

# **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. Hedge funds are subject to minimal regulation. Hence, hedge fund managers voluntarily implement internal controls, and managers and investors freely contract on fees. Consistent with fund managers implementing internal controls to reduce agency conflicts, we find that internal controls are stronger in funds with higher potential agency costs. Further, internal controls are stronger in funds domiciled in jurisdictions that provide investors with limited legal redress for fraud and financial misstatements. Short selling funds, however, are more likely to protect proprietary information by implementing weaker internal controls that limit external oversight. With respect to fees, we find that the percentage of positive profits that the manager receives increases in the strength of the fund's internal controls.

**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 with HedgeFundDueDiligence.com prohibits the authors from making the data available to other parties.

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## **I. INTRODUCTION**

Hedge funds encompass a diverse range of privately managed investment vehicles that are exempt from a broad range of federal acts regulating investment vehicles. They are typically not exchange traded and not registered with the Securities and Exchange Commission (SEC). Hence, hedge funds are in general exempt from securities regulations that dictate internal controls that managers must implement and maintain, fees that managers can charge investors, and disclosures that fund managers must make to investors. Therefore, hedge funds are opaque investment vehicles that expose investors to the risk of substantial losses arising from fraud and/or financial misstatements. Hedge funds thereby provide a setting to examine the extent that fund managers voluntarily implement internal controls to limit agency costs arising from fraud and/or financial misstatements, and the extent that investors value such internal controls when determining the fees that they are willing to pay fund managers.

In this study, we examine the determinants of hedge fund internal controls and the association between internal controls and the fees that fund managers 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 disclosures made to investors. Some examples are: the independent pricing of investment positions; signature protocols for transferring funds from bank and prime brokerage accounts; and the use of reputable service providers, such as auditors and administrators. The risks that hedge fund internal controls monitor and reduce may be more important than financial risks in determining hedge fund performance (Lo 2001, 30–31; Kundro and Feffer 2003).

To investigate the use of internal controls and their association with fees, we utilize a proprietary database of due diligence reports prepared by HedgeFundDueDiligence.com (HFDD). These reports contain an extensive array of details regarding fund characteristics and

internal controls, investment contract terms and provisions, investment style and portfolio characteristics, and fund and manager backgrounds. Investors commissioned these due diligence reports to evaluate whether to invest in the funds. Therefore, our 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 find substantial variation in internal controls. Funds domiciled in the Caribbean are more likely to incorporate stricter signature authority for the transfer of funds, to implement pricing mechanisms that involve external oversight, and to employ more reputable outside service providers. These findings are consistent with investors demanding greater internal controls for funds domiciled in jurisdictions that provide investors with limited legal redress for fraud and financial misstatements. Furthermore, and also consistent with managers implementing internal controls to reduce agency conflicts, we find that younger funds are more likely to use more reputable external administrators and levered funds are more likely to implement more stringent external oversight of pricing and to use more reputable auditors. Short selling funds, however, are more likely to protect proprietary information by implementing weaker internal controls that limit external oversight of investment position pricing.

Next, we argue that when considering a hedge fund investment, investors estimate potential agency costs arising from fraud and financial misstatements, and their expectations of these agency costs decrease 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. Consistent with this argument, we observe that internal controls that reduce managers' opportunities to manipulate reported performance and/or commit fraud are positively associated with the percentage of investment profits received by the manager. Therefore, investors appear to

mitigate moral hazard costs arising from fraud and /or manipulated reported returns when managers have greater discretion.

Further, we supplement the above analysis of fees by examining the association between restatements and fees. Relevant to our setting, restatements are predetermined at the point of contracting. We find that managers of funds that have restated prior performance receive a significantly lower percentage of assets under management for managing the funds, providing further support for our prediction that investors protect against the risk of future misstatements by paying lower fees.

Finally, we investigate whether internal controls are associated with future regulatory investigations of fraud and/or financial misstatements on the part of the fund and its managers. Such investigations can be considered an extreme form of poor performance because they are typically associated with fund liquidations and deeply discounted investor redemptions. We find that excluding the manager from setting and reporting the fund's official net asset value to investors reduces the probability of such investigations by over two-thirds. Moreover, we find that reputational incentives as proxied by fund age and explicit monitoring and screening from leverage providers are associated with lower likelihoods of future regulatory investigations of fraud and/or financial misstatements.

We contribute to the internal control and hedge fund literatures. First, we contribute to the internal control literature by investigating a broad range of internal controls in a setting with the potential for substantial agency costs. Prior empirical research on internal controls is generally based on public firms subject to securities regulations that limit the risks that investors face from weak internal controls.<sup>1</sup> Moreover, this study differs from previous research on

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<sup>1</sup> Some examples are Ashbaugh-Skaife, Collins, and Kinney (2007), Ashbaugh-Skaife, Collins, Kinney, and LaFond (2009), Doyle, Ge, and McVay (2007), Ge and McVay (2005), Hammersley, Myers, and Shakespeare (2008), Kim, Song, and Zhang (2008), and Ogneva, Raghunandan, and Subramanyam (2007).

internal controls by examining actual internal controls as opposed to the disclosure of internal control weaknesses. And, in contrast with public companies, internal control failures may be more important than financial risks in determining fund performance (Lo 2001, 30–31; Kundro and Feffer 2003).

Second, we extend the literature on hedge funds by examining their internal operations. Research on hedge funds generally concentrates on investment returns (for a review see Lo 2008). In recent research, Brown, Goetzmann, Liang, and Schwarz (2008) use a sample of SEC Registered Investment Advisors to examine the extent to which fund managers' conflicts of interests are associated with capital flows. We extend this research by directly observing the internal controls employed by funds to reduce agency costs, and how these controls are associated with fees. Moreover, we demonstrate that weak internal controls are associated with future regulatory investigations of fraud and financial misstatements and that reputational incentives and leverage providers reduce the likelihood that managers carry out actions that lead to such regulatory investigations.

Finally, we contribute to the recent debate on the regulation of hedge funds. In general, the SEC regards internal controls as a critical element of investor protection, and it recently increased its regulatory focus on hedge funds, proposing regulations that include mandatory disclosures and other internal controls (Smith 2006a; Smith 2006b; Oesterle 2006). Hedge fund advocacy groups responded to these proposals by suggesting that funds follow "best practice" industry standards that give consideration to the particular characteristics and circumstances of each fund (MFA 2005). Consistent with the advocacy groups' proposals, we find that funds systematically vary their internal controls to address potential agency costs. Furthermore, we show that internal controls are positively associated with investor fees, suggesting that investors evaluate and price the risks arising from internal control failures.

## II. HEDGE FUND SETTING

A hedge fund is a 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).<sup>2</sup> There has been substantial growth in the hedge fund industry, both in the number of funds and in assets under management (Brown, Goetzmann, and Ibbotson 1999; Fung and Hsieh 1999; Lo 2008). 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, they are opaque and therefore 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 the 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).<sup>3</sup> 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.<sup>4</sup> 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

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<sup>2</sup> 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.

<sup>3</sup> For a more detailed discussion of the regulation of hedge funds see ABA (2005), Fung and Hsieh (1999, 314–317), and Lhabitant (2008, 37–84).

<sup>4</sup> Although issuers of private placements are required to file a Form D with the SEC within 15 days after the first sale, this form contains very little detailed information about the issuance (Lhabitant 2008, 41).

a spouse of over \$300,000; and up to 35 other U.S. purchasers.<sup>5</sup> 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).<sup>6</sup> To ensure exemption from SEC regulation, hedge funds 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).<sup>7</sup>

This minimal regulatory environment provides hedge funds substantially more flexibility in their operations compared to regulated investment vehicles, such as mutual funds. For example, hedge funds have greater discretion regarding valuation and reporting of their investments (McVea 2008; SEC 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).<sup>8</sup> 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).<sup>9</sup>

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<sup>5</sup> Regulation S provides detailed exemptions related to issuances to non-U.S. investors.

<sup>6</sup> 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).

<sup>7</sup> 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.

<sup>8</sup> For example, open-end investment companies are restricted to bank sourced leverage only, with this amount capped at 300 percent of the asset coverage (Section 18(f)(1) Investment Company Act of 1940).

<sup>9</sup> Although 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

When evaluating an investment in a hedge fund, investment advisors or accredited investors solicit information about the fund, with the investment terms provided 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 terms under 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 contractual terms laid out in the PPM, and subsequent executable agreements, represent the primary mechanisms in place to protect the investor’s investment.

### **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 and information asymmetries between investors and fund managers. Moreover, 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

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(Investment Advisers Act of 1940 Rule 205-3). Specifically, an SEC registered investment adviser or offshore fund with U.S. 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 for themselves against potential fee abuses related to hedge fund performance (ABA 2005, 331–334).



performance disclosures made to investors.<sup>10</sup> 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 percent of the 100 failed funds they investigated.

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. Whereas 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). For example, external oversights can inhibit the manager's ability to quickly respond to trading opportunities. Further, there are explicit costs to retain external service providers for operational oversight and support, and the use of external service providers requires the manager to disclose to the service providers proprietary information about investment strategies and positions.

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 lower incentives to commit fraud and greater incentives to provide investors with more accurate performance reports (Klein and Leffler 1981), thereby reducing the benefit of 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

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<sup>10</sup> Note that even in the absence of agency problems, internal controls can increase the precision of asset values

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.<sup>11, 12</sup>

Although onshore and offshore funds are generally exempt from U.S. securities regulations, investors in onshore funds can use the U.S. legal system to redress fraud and financial misstatements. Although many offshore funds are domiciled in countries that regulate investment vehicles and provide investors with legal redress, U.S. legal contract enforcement mechanisms are generally considered superior (Djankov, La Porta, Lopez-de-Silanes, and Shleifer 2008) and most offshore hedge funds are domiciled in Caribbean islands that have historically been associated with secret bank accounts and money laundering (Suss, Williams, and Mendis 2002).

There may be systematic variation in the types of investors that invest in onshore versus offshore funds.<sup>13</sup> In particular, when U.S. tax-exempt entities, such as pension funds and charitable trusts, invest in offshore funds, they can avoid recognizing unrelated business taxable income arising from investments in leveraged portfolios (ABA 2005, 360; Lhabitant 2008, 88). Nevertheless, it is not clear why, holding other investor characteristics constant, U.S. tax-exempt investors would have monitoring incentives that differ significantly from those of other

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disclosed to investors and, therefore, reduce uncertainty about the cash flows that investors expect to receive.

<sup>11</sup> Smaller funds can be considered to be of lower quality because they have had less capital inflows. Therefore, they may have greater benefits from implementing internal controls than larger funds. However, larger funds may have greater incentives to implement internal controls because the magnitude of potential agency costs can increase in fund size. 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.

<sup>12</sup> Note that this prediction is based on the assumption 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.

<sup>13</sup> Although the Taxpayer Relief of 1997 eliminated the historical primary tax rationale for offshore hedge fund investing, namely the avoidance of U.S. taxation of non-U.S. investors on their capital gains, non-U.S. investors

investors, suggesting this potential difference has limited implications for hedge fund internal controls. 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 prime brokers who provide managers with trade execution and custodial services (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 a positive relation between leverage and internal controls. However, to the extent that the prime broker has an incentive and the ability to monitor the fund manager because it typically executes the fund's trades, leverage 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 2008). Hence, a fund can incur substantial costs if outsiders acquire proprietary information about the fund's investment strategies and positions.<sup>14</sup> 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

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may still prefer offshore funds to limit their exposure and retain their anonymity from U.S. regulatory authorities, such as the IRS (ABA 2005, 98–99 & 360; Lhabitant 2008, 88).

<sup>14</sup> 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 percent 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 are of limited proprietary risk given the disclosures are aggregated, delayed, and restricted to long positions only (Lhabitant 2008, 44).

against the fund when fund has to cover its short positions (Dechow, Hutton, Meulbroek, and Sloan 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.<sup>15</sup> 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 investment positions.

#### **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.<sup>16,17</sup> Therefore, the sample represents a set of hedge funds in which 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,

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<sup>15</sup> 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, and Ivashina and Sun (2007) find that institutional investors trade on proprietary information that they receive from participating in loan syndicates.

<sup>16</sup> All HFDD investigations were initiated and paid for by potential investors. No investigations were commissioned and/or paid for by the investigated hedge funds.

discussions with service providers (auditors and administrators), review of offering 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.<sup>18</sup> The HFDD reports provide extensive 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 investigated from 2003 to 2007. Panel A shows the sample distribution by domicile. Sample funds are domiciled primarily in the Cayman Islands (251 funds), United States (70 funds), British Virgin Islands (50 funds), and Bermuda (34 funds). 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 percent of our sample funds' managers are domiciled offshore; however, in contrast to manager location, most funds (84 percent) are located offshore. Examining the overlap between offshore managers and offshore funds, more than half (56.8 percent) of our offshore funds are managed by onshore managers; however, no onshore funds are managed by offshore managers. For multivariate analyses, we create two indicator variables to reflect the joint distribution of offshore funds and managers, and capture potential variation from the separation of fund and manager domicile. The first variable is coded

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<sup>17</sup> Instead of undertaking due diligence, investors can invest in funds of hedge funds that specialize in evaluating and monitoring fund managers (Brown, Fraser, and Liang 2008).

<sup>18</sup> 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.

as 1 if both the manager and the fund are offshore, and 0 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 percent of the funds use leverage to finance their investments. We obtain fund investment style from classifications provided in the due diligence reports. These classifications are based on qualitative analysis of the funds' returns. With respect to investment style, 20 percent of the funds have a short bias, whereas 36 percent have a long bias. In addition, there is substantial variation in the number of investment positions typically held in the funds' portfolios: 41 percent holding less than 40 positions, and 3 percent holding 1,000 or more positions. There is also variation in the typical holding period for the investments made by the sample funds, with 13 percent holding investment positions for only days and 32 percent holding positions for longer than a year.

Hedge fund managers generally receive two types of fees. First, they receive an annual management fee calculated as a percentage of assets under management. For the sample, the mean (median) management fee is 1.52 percent (1.50 percent) 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 percent (20.00 percent). 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 percent, 1.50 percent, and 2.00 percent; whereas the majority of performance fees are clustered at 20.0 percent.<sup>19</sup> Finally, we find that 10 percent of our sample funds have restated asset values and performance disclosures that were made to investors. Hedge fund restatements

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<sup>19</sup> To address the kinks in the distributions of management fees and performance fees, in robustness tests, we replace 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.

are potentially more serious than restatements of public firms, because hedge fund restatements involve net asset values that determine fees and redemptions. Overall, the characteristics of the sample are consistent with previous empirical evidence on hedge funds (Aragon 2007).

## **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 brokerage accounts. 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 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.<sup>20</sup> The role of fund administrators varies substantially across engagements; however, 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). The practitioner literature strongly advocates against allowing fund managers to perform final valuations and/or to communicate valuations to an administrator, except in highly exceptional circumstances, and even then, such occasions are recommended to be made with auditor approval and fully disclosed to investors (Lhabitant 2008, 100). Similar to auditors, we observe many unique administrators serve several of our sample hedge funds. Therefore, 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 percent of the funds require multiple signatures from both internal and external parties, and 24.2 percent require only an external signature. Some funds require only internal signatures with 24.6 percent requiring at least two internal signatures and 23.5 percent requiring only one internal signature to transfer money out of the fund’s bank and prime brokerage accounts.

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<sup>20</sup> 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 misstatement is probably larger than any damages that can be recovered especially for funds and service providers located offshore, especially those located in tax havens.



There is also substantial variation as to who prices the funds' portfolios. We observe that 9.2 percent of funds use at least one internal service and one external service to price investment positions, whereas 62.9 percent use only external services to price the portfolio. We also find that 11.7 percent 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 percent 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. Given that some funds use multiple pricing sources, we report all sources and the least objective source used by each fund. The most objective source, exchange quotes, is used (solely used) by 69.9 percent (34.8 percent) of the funds. Over-The-Counter (OTC) quotes are used (the fund's least objective source) for 15.8 percent (5.9 percent) of the funds, whereas dealer quotes are used (the fund's least objective source) for 40.2 percent (33.2 percent). Regarding proprietary based valuation sources, we find 14.8 percent (12.7 percent) of our sample uses (as their least objective source) model-based prices. Finally, 13.4 percent 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 fund's least objective price source for our empirical analyses.

The entity that sets and reports to investors the NAV of the hedge fund's investment portfolio differs from that which prices the individual investment positions. Pricing is done on an asset by asset basis and occurs on a routine, frequent basis; whereas NAV represents the net asset value of the entire portfolio and is therefore an aggregation of the individual prices determined by the fund's pricing systems. It is typically estimated and reported to investors at month end. The majority of funds (85.9 percent) have no manager involvement in the

determination of the NAV, which represents the most unbiased approach to its calculation.

However, the remaining 14.1 percent have some manager involvement, with most giving the manager sole determination of the setting and reporting of NAV.

We now describe the use of service providers by our funds. All funds in the sample are audited, but there is heterogeneity in auditor quality and reputation. Whereas a Big 4 auditor is typically used in accounting research to represent auditor quality or reputation (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.<sup>21</sup> 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 percent are audited by an auditor that is ranked in the Alpha survey. We also use the Alpha survey to determine the quality of the fund administrator and find that 31.6 percent of sample utilizes a ranked administrator.<sup>22</sup>

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

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<sup>21</sup> The correspondence between Big 4 and the hedge fund industry specific measure is 85 percent.

<sup>22</sup> We also considered a prime broker as a potential service provider. We found, however, that almost all the funds in our sample utilized a prime broker that was ranked by the Alpha survey.

providers who are 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 U.S. domiciled funds, suggesting that any offshore findings are not solely attributable to being domiciled in 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. We chose the ordering of each item based on the specific ordering determined by HedgeFundDueDiligence.com and provided in its reports. 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.<sup>23</sup> 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 statistics for summary measures of each internal control and our overall internal control measure.<sup>24</sup>

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.

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<sup>23</sup> In unreported results, we attempted to reduce the dimensionality of the internal control variables through principal component factor analysis. Although the six internal controls were positively correlated with each other, as shown in Table 3, the largest factor obtained explained only 33.9 percent of the overall variance in our internal controls.

<sup>24</sup> In the results section we investigate the robustness of our finds to variation in the internal control index.

### *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, the natural logarithm of the fund's age in days, and 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 using a measure based on the serial correlation of self-reported monthly fund returns (Getmansky et al. 2004), we use the series of indicators representing typical number and length of positions to avoid a mechanical association 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 increase 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 determine 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's investment positions. We find offshore funds are significantly less likely to internally price their portfolios, and significantly more likely to use external pricing services. Levered funds are also significantly less likely to have the manager price investment positions and more likely to use external pricing services. 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 quality with respect to who prices individual investment positions. 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 portfolios. 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 potential agency costs using relatively more objective pricing sources. 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 price sources, and some evidence that small funds use less objective sources. We also observe that funds with managers domiciled offshore make 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, and 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 fund risk, also employ stronger internal control mechanisms. Overall, internal control quality is negatively 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*

Managers have incentives to deflate, inflate, and smooth reported performance and asset under management. First, when the investor cashes out, the value of the investor's asset is revealed by the hedge fund. At this point, the manager has an incentive to deflate the revealed value of the investor's claim, thereby increasing the value of assets retained by the hedge fund. Managers also have incentives to inflate reported performance because they collect management based on reported assets under management and reported performance is a determinant of capital flows (Fung, Hsieh, Naik, and Ramadorai 2008). Finally, they have incentives to smooth reported performance to reduce the perceived volatility of the fund and therefore increase its perceived risk adjusted performance (Getmansky et al. 2004).

We posit that more extensive internal controls improve the accuracy and precision of asset valuations and returns disclosures made to investors, and that investors are willing to pay higher management fees to funds with more extensive internal controls because of the decreased likelihood and magnitude of losses arising from managers' manipulation of reported performance. Therefore, *ceteris paribus*, we predict that internal controls that provide greater opportunity to manipulate reported performance are negatively associated with the management fee paid to fund managers.

Aside from any variations in management fees, the use of internal controls can also affect performance fees. The incentives to manipulate the reported performance and valuations increases with the sensitivity of the manager's compensation relative to reported values and performance. An obvious mechanism to vary this sensitivity is through the 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.<sup>25</sup> 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 variable, the management fee, 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.

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<sup>25</sup> The use of the same independent variables in the determinants of internal control use and the hedge fund fee models is equivalent to using a two-stage approach, in which the first stage estimates internal control use, and the second stage regresses fees on the residuals from the first stage.



Panel B presents ordinary least squares regressions that model the determinants of the performance fee paid to the manager. As with the management fee, we multiply the performance fee by 100 for exposition. With respect to the control variables, performance fees are positively associated with funds that have higher turnover in their investment portfolios. 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.<sup>26</sup> This finding suggests that as the opportunity for manipulation of fund performance increases, the reliance on fund performance as an incentive mechanism decreases.

### *Endogeneity*

A potential concern is that our internal control measures are endogenous. Although 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

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<sup>26</sup> We also performed bootstrap analysis using an equal sample of funds with 20 percent performance fees randomly selected without replacement with the non-20 percent performance fee funds ( $n = 67$ ) to examine the extent that our findings and power may be influenced by the high proportion of funds with 20 percent performance fees. This selection process was repeated for 1,000 iterations to estimate the parameter and level of significance. We again observe a significant positive association between internal controls and performance fees, suggesting our results are invariant to this alternative sampling procedure.

characteristics over time; therefore, making these characteristics predetermined.<sup>27</sup> 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. Furthermore, 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.<sup>28</sup>

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 Krauth's (2007) calculation to estimate how large the correlation between unobserved heterogeneity and the internal control index would have to be compared to the correlation between the internal control index and the other independent variables. In order for the 95 percent 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 percent of the correlation between the index and the other independent variables. Although such a correlation is possible, we suggest it is unlikely given the range of fund characteristics included in our independent variables and the inclusion of relevant variables used in published hedge fund research. Obviously, the extent to which such omitted variables exist is a limitation of our study.

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<sup>27</sup> Moreover, investors have the ability and the incentives to monitor the fund's internal controls on an ongoing basis, thereby limiting a manager's ability to weaken the fund's internal controls.

<sup>28</sup> 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

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 performed our analyses only for those funds that typically held 1 to 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 ( $\beta = 0.502$ ;  $se = 0.147$ ;  $p < 0.01$ ). Additionally, we performed our analyses only for those hedge funds that typically held their positions for one year and greater, the holding period category with the greatest number of sample funds. Again, we observed the determinants of internal control use and the association between internal controls and fees to be consistent with the overall sample ( $\beta = 0.622$ ;  $se = 0.231$ ;  $p < 0.01$ ).

Finally, we consider an alternative measure based on the outcomes, namely restatements. Important for this study, restatements are not chosen by hedge funds at the time of due diligence, making them predetermined. 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 the mean fund a restatement is associated with \$692,000 less in management fees per annum, which is equivalent to a 15 percent ( $\$692,000 / \$4,608,633$ ) reduction. The observation of restated performance by the hedge fund increases the likelihood that future fund performance be restated thereby reducing confidence in the accuracy of present and future reported fund performance. Therefore,

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investors also granted to them, suggesting that the presence of such a clause would increase the overall cost to the

this evidence demonstrates a significant association between restatements, a predetermined and observable event that occurred prior to contracting, and management fees paid by investors, thereby providing further support for the finding that investors protect against the risk of future misstatements by paying lower fees. However, in contrast to the management fee findings, we find little evidence of a relationship between restatements and performance fees.

## **VI. ANALYSIS OF FRAUD INVESTIGATIONS**

We investigate a performance consequence from the use of internal controls. Specifically, we examine whether internal controls are associated with future regulatory investigations of fraud and/or financial misstatements on the part of the fund and its managers. We use investigations instead of the resolution of legal proceedings because of the long delay between the commencement of an investigation and the conclusion of legal proceedings. Such investigations can be considered an extreme form of poor performance because they are typically associated with fund liquidations and deeply discounted investor redemptions.

For the funds in the sample we search both Factiva and the SEC's website for investigations of fraud and/or financial misstatements. For Factiva we use a keyword search that captures fraud and/or financial misstatement events and carry out the search over the period starting the month after completion of the due diligence report and ending in March 2009.<sup>29</sup> For the SEC we search the SEC's website for the name of every fund in our sample. We then read every Factiva article and SEC document to determine whether the fund is under investigation for fraud and/or financial misstatements. We identify 12 funds in our sample investigated or under investigation of fraud and/or financial misstatements.

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fund when offering more favorable terms to some investors.

Table 6 Panel A compares the mean characteristics for the 12 investigated funds with the non-investigated funds in the sample. The two groups are similar except that investigation funds are significantly younger, significantly more likely to hold thousands of investment positions, and significantly more likely to hold positions for only days. Panel B compares the internal controls between the two groups of funds. The two groups are similar except that managers are more likely to be involved in setting and reporting NAV in funds that are subsequently subject to fraud investigations.

Because fund characteristics can determine both internal controls and the probability of investigation we next carry out multivariate tests. Panel C presents Probit regressions where the dependent variable is coded as 1 if the fund is subject to investigations and 0 otherwise. The independent variables are the same variables we use to examine the determinants of the internal controls, thereby allowing us to investigate whether deviations from expected internal controls are associated with future allegations and/or investigations.

The first column presents the baseline Probit regression, which has an overall statistical significance at  $p < 0.001$ . Levered funds are significantly less likely to be subject to future investigations (marginal effect = -2.18 percentage points), suggesting that leverage providers either carry out explicit monitoring or implement extensive screening prior to providing credit. Funds that hold their investment positions for quarters (marginal effect = -0.99 percentage points) are significantly less likely to have been investigated or under investigation for fraud and/or financial misstatements. Consistent with greater opportunities to commit fraud and/or financial misstatements, we find that funds holding thousands of investment positions are significantly more likely to be subject to future regulatory investigations (marginal effect = 9.55

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<sup>29</sup> We used the following keywords: wind w/5 down; fraud\*; restate\*; bankrupt\*; death; liquidat\*; blow\* w/5 up; failure; fine\*; defraud\*; guilty; conspir\*; scandal; deceive\*; plea; missing; insolven\*; collapse\*; probe\*; prosecut\*; fled; and indict\*.

percentage points). Further, the coefficient on fund age is negative and significant. Note that in Table 4 Panel E we find that the internal control index decreases in fund age, suggesting that older funds have valuable reputations that substitute for explicit internal controls by providing incentives against carrying out actions that would lead to investigations of fraud and/or financial misstatements.

In the second column we introduce the internal control index. Consistent with higher levels of internal controls being associated with a lower probability of investigation, the coefficient on the index is negative, but not statistically significant. Next we examine whether the univariate difference with respect to managerial involvement in setting and reporting NAV remains significant when controlling for fund characteristics. When we introduce the indicator variable for whether the manager is not involved in setting and reporting the fund's official NAV to investors, its coefficient is negative and significant ( $\beta = -0.838$ ;  $p < 0.05$ ) with a marginal effect of 2.17 percentage points. With respect to economic significance, the unconditional probability of a sample fund being investigated is 3 percent, implying that not having the fund manager involved in setting and reporting the NAV reduces the likelihood of being investigated for fraud by over two-thirds.

Overall, we observe some evidence consistent with the choice of internal controls being associated with a critical performance consequence, namely fraud investigations against the hedge fund. Moreover, we find that reputational incentives as proxied by fund age and explicit external monitoring and/or screening by leverage providers are associated with lower likelihoods of future regulatory investigations of fraud and/or financial misstatements.

## **VII. ROBUSTNESS**

### *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 performed 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.

Further, the reported analyses employ fund characteristics associated with assets under management and fund age, which have been commonly used by researchers to capture cross-sectional variation in fund characteristics (Aragon 2007; Brown et al. 2008). The extent that the use of fund level characteristics, rather than manager level characteristics, influences our findings is an empirical question. We consider two manager-based measures, namely the manager's assets under management and the natural logarithm of the number of funds that the manager manages. The Pearson correlation between the fund's assets under management and the natural logarithm of the fund's age in days with the manager's assets under management was 0.61 ( $p < 0.01$ ) and 0.25 ( $p < 0.01$ ), respectively. Although the Pearson correlation between the fund's assets under management and the natural logarithm of the fund's age in days with the natural logarithm of the number of funds that the manager manages was 0.16 ( $p < 0.01$ ) and 0.03 ( $p < 0.56$ ), respectively. Replacing the fund characteristics with the manager characteristics in the specifications presented in Table 5, we again observe a significantly positive association between overall internal control quality and performance fees ( $\beta = 0.236$ ;  $p < 0.05$ ), and no

significant association between internal control quality and management fees ( $\beta = 0.009$ ;  $se = 0.011$ ).

#### *Internal control index*

To examine the extent that the choice and weighting of index items significantly affects our inferences we considered an alternative index to capture overall hedge fund internal control quality. In particular, we adopted an index based solely on the extent that the internal controls did or did not include manager involvement. Specifically, for signature authority to transfer funds, who prices the portfolio, and the pricing source of the portfolio, we coded '0' for each component if the manager was involved, and '1' if the manager was not involved. Therefore, for this alternative index each fund was scored between 0 and 3. Consistent with the reported hedge fund quality index results, we again observed no significant association between internal controls and management fee ( $\beta = 0.012$ ;  $se = 0.036$ ), and a significantly positive association between internal controls and performance fees ( $\beta = 0.586$ ;  $se = 0.287$ ;  $p < 0.05$ ).

#### *Self selection in reporting performance*

We compare our sample hedge funds that do and do not self-report performance to the Lipper TASS database, which is the primary database used in academic research on hedge funds (see Lo (2008) 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 of self selection will assist in evaluating the implications of our findings to the broader hedge fund population.



Table 7 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. In addition, we note that investors were actively considering an investment in the funds included in our sample.

#### *Further controlling of investment style*

Although we control for fund investment style, including typical holding period, number of positions, and the use of long or short bias, we examine the extent that further control of investment style influences our observed findings. Specifically, for our 232 sample observations that report to Lipper TASS, we include dummy variables for each fund's investment style as classified by Lipper 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. In unreported results, all the findings for the determinants of internal controls and the determinants of investor fees are robust to the inclusion of the Lipper TASS investment style dummies consistent with our empirical predictions, with the exception of

our investment position dummies. Specifically, replicating the results from Table 4 Panel E with investment style variables, we observe that both 1000+ positions ( $\beta = -0.511$ , originally  $-2.259$ ) and 1-39 positions ( $\beta = 0.243$ , originally  $-0.547$ ) are no longer significantly negatively associated with our overall internal control index. One interpretation of these findings is that our investment position variables are to some extent capturing the underlying investment style of the funds as based on Lipper TASS classifications. Finally, note that with the inclusion of investment style variables the coefficients on 1000+ positions ( $\beta = -0.985$ ) remain significant and negative in the signature authority regressions (Table 4, Panel A) .

#### *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.

## **VIII. 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. The multi-faceted nature of this data provides a substantial detail regarding fund characteristics, operations, and internal controls. These reports are based on interviews, analyses of contract terms and financial position, and third party sources, which is in contrast to other hedge fund datasets that are solely based on self-reported, 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 that 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, which is 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. Finally, we find that funds in which the manager is removed from setting and reporting the official NAV to investors are significantly less likely to be subject to future regulatory investigations for fraud and/or financial misstatements.

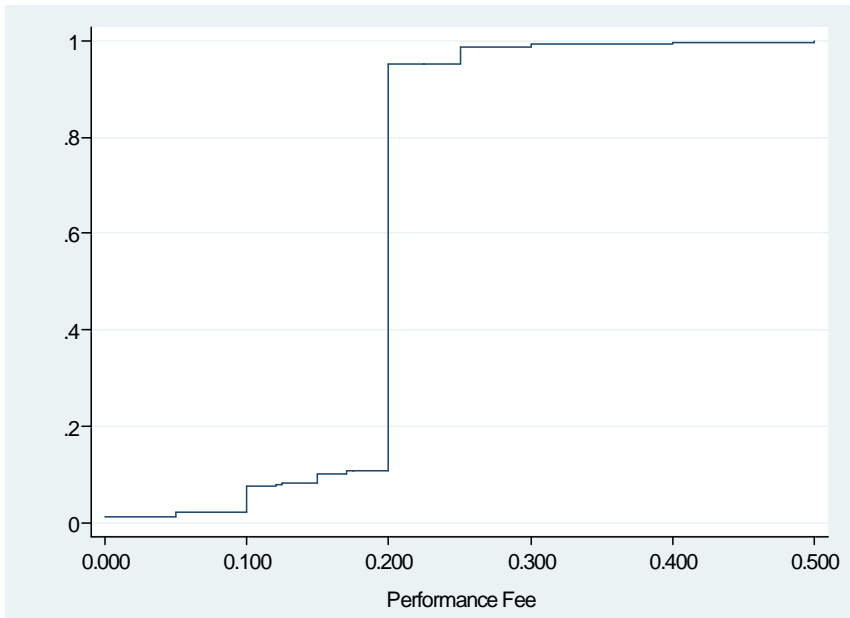
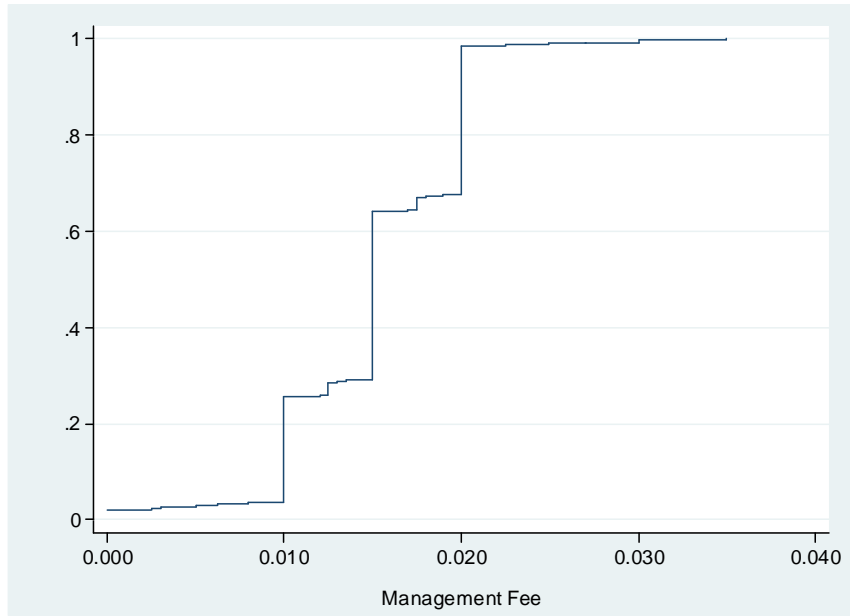
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**FIGURE 1**  
**Cumulative Distribution Functions of Management and Performance Fees**



**TABLE 1**  
**Descriptive Statistics of Hedge Funds**

**Panel A: Domicile of Funds**

Domicile	Funds
Cayman Islands	251
United States	70
British Virgin Islands	50
Bermuda	34
Bahamas	5
Other	14
Total	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**  
**Correlation Matrix <sup>a</sup>**

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

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

<sup>a</sup> Correlations in bold are statistically significant at the 0.10 level.

**TABLE 4**  
**Determinants of Internal Controls<sup>a</sup>**

**Panel A: Determinants of Signatures Required to Transfer Funds Out of Bank or Prime Broker**

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 <sup>2</sup>	0.128		0.088		0.210		0.071		0.051	
Log-Likelihood	-192.937***		-200.654**		-179.301***		-220.259		-529.657***	
n	403		403		403		403		403	

<sup>a</sup> 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.)<sup>a</sup>**

**Panel B: Determinants of Who Prices the Portfolio**

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 <sup>2</sup>	0.176		0.052		0.111		0.202		0.064	
Log-Likelihood	-147.160***		-139.920		-237.264***		-95.981***		-398.853***	
n	406		406		406		406		406	

<sup>a</sup> 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.)<sup>a</sup>**

**Panel C: Determinants of Sources for Pricing the Portfolio**

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 <sup>2</sup>	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***	
n	405		405		405		405		405		405	

<sup>a</sup> 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 a two-tailed test).



**TABLE 4**  
**Determinants of Internal Controls (cont.)<sup>a</sup>**

**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		0.305
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 <sup>2</sup>		0.171		0.131		0.143
Log-Likelihood		-135.054***		-191.070***		-219.868***
n		406		407		407

<sup>a</sup> 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.)<sup>a</sup>**

**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 <sup>2</sup>		0.224
F-stat		5.792***
n		403

<sup>a</sup> 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<sup>a</sup>**

**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 <sup>2</sup>		0.070		0.066		0.086
F-stat		3.275***		3.062***		3.934***
n		406		402		404

<sup>a</sup> 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.)<sup>a</sup>**

**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 <sup>2</sup>		0.167		0.181		0.165
F-stat		2.288***		2.144***		2.170***
n		406		402		404

<sup>a</sup> 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**  
**Determinants of Fraud Investigations<sup>a</sup>**

**Panel A: Mean Hedge Fund Characteristics by the Presence of Fraud Investigation**

Variable	Investigation	
	Yes	No
Ln(AUM)	17.71	18.41
Ln(Age)	5.16***	6.41
Off. Mgr & Fund	0.17	0.36
Fund Offshore Only	0.55	0.47
Leverage	0.42	0.54
Short Bias	0.08	0.20
Long Bias	0.50	0.35
1000+ Positions	0.25***	0.03
200–999 Positions	0.08	0.08
100–199 Positions	0.08	0.12
40–99 Positions	0.33	0.35
1–39 Positions	0.25	0.42
Years	0.17	0.32
Quarters	0.17	0.32
Months	0.25	0.15
Weeks	0.08	0.09
Days	0.33**	0.13

<sup>a</sup> Variables defined in Table 1 and 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**  
**Determinants of Fraud Investigations (cont.)<sup>a</sup>**

**Panel B: Mean Hedge Fund Internal Controls by the Presence of Fraud Investigation**

Variable	Investigation	
	Yes	No
Internal Control Index	6.92	7.50
<i>Signatures:</i>		
One Internal Signature	0.25	0.24
Two Internal Signatures	0.42	0.24
One External Signature	0.08	0.25
Dual/Triple Entity Signatures	0.25	0.27
<i>Who Prices Portfolio:</i>		
Manager Only	0.33	0.16
Manager and Administrator	0.17	0.12
Administrator	0.50	0.64
Dual/Triple Entity Pricing	0.00	0.09
<i>Least Objective Source of Pricing:</i>		
Manager	0.17	0.13
Model	0.25	0.15
Dealer Quote	0.25	0.41
OTC Quotes	0.17	0.15
Exchange Quotes	0.83	0.70
Manager Not Involved NAV	0.67*	0.86
Ranked Auditor	0.75	0.77
Ranked Administrator	0.17	0.32

<sup>a</sup> Variables defined in Table 1 and 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**  
**Determinants of Fraud Investigations (cont.)<sup>a</sup>**

**Panel C: Determinants of Fraud Investigations (Probit)**

Independent variables	Base		With Index		With NAV No Manager	
	Coefficient	Std. error	Coefficient	Std. error	Coefficient	Std. error
Internal Control Index			-0.024	0.047		
NAV No Manager					-0.838**	0.389
Ln(Age Fund)	-0.239**	0.115	-0.245**	0.115	-0.270**	0.076
Off. Mgr. & Fund	-0.064	0.435	0.024	0.501	0.299	0.565
Fund Offshore Only	0.181	0.420	0.261	0.476	0.521	0.544
Leverage	-1.001***	0.315	-1.004***	0.326	-1.094***	0.349
Short Bias	-0.329	0.406	-0.334	0.417	-0.288	0.421
Long Bias	0.353	0.295	0.353	0.307	0.336	0.296
Ln(AUM Fund)	-0.047	0.071	-0.045	0.072	-0.050	0.076
Years	-0.872	0.567	-0.875	0.548	-1.050**	0.510
Quarters	-0.776**	0.372	-0.786**	0.376	-0.801**	0.388
Weeks	0.005	0.469	-0.003	0.459	-0.238	0.478
Days	-0.151	0.439	-0.134	0.427	-0.154	0.455
1000+ Positions	1.302***	0.595	1.219**	0.584	1.391**	0.605
200–999 Positions	0.353	0.527	0.350	0.524	0.441	0.528
100–199 Positions	0.034	0.495	-0.009	0.487	0.080	0.542
1–39 Positions	-0.490	0.341	-0.533	0.331	-0.558*	0.339
Intercept	0.953	1.087	1.088	1.107	1.626	1.064
Pseudo R <sup>2</sup>	0.278		0.280		0.313	
Chi Square	-36.52***		-33.631***		-32.129***	
n	401		397		400	

<sup>a</sup> Variables defined in Table 1 and 2. Standard errors for all regressions are clustered at the manager level. Dependent variable is an indicator for whether there allegations and/or investigations of fraud and/or financial misstatements for the fund. \* 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 7**  
**Mean Hedge Fund Characteristics by Lipper 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

<sup>a</sup> 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.