because the fund eventually has to unwind its short positions and the informed outsiders can therefore trade against the fund when it has to cover its short position (Dechow, Hutton, Meulbroek, and Sloan

¹² Note that hedge funds are required under Section 13(d) and Section 13(g) of the Securities Act of 1933 to report long positions relevant to corporate control and transfer, namely those with more than 5% of a class of equity security registered under Section 12 of the Securities Exchange Act 1934. Also, hedge funds with discretion over \$100 million in assets are required to disclose their long positions on a quarterly basis. However, these requirements

2001). If short bias funds take actions to protect proprietary information about investment strategies and positions, then they should limit the use of objective external verification of fund operations, such as the valuation of fund assets.¹³ Consequently, *ceteris paribus* we predict a negative association between short selling and internal controls that involve outside service providers.

In conclusion, we predict that managers of younger funds and offshore funds are more likely to adopt stronger internal controls and reporting mechanisms, as these funds are riskier along the dimensions of fraud and financial misstatements and therefore internal controls should allow managers of these funds to charge higher fees. In addition, we predict that leverage affects managers internal control decisions and that short bias funds are less likely to use external parties to value fund assets.

IV. SAMPLE

To investigate the determinants of internal controls and their association with fees we utilize a database of hedge fund due diligence reports prepared by HFDD. The reports were commissioned by investors evaluating whether to invest in the funds.¹⁴ Therefore, the sample represents a set of hedge funds that investors were actively seeking to invest capital. HFDD specializes exclusively in hedge fund due diligence and it obtained the information included in these reports from several sources including on-site visits and interviews with key staff, discussions with service providers (auditors and administrators), review of offering

are of limited proprietary risk given the disclosures are aggregated, delayed, and restricted to long positions only (Lhabitant 2008, 44).

¹³ Although service providers can and do implement mechanisms to protect the release and use of clients' proprietary information, such systems are not perfect. For example, Geczy and Yan (2006) find that such mechanisms do not completely prevent the transmission of proprietary information between brokers and market makers, while Ivashina and Sun (2007) find that institutional investors trade on proprietary information that they receive from participating in loan syndicates.

memorandums, examinations of public filings and registrations, media scans, background checks of fund managers and staff, review of financial statements, and review of internal control protocols. Consequently, this database overcomes potential concerns related to commercial hedge fund databases that are based on self-reported fund performance and manager characteristics.¹⁵ The HFDD reports provide an extensive array of detail regarding fund characteristics, internal controls, contract terms, and manager backgrounds.

Table 1 provides the descriptive statistics for the funds and managers. The sample consists of 427 funds run by 358 unique managers. Panel A shows the sample distribution by year and domicile. The funds were investigated from 2003 to 2007. Sample funds are domiciled primarily in the Cayman Islands, United States, British Virgin Islands, and Bermuda. Panel B provides a summary of fund characteristics. The mean (median) fund has \$304 million (\$107 million) in assets under management and is on average less than three years old (1,020 days) at the time of due diligence. We find 36% of our sample funds' managers are domiciled offshore; however, in contrast to manager location, most funds (84%) are located offshore. Examining the overlap between offshore managers and offshore funds, all of the onshore funds in our sample are managed by onshore managers. More than half (56.8%) of our offshore funds managed by onshore managers; however, no onshore funds are managed by an offshore manager. For multivariate analyses we create two indicator variables to reflect the joint distribution offshore funds and managers, and capture potential variation from the separation of fund and manager domicile. The first variable is coded as 1 if both the manager and the fund are offshore, and 0

¹⁴ All HFDD investigations were initiated and paid for by potential investors, there were no investigations that were commissioned by, or compensation received by, HFDD from the investigated hedge funds.

¹⁵ One concern with the database is that it consists of funds willing to be subject to due diligence. However, the management HFDD stated that it was rare for a hedge fund to refuse due diligence, given that refusal typically resulted in their clients not investing in the fund.

otherwise. The second variable is coded as 1 if the fund is offshore and the manager is onshore, and 0 otherwise.

Table 1 also provides descriptive detail on the funds' investment styles and portfolio characteristics. We observe that 54% of the funds use leverage to finance their investments. With respect to investment style, 20% of the funds have a short bias, while 36% have a long bias. In addition, there is substantial variation in the number of investment positions typically held in the funds' portfolios: 41% holding less than 40 positions, and 3% holding 1000 or more positions. There is also variation in the typical holding period for the investments made by the sample funds, with 13% holding investment positions for only days, 32% holding investment positions for greater than a year.

Hedge fund managers generally receive two types of fees. First, they receive a management fee calculated as a percentage of assets under management. For the sample the mean (median) management fee is 1.52% (1.50%) of assets under management. Second, managers receive a performance fee calculated as a percentage of investment profits. For the sample, the mean (median) performance fee is 19.34% (20.00%). To provide further descriptive detail of the fees paid to managers, Figure 1 provides cumulative distributions of the sample's management and performance fees. A large proportion of management fees are set at 1.00%, 1.50%, and 2.00%; while the majority performance fees are clustered at 20.0%.¹⁶ Finally, we find that 10% of our sample funds have restated asset values and performance disclosures that were made to investors. Overall, the characteristics of the sample are consistent with previous empirical evidence on hedge funds (Aragon 2007).

¹⁶ To address the kinks in the distributions of management fees and performance fees, in robustness tests we replace with fee measures with ordinal measures coded as 0 for below the mode of the distribution, 1 equal to the mode, and 2 for above the mode. The results are invariant to this alternative specification.

V. RESULTS

Descriptive statistics of internal controls in hedge funds

We report a comprehensive set of internal controls used in hedge funds. The first group consists of the signatures required to make transfers out of the fund's bank and prime broker account. The use of more than one signature authority and the use of external parties to authorize fund movement and withdrawals provide greater control of the cash held by the fund, thereby decreasing the likelihood of fraud. The second group relates to the mechanisms used to estimate and disclose the fund's performance to investors. This group can be further broken down into three sub-groups: who prices the portfolio; what is the source of prices used to value individual asset performance; and who calculates the portfolio's net asset value (NAV) that is reported to investors. The use of external parties and objective sources to value invested assets and the use of an independent party without manager involvement to report and verify the NAV to investors provide the most objective measurement of fund position and performance, thereby reducing the likelihood of fraud and increasing the precision of asset valuations disclosed to investors.

The third group of internal controls consists of the quality and reputation of the fund's service providers, specifically its auditor and administrator. Similar to engagements with operating firms, auditors generally undertake annual audits of hedge funds to ensure that the financial statements furnished to fund investors comply with the relevant accounting standards. However, note that in our setting auditors typically neither review nor comment on how funds value their investment positions (Lhabitant 2008). Nevertheless, auditors with good reputations have incentives to decrease the likelihood of fraud or financial misstatement on the part of their clients.¹⁷ The role of a fund administrator varies substantially across engagements; however,

¹⁷ Note that in contrast with much of the auditing literature, we assume that the reputation as opposed to the size of the auditor and/or administrator determines the quality of services provided (see Weber, Willenborg, and Zhang 2008 for a discussion). Although hedge fund service providers can be sued, the reputational loss due to fraud or

they generally provide “back-office” support, such as performing day-to-day administrative operations, accounting and valuation services, and serving as the interface with investors. In many cases the administrator also calculates the NAV using data provided by either the fund custodian or prime broker (Lhabitant 2008). Similar to auditors, we assume that administrators with valuable reputations work to decrease the likelihood of fraud or financial misstatement.

Table 2 Panel A reports the descriptive statistics for the internal controls implemented by the funds in the sample. We find that the type and number of signatures required to transfer funds out of the bank or prime broker account vary substantially across our sample. We observe 27.7% of the funds require multiple signatures from both internal and external parties, and 24.2% require only an external signature. Some funds require only internal signatures with 24.6% requiring at least two internal signatures and 23.5% requiring only one internal signature to transfer money out of the fund’s bank and prime broker accounts.

There is also substantial variation as to who prices the funds’ portfolio. We observe that 9.2% of funds use at least one internal service and one external service to price investment positions, while 62.9% use only external services to price the portfolio. We also find that 11.7% of funds use collaborative pricing, whereby an external pricing service collaborates with the fund manager to determine the value of the portfolio. Finally, 16.2% of the funds in the sample price the portfolio internally.

The HFDD reports list all price sources that the funds use to value their invested assets. We report all sources and the least objective source used by each fund. The most objective source, exchange quotes, are used (solely used) by 69.9% (34.8%) of the funds. Over-The-Counter (OTC) quotes are used (the least objective source) for 15.8% (5.9%) of the funds, while dealer quotes are used (the least objective source) for 40.2% (33.2%). Regarding proprietary

misstatement is probably larger than any damages that can be recovered especially for funds and service providers

based valuation sources, we find 14.8% (12.7%) of our sample uses (use as their least objective source) model based prices. Finally, 13.4% of our sample generates price internally. Internal pricing may be advantageous if the asset is difficult to value, allowing managers to use their superior judgment and information to provide the best estimate of the investment value. But, it provides managers with greater opportunities to manipulate reported performance. We use the least objective price source for our empirical analyses.

Who sets and reports to investors the NAV of the hedge fund's investment portfolio differs from who prices the investment positions. Pricing is done on an asset by asset basis and occurs on a routine, frequent basis, while NAV represents the net asset value of the entire portfolio and it is estimated and reported to investors typically at month end. The majority of funds (85.9%) have no manager involvement in the determination of the NAV, which represents the most unbiased approach to its calculation. However, the remaining 14.1% have some manager involvement, with most giving the manager sole determination of the setting and reporting NAV.

We now describe the use of service providers by our funds. While Big 4 auditor is typically used in accounting research to represent auditor quality (Fortin and Pittman 2007; Hogan 1997; Mansi et al. 2004), we utilize hedge fund industry specific rankings of audit firms obtained from Institutional Investor's Alpha Survey, because hedge fund auditing may require specialized skills that differ from those required to audit publicly traded firms.¹⁸ The Alpha survey is based on voting by industry participants and it is similar to Institutional Investor's ranking of equity analysts used by researchers (Hong and Kubik 2003; Stickel 1992). Of the funds in the sample, 77.0% are audited by an auditor that is ranked in the Alpha survey. We also

located offshore.

¹⁸ The correspondence between Big 4 and the hedge fund industry specific measure is 85%.

use the Alpha survey to determine the quality of fund administrator and find that 31.6% of sample utilizes a ranked administrator.¹⁹

Panel A also reports internal control use for all domiciles with more than 10 observations. In doing so, we rule out the possibility that one or more regulatory regimes require hedge funds to utilize mandated internal controls. Importantly, we observe variation across all the internal controls investigated within domicile group, suggesting that funds have discretion on all these internal control choices. Further, examining the regulation of our sample domiciles we find no mandatory requirements that would require internal control adoption investigated in this study (ABA 2005; PWC 2006). For example, the Cayman Islands have a requirement that hedge fund service providers are from an accredited registered list, but this list includes many service providers who were not ranked by Alpha Investors. Consistent with this list, we observe non-ranked auditors and administrators used by Cayman Island domiciled funds. Further, we observe a higher likelihood of engaging a ranked auditor and administrator across non-Cayman offshore funds than in US domiciled funds, suggesting that our offshore findings are not solely attributable to the Cayman Islands.

We numerically rank each of our internal controls by quality, to allow estimation of better internal controls across each of our investigated internal controls types.²⁰ These ranks are provided in Panel A. Further, to measure the overall association between more effective internal controls and their determinants we sum the individual internal controls used into an overall index score.²¹ An advantage of this approach is to enable estimation of overall internal control use and allow for potential substitutes and complements across their use. Panel B presents the descriptive

¹⁹ We also considered prime broker as a potential service provider. We found that almost all of our sample hedge funds utilized a prime broker that was ranked by the Alpha survey.

²⁰ The ordering of each item is based on the ordering provided in the due diligence reports.

statistics for summary measures of each of our internal controls and our overall internal control measure.

Table 3 reports the correlations between each of the internal controls investigated, the overall internal control measure, the independent variables, and hedge fund fees. We observe that the six internal controls are all significantly positively correlated (at $p < 0.10$, two-tailed), aside from the signature-administrator pairing. We also find that better internal controls are significantly positively correlated with funds and managers that are offshore, levered funds, and management and performance fees, and negatively correlated with fund age, and short bias in investment strategy.

Examination of determinants of hedge fund internal controls

Table 4 presents regressions modeling the determinants of internal controls used by the funds in the sample. To represent fund characteristics we use the following independent variables: the fund's assets under management; and the natural logarithm of the fund's age in days; indicators for whether the fund and fund manager are offshore and for whether the fund is offshore but the manager is onshore. To proxy for portfolio characteristics and investment style we include indicator variables for whether the fund uses leverage, whether the portfolio has a long bias, and whether the portfolio has a short bias. To control for the liquidity of the portfolio's investments we include indicator variables for typical holding period of portfolio investments, indicator variables for typical number of positions held by the fund, and year fixed effects.

Although previous research that investigates the liquidity of hedge fund investment portfolios uses a measure based on the serial correlation of self-reported monthly fund returns

²¹ In unreported results we attempted to reduce the dimensionality of the internal control variables through principal component factor analysis. While the six internal controls were positively correlated with each other, as shown in Table 3, the largest factor obtained explained only 33.9% of the overall variance in our internal controls.

(Getmansky et al. 2004), we use the series of indicators representing typical number and length of positions to avoid potential endogeneity between the serial correlation measure and internal controls. Specifically, if internal controls affect the serial correlation of reported performance by influencing the ability of the manager to smooth reported performance, then the serial correlation measure of liquidity may also be correlated with the quality of the fund's internal controls.

Panel A presents Probit regressions for the signatures required to transfer funds from the bank accounts and prime broker accounts. We find that single internal signature authority is significantly less likely to be used by offshore funds, regardless of manager domicile, consistent with offshore funds providing higher quality internal controls. Larger funds are also more likely to use single signature authority. As shown from the External Only and Dual/Triple Entity models, offshore funds and offshore managers are also more likely to require external signatures. Transaction costs appear to affect signature authority with funds that hold over 1,000 positions less likely to require external signatures. If these funds move positions regularly and are quite liquid, the requirement to have an external party authorize the transfer of funds on each occasion may be overly burdensome and costly. These funds are, however, more likely to require at least two internal signatures, because large numbers of positions increases the likelihood of fraud.

The right-most column of Panel A presents an Ordered Probit regression in which the dependent variable takes on the index values (0, 1, 2, 3) representing Single Internal, Double Internal, External Only, and Dual/Triple Entity signature authority, respectively, to enable us to determinant the overall association between more effective signature internal controls and the independent variables. Under this specification we observe that larger funds and funds that are domiciled offshore are significantly associated with increased control over signatures required to transfer funds out of bank and prime broker accounts.

Panel B presents a series of Probit regressions modeling who prices the hedge fund portfolio. We find offshore funds are significantly less likely to internally price their portfolio, and significantly more likely to use external pricing services. Levered funds are also significantly less likely to use manager sourced prices and alternatively utilize multiple external entity pricing. Furthermore, funds with a short bias in their investment positions are more likely to use internal pricing and less likely to use external pricing. This finding is likely driven by the proprietary nature of short selling and the potential for outsiders to profit from knowing that the fund has to unwind its short positions. The right-most column of the panel presents an Ordered Probit regression of overall pricing sources quality. The coefficients in this specification are consistent with the inferences from the individual pricing regressions with offshore funds and levered funds more likely to rely on external rather than internal pricing, and those funds with a short bias in their investment strategy more likely to rely on internal pricing than external pricing.

Panel C presents Probit regressions modeling the source of prices used to value the funds' portfolios. Consistent with the results for who prices the portfolio, offshore funds are less likely to use internal and model-based sources of prices, and more likely to use more dealer and exchange-based sources to value their portfolio. Funds that use leverage are less likely to use internal sources and more likely to use dealer sourced prices, consistent with hedge funds with greater agency costs having more objective pricing. Further, we observe that funds with some bias in their investment style, long or short, are less likely to use external sources, such as dealer and exchange-based prices, and more likely to use internal price sources. The right-most column of Panel C provides the Ordered Probit of overall pricing source quality. We again observe those with bias in their investment style making less use of objective prices sources, and some

evidence that small funds use less objective sources. We also observe that funds with managers domiciled offshore making greater use of more objective pricing source measures.

The left-most column of Panel D presents Probit regressions modeling whether the NAV is determined without manager involvement. We observe that managers of offshore funds, regardless manager location, are more likely to determine and report NAV without manager involvement. These findings are consistent with the pricing findings observed in Panel B and C. The remaining columns from Panel D model whether the fund uses an auditor or an administrator ranked by Institutional Investor's Alpha Survey. Larger funds and offshore funds are more likely to use a higher quality auditor and administrator. Additionally, funds that use leverage are more likely to use a higher quality auditor, while younger funds are more likely to use a higher quality administrator.

Panel E provides the Ordinary Least Squares regression modeling overall internal control quality as a function of fund characteristics. Overall, the evidence is consistent with offshore funds and managers adopting stronger internal control mechanisms to decrease the likelihood of fraud and financial misstatements, incorporating stricter signature authority for the transfer of funds, using independent pricing mechanisms, and employing more reputable outside service providers. These findings are consistent with investors demanding greater internal controls for funds that are not subject to the U.S. legal infrastructure. There is also evidence that funds that use leverage, thereby increasing the risk of their fund, also employ stronger internal control mechanisms. Overall internal control quality is weakly associated with fund age, consistent with younger funds having greater incentives to implement stronger internal controls to reduce greater concerns with adverse selection and moral hazard. Finally, short bias funds have lower quality internal controls, driven in part by these funds reducing proprietary costs that can arise from external parties learning the funds' investment positions.

Examination of the determinants of hedge fund fees

This section investigates the association between internal controls and investor fees. We predict that investors take into account the likelihood of fraud and manipulated reported performance when contracting with hedge funds and that therefore weaker internal controls are associated with lower fees and reduced fee-performance sensitivity.

Specifically, when the investor cashes out, the value of the investor's asset is revealed by the hedge fund. The greater the likelihood that the revealed value is deliberately deflated by the hedge fund to reduce the investor's claims, and therefore the asset retained by the hedge fund, the more likely investors will price protect when investing in the fund. Managers have incentives to inflate reported performance because on they collect management fees and future capital inflows based on reported assets under management and returns performance (Fung, Hsieh, Naik, and Ramadorai 2008; Getmansky et al. 2004). Therefore, we posit that more extensive internal controls improve the accuracy and precision of asset valuations and returns disclosures made to investors, decreasing the likelihood and magnitude of investor losses from managers' manipulation of reported performance.

Aside from variations in the fees paid as a proportion of assets under management, the use of internal controls may also affect the sensitivity between the fees paid to managers and fund performance. Specifically, if the manager has greater discretion or less oversight regarding the value of the fund's investments reported to investor, this will increase the opportunity for the manager to misreport the investment values for self-interested purposes. The incentive to manipulate the reported value of the investment increases with the sensitivity of managers' compensation relative to the reported value. The most obvious mechanism to vary this sensitivity is through the relative proportion of fees rewarded from investment profits, namely the

performance fee. Therefore, *ceteris paribus* we predict that internal controls that provide greater opportunity to manipulate reported performance will be negatively associated with the performance fee paid to fund managers.

Table 5 presents regressions of the determinants of hedge fund fees. For these regressions we use the same independent variables as in Section 4.2. Panel A presents ordinary least squares regressions that model the determinants of the management fee paid to the hedge fund manager, with the left-most model presenting the results with controls only, and the second model with controls and our measure of internal control quality. For exposition, we multiply the dependent by 100. Examining our overall measure of internal controls on management fees, there is no significant effect. Taken by itself, this evidence suggests that our investigated internal controls are not priced through the management fees.

Panel B presents ordinary least squares regressions that model the determinants of the performance fee paid to the manager. Examining the internal control coefficients we find that better internal controls are significantly positively associated with performance fees ($\beta = 0.261$; $p < 0.05$). This result is consistent with investors protecting against potential misstatement as a result of inadequate internal controls through lower performance fees. It is also consistent with investors and hedge funds reducing the costs from moral hazard and the motivation for managers to manipulate reported performance. This finding suggests that as the opportunity for manipulation of fund performance increases the reliance on fund performance as an incentive mechanism decreases. Performance fees are also positively associated with funds that have higher turnover in their investment portfolios.

Endogeneity

A potential concern is that our internal control measures are endogenous. While we include the variables that predict internal control quality in the model determining fees we recognize that endogeneity may affect our inferences because of simultaneity and/or correlated omitted variables. We discuss below these endogeneity concerns and how we address them.

First, our motivation for adopting our empirical design is driven by the ordering of the various parameters investigated in this study. Given fund managers have specialized expertise in particular areas of investment (Brown and Goetzmann 2003) it is unlikely that they change fund characteristics over time; therefore, making these characteristics predetermined. Internal controls are then likely chosen as a function of these fund characteristics. The management and performance fees are detailed in the PPM to investors. Investors first observe these predetermined characteristics of the fund and the internal controls used by the fund, and then decide whether to invest in the fund based on the terms and fees offered.²² In addition, given that the observed internal controls and fees are determined based on those offered to all fund investors, the likelihood that internal controls and fees vary by individual investor characteristics is low.²³

Second, to investigate the likelihood that unobserved fund characteristics determine both internal controls and fees, we adopt the approach developed by Rosenbaum (2002) to estimate a bound on the extent that omitted variables would have to be correlated with our measures in order to drive the results. Specifically, we use Kruath's (2007) calculation to estimate how large the correlation between unobserved heterogeneity and the internal control index would have to

²² There is limited ability for the fund to change these investment terms, as changes are only allowed under certain circumstances and with the majority consent of the investors (Aragon 2007). Consistent with this, empirical evidence suggests there is very limited variation in fees over time (Liang 2000).

²³ We acknowledge that some investors have greater bargaining power and are therefore able to negotiate special fees and terms. But, such fees and terms are laid out in "side letters" that are separate from the PPM. Further, some investors may negotiate a "favored nation" clause, which would result in any favorable terms contracted with other investors also granted to them, suggesting that the presence of such a clause would increase the overall cost to the fund to offer more favorable terms to some investors.

be compared to the correlation between the internal control index and the other independent variables. In order for the 95% confidence interval on the internal control index coefficient to include zero the correlation between unobserved heterogeneity and the index would have to be greater than 56% of the correlation between the index and the other independent variables. While such a correlation is possible, it is unlikely due the comprehensive measures of fund characteristics included in our independent variables.

Third, an alternative approach to address potential endogeneity when examining the determinants of internal controls and fees is to hold the investment characteristics of the fund constant, thereby ruling out that the internal controls are deterministic of, or are capturing, the underlying investment characteristics of the fund. To achieve this we reperformed our analyses only for those funds that typically held 1-40 positions, the investment positions category with the greatest number of sample funds. For these 172 funds we observe the determinants of internal controls and the association between internal controls and performance fees are consistent with the presented results for the full sample, and are consequently not reported. Additionally, we reperformed our analyses for those hedge funds that typically held their positions for one year and greater. Again, we observed that the determinants of internal control use and the association between internal controls and fees to be consistent with the overall sample.

Finally, we consider an alternative measure based on the outcomes of inadequate internal controls, namely restatements. Restatements have been used by researchers as a proxy for internal control weakness. Importantly, restatements are not chosen by hedge funds at the time of due diligence, making them predetermined. The results using restatements are reported in the right-most columns of Table 5. Examining the right-most column of Table 5 Panel A, we observe a statistically significant negative relationship between management fees and whether

the fund has restated the performance reported to investors ($\beta = -0.227; p < 0.05$). This relationship between restatements and management fees is also economically significant. For example, for the mean fund restatements of reported performance is associated with \$692,000 less in management fees per annum. This finding is consistent with investors regarding restatements being indicative of internal control problems (Doyle, Ge, and McVay 2007). The observation of restated performance by the hedge fund increases the likelihood that future fund performance may also be restated and reduces confidence in the accuracy of present and future reported fund performance. This finding is consistent with investors protecting against this risk by paying lower management fees. Therefore, this evidence demonstrates a significant association between restatements, a predetermined and observable event that occurred prior to contracting, and management fees paid by investors. However, in contrast to the management fee findings we find little evidence of a relationship between restatements and performance fees.

Unit of analysis

We perform the analyses of the determinants of internal controls and investor fees at the fund level and cluster the standard errors by manager to address any manager-related cross-correlations. Alternatively, the analyses could be performed at the manager level. To investigate the robustness of our results we reformed all the analysis using three alternative selection criteria using only observation per manager. The criteria were: 1) the first investigated fund by manager; 2) the last investigated fund by manager; and 3) an average of the dependent and independent variables by manager. For all three approaches, the results for both the determinants of internal controls and their relationship to fees are consistent with the presented findings and consequently not reported.

Representativeness

The advantage of using the HFDD reports is that they provide detailed and verified information regarding fund operations, such as internal controls, fund and manager characteristics, and investor fees. A potential issue with empirical results based on the data provided in the reports is external validity to the broader hedge fund population. To investigate external validity, we compare our sample hedge funds to a broader population of hedge funds consisting of the funds on the Lipper TASS database, which is the primary database used in academic research on hedge funds (see Lo 2007 for a discussion of the database). It should be noted that similar to our sample, Lipper TASS and other hedge fund databases do not comprise the complete universe of hedge funds as these databases consist of information self-reported from hedge funds that choose to be included in the databases. However, these datasets are an order of magnitude greater in number of reported funds and the extent to which our sample differs from these datasets will assist in evaluating the implications of our findings to the broader hedge fund population.

Table 6 compares sample funds that do ($n = 232$) and do not ($n = 195$) report performance to Lipper TASS. It presents univariate tests for differences across fund age, fund and manager location, use of leverage, investment style, management and performance fees, and internal controls. Across all these variables the only significant difference is that older sample funds have a significantly higher likelihood of reporting to Lipper TASS ($p < 0.01$), with the mean number of days being 1.252 (742) for sample funds reporting (not reporting) to Lipper TASS. An explanation for the difference across fund age is the potential for self-selection based on performance for funds that choose to report to Lipper TASS. Specifically, if older surviving funds generally have better performance, they have greater incentives to self-report to database vendors for promotion and marketing purposes. It should be noted that this significant difference

is above any other potential self-selection bias arising from HFDD being appointed to perform due diligence on a fund. Importantly, aside from the age difference, there are no obvious reasons why our results would not be representative of the population of hedge funds. In addition, we note that investors were considering an investment in the funds included in our sample.

Further controlling of investment style

While we control for fund investment style including typical holding period, number of positions, and the use of long or short bias, we examined the extent that further control of investment style influences our observed findings. Specifically, for our 232 sample observations that report to TASS we include dummy variables for each fund's investment style as classified by TASS. These investment styles include: convertible arbitrage, dedicated short seller, emerging markets, equity market neutral, event driven, fixed income arbitrage, global macro, and long/short equity.²⁴ All the findings for the determinants of internal controls and the determinants of investor fees are robust to the inclusion of the TASS investment style dummies, and are consequently not reported.

Offshore results

In the presented analyses we categorize the domicile of the hedge fund into on- and offshore. We examine the robustness of our findings by replacing the fund domicile variables in the reported analyses with indicator variables for each country with ten or more funds. Our results are not altered by the inclusion of country dummies.

²⁴ Evidence on hedge fund returns suggests very few distinct investment styles (Brown and Goetzmann 2003; Fung and Hsieh 1997). We include all available investment styles on Tass to specifically address concerns that differences in investment style is driving our study findings.

VI. CONCLUSION

We investigate the determinants and internal controls of hedge funds and their association with the fees that funds charge investors. To achieve this, we utilize proprietary due diligence reports commissioned by sophisticated investors. These reports are based on interviews, analysis of contract terms and financial position, third party sources, and publicly available filings. The multi-faceted nature of this data provides a substantial detail regarding fund characteristics and operations, and internal controls and overcomes potential concerns of other hedge fund datasets that are solely based on self-report, unverified information.

Consistent with our predictions, we find that managers of funds domiciled offshore adopt stronger mechanisms to decrease the likelihood of fraud and financial misstatements, incorporate stricter signature authority to transfer funds, use external pricing services, and use more reputable outside service providers. We also observe levered funds and younger funds are more likely to have stronger internal controls. Further, we find that funds that have a short bias investment strategy are less likely to employ independent pricing sources. We suggest this is driven by greater proprietary costs from others trading against the short positions of these funds.

In regard to outcomes from internal control weaknesses, we observe funds that have restated performance charge lower management fees. Further, we find a positive association between the quality of internal controls and the performance fees rewarded to managers, consistent with investors protecting against potential financial misstatements by placing less emphasis on the reported performance when internal controls are less likely to detect or prevent managers from manipulating reported performance. Overall, this study contributes to our understanding by investigating the demand and implications of internal control use in an unregulated setting.

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FIGURE 1
Cumulative Distribution Functions of Management and Performance Fees

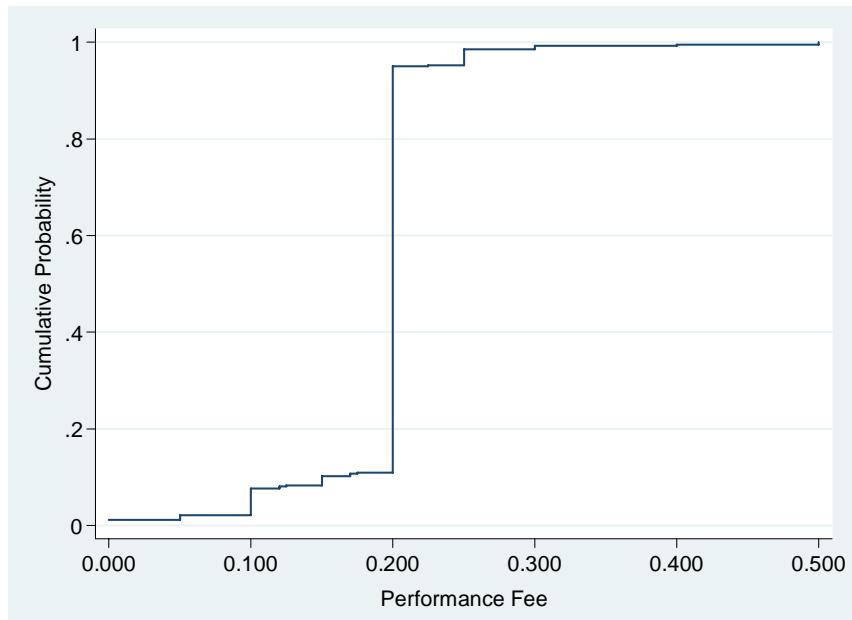
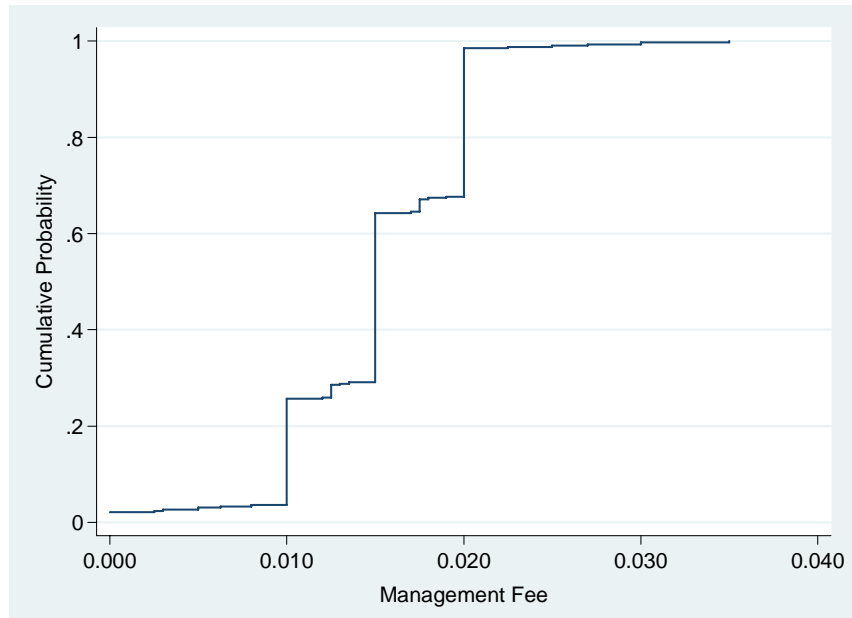


TABLE 1
Descriptive Statistics of Hedge Funds

Panel A: Year and Domicile of Funds

| Year | Funds | Domicile | Funds |
|-------|-------|------------------------|-------|
| 2003 | 110 | Cayman Islands | 251 |
| 2004 | 127 | United States | 70 |
| 2005 | 101 | British Virgin Islands | 50 |
| 2006 | 65 | Bermuda | 34 |
| 2007 | 24 | Bahamas | 5 |
| | | Other | 14 |
| Total | 427 | | 427 |

Panel B: Descriptive Statistics for Funds

| Variable | Mean | Std. Dev | Min | Q1 | Median | Q3 | Max |
|---------------------|---------|----------|------|--------|--------|---------|---------|
| AUM (\$ millions) | 304.78 | 652.38 | 0.00 | 40.00 | 107.00 | 269.00 | 6300.00 |
| Ln(AUM) | 18.43 | 1.74 | 0.00 | 17.50 | 18.49 | 19.41 | 22.56 |
| Age (Days) | 1019.59 | 976.80 | 0.00 | 373.00 | 700.00 | 1339.00 | 4877.00 |
| Ln(Age) | 6.39 | 1.30 | 0.00 | 5.92 | 6.55 | 7.20 | 8.49 |
| Management Fee (%) | 1.52 | 0.48 | 0.00 | 1.00 | 1.50 | 2.00 | 3.50 |
| Performance Fee (%) | 19.34 | 4.42 | 0.00 | 20.00 | 20.00 | 20.00 | 50.00 |
| Fund Offshore | 0.84 | | | | | | |
| Manager Offshore | 0.36 | | | | | | |
| Leverage | 0.54 | | | | | | |
| Short Bias | 0.20 | | | | | | |
| Long Bias | 0.36 | | | | | | |
| 1000+ Positions | 0.03 | | | | | | |
| 200–999 Positions | 0.08 | | | | | | |
| 100–199 Positions | 0.12 | | | | | | |
| 40–99 Positions | 0.35 | | | | | | |
| 1–39 Positions | 0.41 | | | | | | |
| Years | 0.32 | | | | | | |
| Quarters | 0.31 | | | | | | |
| Months | 0.15 | | | | | | |
| Weeks | 0.09 | | | | | | |
| Days | 0.13 | | | | | | |
| Restatement | 0.10 | | | | | | |

AUM is the assets under management for the fund. Age (Days) is the number days since the fund's inception. Management Fee is the percentage of the fund's assets under management that the manager receives annually for managing the fund. Performance Fee is the percentage of positive profits that the manager receives annually as compensation. Fund Offshore is an indicator variable coded as 1 if the fund is registered offshore, and 0 if the fund is located in the United States. Manager Offshore is an indicator variable coded as 1 if the manager is located offshore, and 0 if the manager is located in the United States. Leverage is an indicator variable coded as 1 if the fund uses leverage, and 0 otherwise. Short Bias is an indicator variable coded as 1 if the fund's investment style is weighted

TABLE 1
Descriptive Statistics of Hedge Funds (cont.)

toward short positions, and 0 otherwise. Long Bias is an indicator variable coded as 1 if the fund's investment style is weighted toward long positions, and 0 otherwise. 1000+ Positions, 200–999 Positions, 100–199 Positions, 40–99 Positions, and 1–30 Positions are indicator variables for the average number of investment positions in the fund's portfolio. Years, Quarters, Months, Weeks, and Days are indicator variables for the average holding period of an investment position. Restatement is an indicator variable coded as 1 if fund has restated the performance reported to its investors, and 0 otherwise.

TABLE 2
Descriptive Statistics of Internal Controls

Panel A: Internal Control Measures by Domicile

| Variable | Index Weight | Overall (%) | US (%) | Cayman Islands (%) | British Virgin Islands (%) | Bermuda (%) | Other Offshore (%) |
|--|--------------|-------------|--------|--------------------|----------------------------|-------------|--------------------|
| <i>Signatures:</i> | | | | | | | |
| One Internal Signature | 0 | 23.5 | 49.3 | 20.9 | 12.2 | 17.7 | 5.3 |
| Two Internal Signatures | 1 | 24.6 | 27.5 | 22.5 | 38.8 | 20.6 | 10.5 |
| One External Signature | 2 | 24.2 | 7.3 | 24.5 | 26.5 | 35.3 | 52.6 |
| Dual/Triple Entity Signatures | 3 | 27.7 | 15.9 | 32.1 | 22.5 | 26.5 | 31.6 |
| <i>Who Prices Portfolio:</i> | | | | | | | |
| Manager Only | 0 | 16.2 | 37.1 | 11.2 | 12.0 | 20.6 | 5.3 |
| Manager and Administrator | 1 | 11.7 | 10.0 | 13.2 | 8.0 | 14.7 | 5.3 |
| Administrator Only | 2 | 62.9 | 48.6 | 65.2 | 76.0 | 50.0 | 84.2 |
| Dual/Triple Entity Pricing | 3 | 9.2 | 4.3 | 10.4 | 4.0 | 14.7 | 5.3 |
| <i>Least Objective Source of Prices:</i> | | | | | | | |
| Manager | 0 | 13.4 | 20.3 | 12.4 | 16.0 | 5.9 | 10.5 |
| Model | 1 | 12.7 | 18.8 | 12.0 | 6.0 | 14.7 | 15.8 |
| Dealer Quote | 2 | 33.2 | 17.4 | 36.0 | 38.0 | 35.3 | 42.1 |
| OTC Quotes | 3 | 5.9 | 2.9 | 5.6 | 8.0 | 8.8 | 0.0 |
| Exchange Quotes | 4 | 34.8 | 40.6 | 34.0 | 32.0 | 35.2 | 31.6 |
| <i>Who Sets NAV:</i> | | | | | | | |
| Manager Involved | 0 | 14.1 | 40.0 | 8.8 | 8.0 | 14.7 | 5.3 |
| Manager Not Involved | 1 | 85.9 | 60.0 | 91.2 | 92.0 | 85.3 | 94.7 |
| <i>Auditor:</i> | | | | | | | |
| Not Ranked by Alpha Magazine | 0 | 23.0 | 51.4 | 17.9 | 20.0 | 17.7 | 5.3 |
| Ranked by Alpha Magazine | 1 | 77.0 | 48.6 | 82.1 | 80.0 | 82.4 | 94.7 |
| <i>Administrator:</i> | | | | | | | |
| Not Ranked by Alpha Magazine | 0 | 68.4 | 91.4 | 59.0 | 70.0 | 79.4 | 78.9 |
| Ranked by Alpha Magazine | 1 | 31.6 | 8.6 | 41.0 | 30.0 | 20.6 | 21.1 |

TABLE 2
Descriptive Statistics of Internal Controls (cont.)

Panel B: Internal Control Indices

| | Mean | Std. Dev | Min | Q1 | Median | Q3 | Max |
|------------------------|------|----------|------|------|--------|-------|-------|
| Signatures Index | 1.56 | 1.13 | 0.00 | 1.00 | 2.00 | 3.00 | 3.00 |
| Who Prices Index | 1.65 | 0.86 | 0.00 | 1.00 | 2.00 | 2.00 | 3.00 |
| Source of Prices Index | 2.55 | 1.42 | 0.00 | 1.00 | 3.00 | 4.00 | 4.00 |
| NAV Index | 0.86 | 0.35 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Auditor Index | 0.77 | 0.42 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Administrator Index | 0.32 | 0.47 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Internal Control Index | 7.52 | 2.78 | 0.00 | 6.00 | 8.00 | 10.00 | 12.00 |

Signatures refer to the signatures required to transfer funds out of the bank or prime broker. Double/Triple Signature funds require two or three signatures one of which is internal and one external. External Signature funds require only external signatures. Double Internal funds require at least two internal signatures. Single Internal funds require only one internal signature. Who prices the portfolio identifies who values each of the assets under management. Dual/Triple Entity Pricing funds use at least one internal service and one external service to price the portfolio. External Pricing funds use only external services to price the portfolio. Collaborative Pricing funds use an external pricing service that collaborates with the manager. Internal Pricing funds price the portfolio in house. Least objective source of prices provides the sources used to price individual investment positions in the portfolio. Who sets the NAV identifies whether the manager has involvement in the reporting of the net asset value to fund investors. Ranked Auditors and Ranked Administrators are ranked according to Institutional Investor's Alpha ranking of hedge fund service providers. The index values in Panel B are based on the values from Panel A. Internal Control Index is the sum of the six presented indexes.

TABLE 3
Correlations Matrix ^a

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|-----------------------|-------------|--------------|--------------|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-------------|
| 1. Signatures | | | | | | | | | | | | | |
| 2. Pricing | 0.37 | | | | | | | | | | | | |
| 3. Source of prices | 0.09 | 0.24 | | | | | | | | | | | |
| 4. NAV | 0.19 | 0.54 | 0.14 | | | | | | | | | | |
| 5. Auditor | 0.22 | 0.13 | 0.10 | 0.13 | | | | | | | | | |
| 6. Administrator | 0.07 | 0.15 | 0.09 | 0.18 | 0.16 | | | | | | | | |
| 7. Internal control | 0.64 | 0.72 | 0.68 | 0.50 | 0.35 | 0.34 | | | | | | | |
| 8. Ln(Age) | -0.02 | -0.04 | -0.13 | -0.07 | 0.05 | -0.04 | -0.12 | | | | | | |
| 9. Off. Mgr. & Fund | 0.17 | 0.19 | 0.08 | 0.21 | 0.15 | 0.21 | 0.25 | 0.01 | | | | | |
| 10. Fund offshore | 0.03 | -0.01 | -0.04 | 0.05 | 0.07 | -0.03 | -0.01 | -0.07 | -0.71 | | | | |
| 11. Leverage | 0.12 | 0.13 | 0.12 | 0.03 | 0.13 | 0.16 | 0.17 | 0.00 | 0.08 | -0.02 | | | |
| 12. Short bias | 0.02 | -0.05 | -0.06 | -0.07 | -0.03 | -0.11 | -0.09 | 0.00 | -0.04 | 0.03 | 0.01 | | |
| 13. Long bias | 0.02 | 0.01 | -0.11 | 0.06 | -0.02 | 0.16 | -0.02 | 0.05 | 0.05 | 0.00 | 0.18 | -0.22 | |
| 14. Ln(AUM) | 0.12 | 0.04 | -0.17 | 0.02 | 0.17 | 0.16 | 0.02 | 0.49 | 0.09 | 0.04 | 0.11 | -0.03 | 0.17 |
| 15. Years | -0.05 | -0.04 | -0.33 | -0.06 | -0.09 | -0.06 | -0.24 | 0.07 | -0.07 | -0.01 | -0.18 | 0.05 | 0.03 |
| 16. Quarters | -0.06 | 0.00 | 0.12 | 0.10 | 0.11 | 0.01 | 0.06 | -0.02 | 0.04 | 0.05 | 0.05 | -0.05 | -0.03 |
| 17. Months | 0.05 | -0.04 | 0.12 | -0.02 | 0.03 | 0.01 | 0.09 | -0.01 | -0.03 | 0.02 | 0.00 | 0.01 | 0.01 |
| 18. Weeks | 0.08 | 0.10 | 0.06 | -0.02 | -0.01 | 0.06 | 0.09 | 0.03 | 0.01 | -0.05 | 0.08 | 0.06 | -0.07 |
| 19. Days | 0.04 | 0.01 | 0.10 | -0.02 | -0.05 | 0.00 | 0.06 | -0.08 | 0.07 | -0.03 | 0.11 | -0.05 | 0.05 |
| 20. 1000+ positions | -0.06 | -0.11 | -0.09 | 0.00 | -0.06 | 0.04 | -0.10 | 0.03 | -0.05 | 0.05 | 0.12 | -0.06 | 0.14 |
| 21. 200-999 positions | 0.08 | 0.00 | 0.05 | -0.03 | 0.03 | 0.01 | 0.05 | 0.05 | -0.05 | 0.08 | 0.12 | -0.01 | 0.15 |
| 22. 100-199 positions | 0.00 | 0.05 | 0.04 | 0.03 | 0.07 | 0.10 | 0.06 | 0.10 | -0.02 | 0.11 | 0.07 | 0.03 | -0.05 |
| 23. 40-99 positions | 0.01 | 0.04 | 0.08 | -0.03 | 0.04 | 0.02 | 0.05 | 0.03 | 0.00 | -0.09 | -0.01 | -0.02 | -0.07 |
| 24. 1-39 positions | -0.03 | -0.03 | -0.10 | 0.03 | -0.08 | -0.10 | -0.09 | -0.13 | 0.06 | -0.04 | -0.15 | 0.03 | -0.03 |
| 25. Management fee | 0.05 | 0.15 | 0.12 | 0.13 | 0.09 | 0.04 | 0.16 | -0.05 | 0.17 | -0.04 | 0.09 | -0.04 | 0.06 |
| 26. Performance fee | 0.07 | 0.06 | 0.36 | 0.04 | 0.08 | 0.07 | 0.23 | 0.02 | 0.01 | 0.10 | 0.13 | 0.01 | -0.04 |
| 27. Restatement | -0.02 | -0.02 | 0.05 | 0.00 | 0.04 | -0.06 | -0.01 | 0.04 | -0.01 | 0.06 | -0.04 | -0.01 | -0.06 |

TABLE 3
Correlations Matrix (cont.)^a

| | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 |
|-----------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------|
| 15. Years | 0.06 | | | | | | | | | | | | |
| 16. Quarters | -0.05 | -0.46 | | | | | | | | | | | |
| 17. Months | 0.01 | -0.29 | -0.29 | | | | | | | | | | |
| 18. Weeks | -0.02 | -0.21 | -0.21 | -0.13 | | | | | | | | | |
| 19. Days | -0.01 | -0.27 | -0.26 | -0.16 | -0.12 | | | | | | | | |
| 20. 1000+ positions | 0.15 | -0.04 | -0.10 | -0.08 | -0.01 | 0.29 | | | | | | | |
| 21. 200-999 positions | 0.16 | -0.04 | 0.02 | 0.00 | -0.03 | 0.05 | -0.05 | | | | | | |
| 22. 100-199 positions | 0.16 | -0.06 | 0.06 | 0.04 | 0.04 | -0.08 | -0.07 | -0.11 | | | | | |
| 23. 40-99 positions | -0.02 | -0.03 | 0.08 | 0.02 | 0.02 | -0.10 | -0.14 | -0.21 | -0.28 | | | | |
| 24. 1-39 positions | -0.23 | 0.11 | -0.09 | -0.02 | -0.02 | 0.02 | -0.16 | -0.24 | -0.32 | -0.62 | | | |
| 25. Management fee | -0.02 | -0.15 | 0.07 | -0.01 | 0.11 | 0.04 | -0.11 | 0.06 | -0.06 | 0.01 | 0.04 | | |
| 26. Performance fee | 0.05 | -0.31 | 0.06 | 0.10 | 0.06 | 0.19 | 0.08 | 0.07 | 0.05 | 0.11 | -0.22 | 0.09 | |
| 27. Restatement | 0.01 | 0.06 | 0.05 | -0.05 | -0.05 | -0.06 | -0.02 | -0.04 | 0.14 | -0.04 | -0.03 | -0.15 | 0.00 |

^a Correlations in bold are statistically significant at the 0.10 level.

TABLE 4
Determinants of Internal Controls^a

Panel A: Determinants of Signatures Required to Transfer Funds Out of Bank or Prime Broker (n=403)

| Independent variables | Single Internal (Probit) | | Double Internal (Probit) | | Single External (Probit) | | Dual / Triple (Probit) | | Signature Index (Ordered Probit) | |
|-----------------------|--------------------------|------------|--------------------------|------------|--------------------------|------------|------------------------|------------|----------------------------------|------------|
| | Coefficient | Std. error | Coefficient | Std. error | Coefficient | Std. error | Coefficient | Std. error | Coefficient | Std. error |
| Ln (Fund Age) | 0.059 | 0.067 | 0.021 | 0.068 | -0.010 | 0.081 | -0.066 | 0.064 | -0.061 | 0.051 |
| Off. Mgr. & Fund | -1.122*** | 0.239 | -0.239 | 0.241 | 1.500*** | 0.277 | 0.163 | 0.240 | 0.776*** | 0.200 |
| Fund offshore only | -0.600*** | 0.224 | -0.259 | 0.223 | 0.711*** | 0.268 | 0.597*** | 0.228 | 0.721*** | 0.205 |
| Leverage | -0.215 | 0.156 | 0.003 | 0.159 | 0.080 | 0.172 | 0.143 | 0.159 | 0.173 | 0.125 |
| Short bias | 0.219 | 0.196 | 0.024 | 0.196 | -0.475** | 0.207 | 0.154 | 0.182 | -0.036 | 0.163 |
| Long bias | 0.089 | 0.172 | 0.157 | 0.164 | -0.405** | 0.204 | 0.103 | 0.162 | -0.042 | 0.130 |
| Ln (AUM Fund) | -0.119** | 0.051 | 0.030 | 0.060 | 0.049 | 0.054 | 0.056 | 0.053 | 0.084* | 0.046 |
| Years | 0.028 | 0.246 | 0.178 | 0.242 | 0.598** | 0.278 | -0.588** | 0.231 | -0.294 | 0.212 |
| Quarters | 0.159 | 0.244 | 0.132 | 0.232 | 0.441 | 0.276 | -0.552** | 0.236 | -0.348 | 0.214 |
| Weeks | -0.334 | 0.329 | -0.351 | 0.330 | 0.843** | 0.373 | -0.100 | 0.303 | 0.178 | 0.266 |
| Days | -0.121 | 0.317 | 0.077 | 0.295 | 0.547 | 0.340 | -0.409 | 0.285 | -0.116 | 0.239 |
| 1000+ positions | -0.001 | 0.497 | 1.249*** | 0.452 | -1.407** | 0.586 | -0.632 | 0.475 | -0.606** | 0.285 |
| 200-999 positions | -0.142 | 0.295 | -0.022 | 0.271 | 0.033 | 0.299 | 0.046 | 0.252 | 0.072 | 0.197 |
| 100-199 positions | 0.077 | 0.246 | 0.436* | 0.236 | -0.282 | 0.242 | -0.208 | 0.244 | -0.229 | 0.186 |
| 1-39 positions | 0.081 | 0.175 | 0.113 | 0.179 | -0.157 | 0.178 | 0.023 | 0.160 | -0.054 | 0.135 |
| Intercept | 1.741** | 0.782 | -1.020 | 0.957 | -3.029*** | 0.977 | -1.598* | 0.820 | | |
| Year fixed effects | Yes | | Yes | | Yes | | Yes | | Yes | |
| Pseudo R ² | 0.128 | | 0.088 | | 0.210 | | 0.071 | | 0.051 | |
| Log-Likelihood | -192.937*** | | -200.654** | | -179.301*** | | -220.259 | | -529.657*** | |

^a Individual intercepts not reported on ordered probit. Independent variables defined in Table 1. Dependent variables defined in Table 2. Standard errors for all regressions are clustered at the manager level. * denotes significance at p = 0.10, ** denotes significance at p = 0.05, *** denotes significance at p = 0.01 (based on a two-tailed test).

TABLE 4
Determinants of Internal Controls (cont.)^a

Panel B: Determinants of Who Prices the Portfolio (n=406)

| Independent variables | Manager Only (Probit) | | Manager and Administrator (Probit) | | Administrator Only (Probit) | | Dual / Triple Entity (Probit) | | Pricing Index (Ordered Probit) | |
|-----------------------|--------------------------|------------|---------------------------------------|------------|--------------------------------|------------|----------------------------------|------------|-----------------------------------|------------|
| | Coefficient | Std. error | Coefficient | Std. error | Coefficient | Std. error | Coefficient | Std. error | Coefficient | Std. error |
| Ln (Fund Age) | 0.105 | 0.082 | 0.034 | 0.080 | -0.071 | 0.065 | 0.031 | 0.095 | -0.054 | 0.051 |
| Off. Mgr. & Fund | -1.261*** | 0.264 | -0.003 | 0.278 | 0.861*** | 0.225 | -0.072 | 0.404 | 0.678*** | 0.211 |
| Fund offshore only | -0.706*** | 0.238 | 0.132 | 0.267 | 0.461** | 0.214 | 0.047 | 0.367 | 0.508** | 0.207 |
| Leverage | -0.305* | 0.170 | -0.027 | 0.177 | -0.069 | 0.151 | 0.698*** | 0.223 | 0.346*** | 0.126 |
| Short bias | 0.493** | 0.208 | 0.168 | 0.198 | -0.550*** | 0.178 | 0.422 | 0.271 | -0.168 | 0.175 |
| Long bias | 0.046 | 0.182 | 0.035 | 0.188 | 0.059 | 0.168 | -0.260 | 0.233 | -0.101 | 0.125 |
| Ln (AUM Fund) | 0.003 | 0.063 | -0.022 | 0.076 | -0.038 | 0.062 | 0.120 | 0.094 | 0.039 | 0.048 |
| Years | 0.060 | 0.261 | -0.296 | 0.273 | 0.150 | 0.213 | 0.054 | 0.337 | 0.090 | 0.203 |
| Quarters | 0.168 | 0.267 | -0.113 | 0.243 | -0.082 | 0.197 | 0.171 | 0.350 | 0.035 | 0.213 |
| Weeks | -0.480 | 0.384 | -0.506 | 0.409 | 0.342 | 0.295 | 0.372 | 0.467 | 0.552* | 0.317 |
| Days | -0.196 | 0.372 | -0.212 | 0.353 | 0.084 | 0.278 | 0.250 | 0.429 | 0.199 | 0.261 |
| 1000+ positions | 0.817 | 0.539 | 0.861** | 0.437 | -0.713 | 0.441 | N/A | N/A | -0.995*** | 0.343 |
| 200-999 positions | 0.088 | 0.309 | -0.167 | 0.345 | 0.281 | 0.259 | -0.769** | 0.351 | -0.237 | 0.222 |
| 100-199 positions | -0.064 | 0.305 | 0.199 | 0.254 | 0.017 | 0.220 | -0.205 | 0.318 | -0.114 | 0.190 |
| 1-39 positions | 0.323 | 0.204 | 0.047 | 0.206 | -0.313* | 0.160 | 0.211 | 0.220 | -0.111 | 0.141 |
| Intercept | -0.785 | 1.062 | -0.860 | 1.249 | 0.896 | 1.048 | -4.481*** | 1.585 | | |
| Year fixed effects | Yes | | Yes | | Yes | | Yes | | Yes | |
| Pseudo R ² | 0.176 | | 0.052 | | 0.111 | | 0.202 | | 0.064 | |
| Log-Likelihood | -147.160*** | | -139.920 | | -237.264*** | | -95.981*** | | -398.853*** | |

^a Individual intercepts not reported on ordered probit. Independent variables defined in Table 1. Dependent variables defined in Table 2. Standard errors for all regressions are clustered at the manager level. * denotes significance at p = 0.10, ** denotes significance at p = 0.05, *** denotes significance at p = 0.01 (based on a two-tailed test). N/A represented missing variable due to the model being perfectly identified with its inclusion.

TABLE 4
Determinants of Internal Controls (cont.)^a

Panel C: Determinants of Sources for Pricing the Portfolio (n=405)

| Independent variables | Manager (Probit) | | Model (Probit) | | Dealer (Probit) | | OTC (Probit) | | Exchange (Probit) | | Source Index (Ordered Probit) | |
|-----------------------|---------------------|------------|-------------------|------------|--------------------|------------|-----------------|------------|----------------------|------------|----------------------------------|------------|
| | Coefficient | Std. error | Coefficient | Std. error | Coefficient | Std. error | Coefficient | Std. error | Coefficient | Std. error | Coefficient | Std. error |
| Ln (Fund Age) | 0.099 | 0.099 | -0.081 | 0.074 | 0.086 | 0.066 | 0.010 | 0.072 | -0.098 | 0.070 | -0.052 | 0.055 |
| Off. Mgr. & Fund | -0.764*** | 0.289 | -0.571** | 0.283 | 0.376 | 0.237 | 0.178 | 0.293 | 0.501** | 0.226 | 0.366* | 0.201 |
| Fund offshore only | -0.533* | 0.293 | -0.587** | 0.256 | 0.704*** | 0.223 | 0.331 | 0.287 | 0.339 | 0.213 | 0.087 | 0.189 |
| Leverage | -0.483** | 0.209 | -0.294 | 0.180 | 0.393*** | 0.152 | 0.254 | 0.186 | -0.189 | 0.161 | 0.121 | 0.127 |
| Short bias | 0.472** | 0.239 | 0.141 | 0.190 | 0.489*** | 0.189 | -0.204 | 0.226 | -0.714*** | 0.203 | -0.374** | 0.152 |
| Long bias | 0.485** | 0.229 | -0.218 | 0.199 | 0.557*** | 0.158 | 0.049 | 0.177 | 0.113 | 0.174 | -0.317** | 0.133 |
| Ln (AUM Fund) | 0.182** | 0.083 | 0.139* | 0.073 | 0.078 | 0.075 | 0.072 | 0.084 | 0.006 | 0.055 | -0.119* | 0.071 |
| Years | 1.534*** | 0.382 | 0.227 | 0.240 | 0.210 | 0.234 | -0.672** | 0.297 | -1.086*** | 0.259 | -0.857*** | 0.175 |
| Quarters | 0.636 | 0.405 | -0.098 | 0.267 | 0.253 | 0.234 | -0.035 | 0.276 | -0.535* | 0.273 | -0.221 | 0.171 |
| Weeks | 0.086 | 0.516 | -0.335 | 0.362 | 0.276 | 0.362 | 0.221 | 0.359 | 0.123 | 0.371 | -0.188 | 0.219 |
| Days | 0.521 | 0.543 | -0.615 | 0.431 | 0.121 | 0.303 | -0.118 | 0.369 | 0.600 | 0.392 | 0.196 | 0.242 |
| 1000+ positions | 1.211** | 0.528 | 1.225** | 0.512 | 0.226 | 0.368 | 0.123 | 0.502 | 0.085 | 0.501 | -0.730** | 0.372 |
| 200-999 positions | -0.272 | 0.572 | 0.380 | 0.310 | -0.278 | 0.271 | -0.300 | 0.283 | -0.134 | 0.298 | 0.249 | 0.206 |
| 100-199 positions | 0.459 | 0.358 | 0.161 | 0.267 | -0.224 | 0.214 | -0.407 | 0.260 | 0.624** | 0.297 | 0.103 | 0.188 |
| 1-39 positions | 0.716*** | 0.235 | 0.103 | 0.226 | -0.308* | 0.160 | -0.146 | 0.184 | -0.652*** | 0.185 | -0.237* | 0.138 |
| Intercept | -7.482*** | 1.734 | -2.834** | 1.152 | -2.776** | 1.275 | -2.234 | 1.404 | 1.585* | 0.874 | | |
| Year fixed effects | Yes | | Yes | | Yes | | Yes | | Yes | | Yes | |
| Pseudo R ² | 0.359 | | 0.126 | | 0.166 | | 0.152 | | 0.232 | | 0.088 | |
| Log-Likelihood | -103.054*** | | -142.302*** | | -226.988*** | | -149.837*** | | -184.140*** | | -514.151*** | |

^a Individual intercepts not reported on ordered probit. Independent variables defined in Table 1. Standard errors for all regressions are clustered at the manager level. Dependent variables defined in Table 2. * denotes significance at p = 0.10, ** denotes significance at p = 0.05, *** denotes significance at p = 0.01 (based on

TABLE 4
Determinants of Internal Controls (cont.)^a

Panel D: Determinants of NAV Independence and Service Providers (Probit)

| Independent variables | NAV Independence | | Ranked Auditor | | Ranked Administrator | |
|-----------------------|------------------|-------------|----------------|-------------|----------------------|-------------|
| | Coefficient | Std. error | Coefficient | Std. error | Coefficient | Std. error |
| Ln(Age Fund) | -0.034 | 0.079 | 0.016 | 0.068 | -0.137** | 0.069 |
| Off. Mgr. & Fund | 1.452*** | 0.282 | 1.021*** | 0.237 | 1.270*** | 0.298 |
| Fund Offshore Only | 0.958*** | 0.246 | 0.845*** | 0.226 | 0.924*** | 0.299 |
| Leverage | -0.054 | 0.183 | 0.376** | 0.162 | 0.234 | 0.161 |
| Short Bias | -0.295 | 0.221 | -0.137 | 0.188 | -0.447** | 0.199 |
| Long Bias | 0.142 | 0.197 | -0.219 | 0.172 | 0.347** | 0.163 |
| Ln(AUM Fund) | -0.037 | 0.069 | 0.109* | 0.057 | 0.123** | 0.059 |
| Years | -0.109 | 0.251 | -0.130 | 0.234 | -0.017 | 0.232 |
| Quarters | 0.235 | 0.267 | 0.120 | 0.251 | -0.089 | 0.229 |
| Weeks | 0.033 | 0.359 | -0.165 | 0.304 | 0.244 | 0.288 |
| Days | -0.132 | 0.334 | -0.313 | 0.296 | -0.077 | 0.305 |
| 1000+ Positions | -0.100 | 0.569 | -0.665 | 0.446 | 0.106 | 0.426 |
| 200–999 Positions | -0.222 | 0.272 | -0.102 | 0.301 | -0.288 | 0.276 |
| 100–199 Positions | -0.062 | 0.299 | -0.063 | 0.267 | 0.228 | 0.222 |
| 1–39 Positions | 0.002 | 0.212 | -0.132 | 0.175 | -0.242 | 0.165 |
| Intercept | 0.855 | 1.148 | -1.959** | 0.913 | -2.980*** | 0.912 |
| Year Fixed Effects | | Yes | | Yes | | Yes |
| Pseudo R ² | | 0.171 | | 0.131 | | 0.143 |
| Log-Likelihood | | -135.054*** | | -191.070*** | | -219.868*** |
| n | | 406 | | 407 | | 407 |

^a Independent variables defined in Table 1. Standard errors for all regressions are clustered at the manager level. Dependent variables defined in Table 2. * denotes significance at p = 0.10, ** denotes significance at p = 0.05, *** denotes significance at p = 0.01 (based on a two-tailed test).

TABLE 4
Determinants of Internal Controls (cont.)^a

Panel E: Determinants of Overall Internal Controls (Ordinary Least Squares)

| Independent variables | Coefficient | Std. error |
|-------------------------|-------------|------------|
| Ln(Age Fund) | -0.229* | 0.119 |
| Off. Mgr. & Fund | 2.727*** | 0.469 |
| Fund Offshore Only | 1.973*** | 0.468 |
| Leverage | 0.593** | 0.283 |
| Short Bias | -0.992*** | 0.379 |
| Long Bias | -0.406 | 0.306 |
| Ln(AUM Fund) | 0.036 | 0.115 |
| Years | -1.460*** | 0.450 |
| Quarters | -0.606 | 0.446 |
| Weeks | 0.422 | 0.600 |
| Days | -0.043 | 0.528 |
| 1000+ Positions | -2.259*** | 0.861 |
| 200–999 Positions | -0.053 | 0.441 |
| 100–199 Positions | -0.189 | 0.407 |
| 1–39 Positions | -0.547* | 0.303 |
| Intercept | 6.817*** | 1.903 |
| Year Fixed Effects | | Yes |
| Adjusted R ² | | 0.224 |
| F-stat | | 5.792*** |
| n | | 403 |

^a Independent variables defined in Table 1. Standard errors for all regressions are clustered at the manager level. Dependent variables defined in Table 2. * denotes significance at p = 0.10, ** denotes significance at p = 0.05, *** denotes significance at p = 0.01 (based on a two-tailed test).

TABLE 5
Determinants of Hedge Fund Fees^a

Panel A: Determinants of Management Fees (Ordinary Least Squares)

| Independent variables | Controls Only | | With Index | | With Restatements | |
|-------------------------|---------------|------------|-------------|------------|-------------------|------------|
| | Coefficient | Std. error | Coefficient | Std. error | Coefficient | Std. error |
| Internal Control Index | | | 0.005 | 0.011 | | |
| Restatements | | | | | -0.227** | 0.091 |
| Ln(Age Fund) | -0.013 | 0.021 | -0.013 | 0.021 | -0.008 | 0.022 |
| Off. Mgr. & Fund | 0.208*** | 0.075 | 0.188** | 0.080 | 0.223*** | 0.075 |
| Fund Offshore Only | 0.116 | 0.078 | 0.095 | 0.081 | 0.132* | 0.078 |
| Leverage | 0.074 | 0.049 | 0.069 | 0.050 | 0.066 | 0.048 |
| Short Bias | -0.053 | 0.058 | -0.046 | 0.060 | -0.061 | 0.056 |
| Long Bias | 0.019 | 0.058 | 0.021 | 0.060 | 0.016 | 0.058 |
| Ln(AUM Fund) | -0.002 | 0.015 | -0.002 | 0.015 | -0.004 | 0.015 |
| Years | -0.087 | 0.063 | -0.082 | 0.063 | -0.070 | 0.062 |
| Quarters | 0.039 | 0.061 | 0.040 | 0.061 | 0.047 | 0.060 |
| Weeks | 0.205** | 0.104 | 0.204* | 0.104 | 0.204* | 0.104 |
| Days | 0.088 | 0.099 | 0.083 | 0.100 | 0.087 | 0.098 |
| 1000+ Positions | -0.398* | 0.240 | -0.378 | 0.236 | -0.393 | 0.244 |
| 200–999 Positions | 0.037 | 0.091 | 0.043 | 0.091 | 0.037 | 0.093 |
| 100–199 Positions | -0.121* | 0.065 | -0.114* | 0.066 | -0.096 | 0.066 |
| 1–39 Positions | 0.021 | 0.054 | 0.025 | 0.056 | 0.015 | 0.054 |
| Intercept | 1.387*** | 0.231 | 1.364*** | 0.250 | 1.408*** | 0.240 |
| Year Fixed Effects | | Yes | | Yes | | Yes |
| Adjusted R ² | | 0.070 | | 0.066 | | 0.086 |
| F-stat | | 3.275*** | | 3.062*** | | 3.934*** |
| n | | 406 | | 402 | | 404 |

^a Variables defined in Table 1 and 2. Standard errors for all regressions are clustered at the manager level. Dependent variables defined in Table 2. * denotes significance at p = 0.10, ** denotes significance at p = 0.05, *** denotes significance at p = 0.01 (based on a two-tailed test).

TABLE 5
Determinants of Hedge Fund Fees (cont.)^a

Panel B: Determinants of Performance Fees (Ordinary Least Squares)

| Independent variables | Controls Only | | With Index | | With Restatements | |
|-------------------------|---------------|------------|-------------|------------|-------------------|------------|
| | Coefficient | Std. error | Coefficient | Std. error | Coefficient | Std. error |
| Internal Control Index | | | 0.261** | 0.102 | | |
| Restatements | | | | | -0.137 | 0.591 |
| Ln(Age Fund) | 0.135 | 0.236 | 0.193 | 0.236 | 0.142 | 0.243 |
| Off. Mgr. & Fund | 1.303 | 0.887 | 0.516 | 0.782 | 1.319 | 0.890 |
| Fund Offshore Only | 1.640* | 0.849 | 1.008 | 0.776 | 1.649* | 0.852 |
| Leverage | 0.452 | 0.416 | 0.273 | 0.420 | 0.435 | 0.415 |
| Short Bias | 0.013 | 0.427 | 0.347 | 0.447 | -0.010 | 0.432 |
| Long Bias | -0.632 | 0.522 | -0.473 | 0.528 | -0.625 | 0.527 |
| Ln(AUM Fund) | -0.014 | 0.112 | -0.028 | 0.114 | -0.017 | 0.113 |
| Years | -2.698*** | 0.609 | -2.276*** | 0.581 | -2.688*** | 0.614 |
| Quarters | -0.880* | 0.450 | -0.715 | 0.453 | -0.890* | 0.454 |
| Weeks | -0.095 | 0.485 | -0.201 | 0.501 | -0.091 | 0.487 |
| Days | 1.525* | 0.892 | 1.557* | 0.901 | 1.518* | 0.903 |
| 1000+ Positions | -0.279 | 2.455 | 0.324 | 2.426 | -0.275 | 2.459 |
| 200–999 Positions | -0.251 | 0.614 | -0.230 | 0.631 | -0.248 | 0.614 |
| 100–199 Positions | -0.766* | 0.443 | -0.688 | 0.437 | -0.747* | 0.448 |
| 1–39 Positions | -1.950*** | 0.522 | -1.782*** | 0.498 | -1.967*** | 0.525 |
| Intercept | 19.633*** | 1.967 | 18.064*** | 2.136 | 19.672*** | 2.073 |
| Year Fixed Effects | | Yes | | Yes | | Yes |
| Adjusted R ² | | 0.167 | | 0.181 | | 0.165 |
| F-stat | | 2.288*** | | 2.144*** | | 2.170*** |
| n | | 406 | | 402 | | 404 |

^a Variables defined in Table 1 and 2. Standard errors for all regressions are clustered at the manager level. Dependent variables defined in Table 2. * denotes significance at p = 0.10, ** denotes significance at p = 0.05, *** denotes significance at p = 0.01 (based on a two-tailed test).

TABLE 6
Mean Hedge Fund Characteristics by TASS Reporting

| Variable | Non-TASS reporting (n=195) | TASS reporting (n=232) | p-value |
|------------------------|----------------------------------|---------------------------|---------|
| Ln(Age Fund) | 6.02 | 6.71 | 0.00 |
| Off. Mgr. & Fund | 0.37 | 0.35 | 0.67 |
| Fund Offshore Only | 0.49 | 0.46 | 0.49 |
| Leverage | 0.54 | 0.54 | 0.99 |
| Short Bias | 0.17 | 0.22 | 0.23 |
| Long Bias | 0.38 | 0.34 | 0.46 |
| Ln(AUM) | 18.27 | 18.56 | 0.08 |
| Management Fee (%) | 1.51 | 1.53 | 0.65 |
| Performance Fee (%) | 19.45 | 19.25 | 0.65 |
| Signatures Index | 1.59 | 1.53 | 0.59 |
| Who Prices Index | 1.68 | 1.63 | 0.56 |
| Source of Prices Index | 2.49 | 2.25 | 0.09 |
| NAV | 0.88 | 0.84 | 0.34 |
| Auditor | 0.75 | 0.78 | 0.45 |
| Administrator | 0.34 | 0.29 | 0.26 |
| Internal Control Index | 7.73 | 7.34 | 0.16 |

^a TASS reporting represents those funds that reported their fund returns to Lipper TASS. Remaining variables defined in Table 1 and 2. P-values based on two-tailed tests.