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# Does Skin in the Game Matter? Director Incentives and Governance in the Mutual Fund Industry

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## Abstract

We use a unique database on ownership stakes of equity mutual fund directors to analyze whether the directors' incentive structure is related to fund performance. We find that the ownership stakes of both independent and non-independent directors play an economically important and statistically significant role. Specifically, funds in which directors have low ownership stakes, or "skin in the game," significantly underperform. We posit two economic mechanisms to explain this relation. First, lack of ownership could indicate a director's lack of alignment with the interests of fund shareholders. Second, directors may have superior private information on future mutual fund performance. We find evidence in support of the incentive alignment mechanism and against the private information mechanism. Finally, our results cannot be explained by the previously documented relation between fund governance and mutual fund fees.

## 1. Introduction

While conflicts of interest in mutual funds between managers, fund sponsors and shareholders have recently attracted much popular, academic, political and even legal attention, relatively little is known about the importance of director incentives in mutual funds, or the extent to which effective corporate governance is related to mutual fund performance.

Most studies of corporate governance have focused on industrial corporations and the evidence is mixed. For example, Weisbach (1988), Byrd and Hickman (1992), Cotter, Shivdasani and Zenner (1997), and Brickley, Coles and Terry (1994) find that more independent boards make decisions that maximize shareholder value, but Baysinger and Butler (1985), Hermalin and Weisbach (1991), and Klein (1998) find no evidence of a relation between board composition and firm performance. In the context of investment companies, Tufano and Sevick (1997) find that the fees charged by open-end funds are lower when boards have characteristics that are consistent with effective governance, and Del Guercio, Dann and Partch (2003) find that board structures conducive to effective board independence are associated with lower expense ratios and value-enhancing restructurings, but their results on the relation between governance and discounts from net asset value are mixed.

We ask whether effective governance, particularly director ownership, is associated with superior mutual fund performance, and if so, what economic mechanism could explain that. Disclosure by mutual fund directors of ownership stakes in the funds they oversee is a relatively new requirement under a rule passed by the SEC in January 2001 to help "a mutual fund shareholder to evaluate whether the independent directors can, in fact, act as an independent, vigorous, and effective force in overseeing fund operations" (SEC, 2001). To the best of our knowledge the link between the performance of mutual funds and their director's stakes has not been previously investigated in the academic literature.[1] To answer these questions, we assemble a unique database on holdings of board members of the largest equity mutual funds, and investigate whether fund performance is related to the ownership stakes of the directors overseeing those same funds. Specifically, for all the funds in the largest equity mutual fund families, we collect information on the ownership stakes of all independent and non-independent directors.

Our main finding is that effective governance matters a great deal for fund performance. Specifically, funds in which directors have low ownership stakes, or "skin in the game," significantly underperform. This underperformance has sizeable statistical significance and is

[1] Upon completion of this paper, we became aware of independent work by Meschke (2004) and Chen, Goldstein and Jiang (2005), who also study the governance of mutual funds. Although neither paper focuses directly on the relation between performance and ownership, they both consider this relation. Using different data, ownership definitions and methodology, they find less evidence that director ownership is related to fund performance. However, among other things, neither paper forms governance-sorted portfolios of funds as we do. Instead, these papers look at individual fund performance, which greatly increases the estimation risk in short time series.

economically large. This is true for ownership both at the fund family level and at the individual fund level. Funds in families in which ownership by independent directors is low generate average annual abnormal returns of -2.54%. Similarly, funds with low ownership by non-independent directors generate average abnormal returns of -2.48% and funds with low ownership by independent directors generate abnormal returns of -2.01%. The relation between ownership and performance is not linear, rather it is driven by the significant underperformance of low (and often zero) ownership funds.

We investigate the extent to which our results are driven by fees. We find that while fees are indeed higher in low director-ownership funds, and this does explain part of our results, it in fact explains a surprisingly small fraction of the results. This suggests that the role of mutual fund boards of directors extends well beyond fee negotiations.

We posit two hypotheses to explain the relation between director ownership and fund performance. First, a lack of ownership could lead directors (especially independent directors) to be less active monitors. A lack of ownership by non-independent directors (who are fund insiders) might indicate their lack of alignment with the interests of fund investors. Khorana, Servaes and Wedge (2006) present evidence that ownership by mutual fund managers has similarly "desirable incentive alignment attributes." In both cases one might expect increased agency costs between fund shareholders and fund managers (e.g., Mahoney (2004) and Zitzewitz (2003)) or even between fund shareholders and the family (Gaspar, Massa and Matos (2006) and Guedj and Papastaikoudi (2004)). The second hypothesis states that directors may have superior, private information on future fund performance, choosing not to invest in funds they expect to perform poorly.

Both mechanisms could potentially explain the observed relation. Because it is not trivial to distinguish between these two mechanisms, we present a simple model that helps in making the distinction. Specifically, if the underperformance of low ownership funds is driven by directors' private information, then directors should on average pick funds that outperform the funds they do not invest in. On the other hand, if the underperformance is due to a lack of incentive alignment, then no such relation would exist at the director level, even though it would still be observed at the fund level. Intuitively, this happens because director holdings are correlated if they are driven by superior information. On the other hand, if directors do not act on superior information, but rather pick funds based on their own risk profile, then there should be little correlation in holdings across directors.

Empirically, we find no evidence that directors pick funds that outperform the funds that they do not invest in. This stands in stark contrast to the predictions of the private information hypothesis. This result is not inconsistent with our finding that funds with low director ownership

underperform. That result holds at the fund level and is different from this analysis, which focuses on the patterns at the director level to distinguish between the two economic mechanisms. Since there is considerable variation in ownership across directors, we obtain very different results at the director level.

Having ruled out private information, we further argue that if the underperformance of low ownership funds is due to a lack of needed director incentives, then the underperformance should be most severe in funds where ownership is low and greater incentive alignment could add value. We consider several proxies for the importance of director incentives and monitoring to show that this is the case. Specifically, we argue that director incentives are more important in funds that pursue more risky strategies or that are more actively managed, as measured by their idiosyncratic volatility and turnover, respectively. In addition, we use the finding of Chen et al. (2004) that fund performance tends to decline with fund size, which they attribute to liquidity and organizational diseconomies. As a result, having appropriately incentivized directors may have more value for larger funds. Finally, incentive alignment may also have more value in funds that have less independent boards. Using these four proxies for the importance of monitoring and incentive alignment attributes, we indeed find that the link between ownership and performance is stronger when having appropriately incentivized directors is expected to matter more. [2]

We make several contributions with this paper. Our first contribution is to the literature on equity mutual funds: we identify a previously overlooked, yet economically intuitive, determinant of fund performance, namely director ownership. We present strong evidence that low ownership funds underperform.

Our second contribution is to the corporate governance literature. This paper is the first to relate director ownership to performance in the context of mutual funds. While others have done this for industrial corporations, see, e.g., Morck, Shleifer and Vishny (1998), McConnell and Servaes (1990), and Hermalin and Weisbach (1991), the issues in the mutual fund context are quite different.[3] This paper is also the first to directly relate governance and fund performance, as the previous literature focuses almost exclusively on fees. We build on the work of Tufano and Sevick (1997) and Del Guercio, Dann and Partch (2003) by not only introducing a new board characteristic, namely director ownership, but also by relating ownership to performance directly.

[2] The link between family ownership by unaffiliated directors and fund performance is also consistent with monitoring: directors typically oversee many funds but may not invest in all of them even if they are generally active monitors; hence, while zero ownership in a fund suggests lack of incentives, if a director has no ownership in any fund, it is very unlikely that the director will be an active monitor.

[3] There is evidence in this literature of a non-monotonic relation between manager and director ownership and Tobin's Q, with Q increasing at low levels of ownership and then decreasing. This is not unexpected in the context of an industrial corporation, where high ownership insulates management from board discipline and the threat of takeovers (Demsetz, 1983) but it does not apply in the mutual fund context.

An interesting by-product of our approach is that it enables us to quantify the extent to which the relation between governance and performance is due to the relation between governance and fees.

Our third contribution is to the individual investor. Following the recent mutual fund scandals, individual investors may wish to know whether a fund is likely to put its shareholders first. Our results suggest that investors should pay close attention to the incentive structure of their funds' boards of directors, and to the information disclosed in a seemingly little known document, the "Statement of Additional Information," which has a wealth of information on directors, including ownership stakes.

Our fourth contribution is to the current policy debate. Here interpretation is treacherous because our results only imply association, not necessarily causation. Still, our results indicate that the disclosure requirements brought about by the 2001 SEC rules were warranted. The latest SEC proposals require even greater transparency, as well as boards chaired by independent directors and a proportion of at least 75% of independent directors. Our findings suggest fund ownership as a mechanism to ensure that directors' interests are aligned with those of the shareholders.

We document that this mechanism is especially important for non-independent directors. This is perhaps not surprising: non-independent directors are not monitors, rather they are insiders who are more likely to be intimately involved with the life of the fund and to affect performance. This finding is consistent with Khorana, Servaes and Wedge (2006) who provide strong evidence that risk adjusted mutual fund performance is positively related to mutual fund manager ownership.

The rest of this paper is organized as follows. Section 2 discusses the legal roles of mutual fund boards of directors and the main economic hypotheses. Section 3 describes our data on mutual fund boards. Section 4 reports our results on how director ownership is related to mutual fund performance. Section 5 distinguishes between the incentives hypothesis and the private information hypothesis. Section 6 analyzes to what extent our results can be explained by fees. Section 7 concludes.

## 2. The Roles of Mutual Fund Directors

We briefly review the recent literature on mutual fund boards and develop the main hypotheses concerning the economic relation between director ownership and fund performance.

### 2.1. Structure of the Mutual Fund Industry

Mandated by the Investment Company Act of 1940, the organizational structure of the mutual fund industry is unlike that of any other sector of the economy. Mutual fund management

companies run a variety of individual funds. Mutual funds are investment companies owned by their customers, the investors. As owners, fund shareholders have voting rights and a separate, legally empowered board of directors that represents their interests. Management companies (also referred to as fund sponsors, or advisory firms) are separate corporate entities. Management companies start mutual funds: initially they own all fund shares and select directors to serve on the initial board. Thereafter, the primary responsibility of mutual fund boards is to contract for fund management services, as funds have no employees and outsource all management activities.

The role of mutual fund directors in negotiating fees with the sponsor is the subject of much prior research, e.g., Tufano and Sevick (1997). Importantly however, Phillips (2003) argues that the role of mutual fund directors (especially independent directors) is more extensive than the negotiation and approval of investment advisory contracts and fees, and includes, e.g., selection of auditors, monitoring of compliance with regulatory requirements and "responsibilities (…) to oversee many other transactions involving potential conflicts of interest between the fund's shareholders and the investment advisor." The importance of directors in mitigating potential conflicts of interest is made clear by recent fund trading scandals and allegations made by the SEC that some fund managers themselves had participated in improper trading.[4] Zitzewitz (2003) finds that agency problems may be the root cause of the alleged fund trading activities. Khorana, Tufano and Wedge (2005) show that independent boards show less tolerance of poor performance before initiating a merger. Recent research also suggests that differences might arise between the interests of the shareholders of a fund and those of the fund family. For example, Gaspar, Massa and Matos (2006) show that fund families use trades across member funds to strategically transfer performance across funds (see also Guedj and Papastaikoudi, 2004). Regulations dealing with these matters require that fund boards implement detailed policies that protect shareholders.

Within the mutual fund industry, some have argued that boards of directors fail to adequately fulfill the monitoring and advisory roles assigned to them under the 1940 Act.[5] This critique seems based upon the belief that directors, even legally independent ones, have interests more aligned with those of fund sponsors than shareholders'. According to this argument, mutual fund boards have become captured by their funds' sponsors: directors typically serve on the boards of many funds within a family and often earn significant compensation; therefore they may wish to develop a reputation for not rocking the boat and thus take actions aimed at protecting their compensation, as opposed to maximizing the fund's returns to its shareholders.[6]

[4] The SEC has alleged that some portfolio managers have market timed their own funds, and that a fund manager allowed a hedge fund he had invested in to trade improperly in the fund he managed. In other instances, fund management companies and fund managers were on opposing sides. See Mahoney (2004).
[5] See, e.g., Carter (2001) for a discussion.
[6] While fund sponsors have no direct legal means of removing independent directors, as Tufano and Sevick (1997) point out, they may pressure them into resigning or not seeking reelection. See Carter (2001) for a specific example.

In sum, directors have the important responsibility to monitor conflicts of interest and ensure that transactions with affiliates are in the best interest of the fund and its shareholders. These responsibilities extend beyond fee negotiations and cannot be dismissed simply because investment advisors are fired infrequently (Phillips (2003)). These conflict and compliance oversight responsibilities of directors occupy a major part of their role under the 1940 Act and provide significant protection for shareholders. In addition, non-independent directors are executives of funds and they can have a direct impact on performance. Nevertheless, there has been virtually no research on the economic role of mutual fund boards beyond their impact on fees and on the extent to which they successfully fulfill their roles of fiduciaries of mutual fund investors. One of the goals of this paper is to attempt to fill this gap in the literature.

### 2.2. Theory and Hypotheses

This section develops the main hypotheses concerning the economic mechanisms through which director ownership may be related to performance.

Director ownership may be related to fund performance through two economic channels. First, lack of ownership could prevent independent directors from monitoring actively. Jensen and Meckling (1976) suggest that ownership can assist in resolving the moral hazard problem by aligning directors' interests with those of shareholders. In the context of mutual funds, this would mean that directors without ownership might not have the incentive to serve as effective monitors, thereby increasing agency costs between fund shareholders and fund managers (e.g., Mahoney (2004) and Zitzewitz (2003)) or even between fund shareholders and the family (Gaspar, Massa and Matos (2006) and Guedj and Papastaikoudi (2004)). Non-independent directors, on the other hand, while not monitors, are often fund executives and can significantly affect performance. Ownership on their part can help ensure that their interests are aligned with the fund investors'.

Second, directors may have superior, private information on future fund performance. Using their private information, directors would then avoid the funds they expect to perform poorly.
Both mechanisms suggest a relation between director ownership and fund performance at the fund level, but generate very different predictions at the director level, as we now illustrate by means of a simple model. Assume that there are $d$ directors overseeing $2f$ funds, each investing in $f$ funds and not investing in the other $f$ funds. Consider the following two scenarios.

In the first scenario where directors have superior, private information, some funds are high type ($\alpha = H$) and others are low type ($\alpha = L$). Investors cannot tell the difference between the two, but directors can, by virtue of their private information. Directors invest in the high type funds and

avoid the low type funds. In this world, the spread in abnormal fund performance (alpha) at the fund level is $H - L$, and the spread in alpha at the director level is also $H - L$.[7]

In the second scenario where director incentives improve performance, all funds are ex ante identical. If at least one director invests in a fund, the director exerts greater effort and the fund becomes a type *H* fund. If on the other hand all directors happen not to invest in a fund, the fund does not benefit from the directors and becomes a type *L* fund. This nonlinear effect of ownership is consistent with our empirical finding that ownership only impacts performance at low ownership levels (section 4). The directors' investment decisions are random and independent of each other, because they are not driven by information, but rather by each director's own preferences and other assets in their portfolios besides the funds they oversee. Clearly, in this second scenario, the spread in alpha at the fund level is again $H - L$.

The spread in alpha at the director level is the expected alpha on the funds invested in minus the expected alpha on the funds not invested in. The expected alpha on the funds invested in is simply *H*, because if one director invests, the fund becomes an *H* fund. The probability that a fund has an alpha of *L* given that the director does not invest in it is the probability that the other $d$-1 directors also do not invest, i.e. $(1/2)^{d-1}$. The probability that the alpha is *H* given that the director does not invest is $1-(1/2)^{d-1}$, so the expected spread in alpha at the director level is given by

$$H - \left[\left(1 - \frac{1}{2^{d-1}}\right)H - \frac{1}{2^{d-1}}L\right] = \frac{1}{2^{d-1}}(H - L),$$

which tends to zero as the number of directors increases.

Thus if directors act on the basis of private information by avoiding funds they expect to underperform, individual director portfolios should earn positive risk adjusted returns. On the other hand, the incentive alignment hypothesis would be consistent with directors picking funds that do not necessarily outperform the funds that they do not invest in.

In the empirical work in section 5, we first rule out the private information hypothesis by considering the director level portfolios suggested by our model, and then we use proxies for the importance of director incentives to show that the relation between director ownership and fund performance is indeed concentrated in those funds in which incentives matter more.

[7] Note also that the performance differentials at the director and fund levels are identical only because we assume that directors know fund types. Assuming noisy correlated director signals might lead to larger spreads at the fund level because having multiple directors avoiding a fund reinforces signals. In either case, however, the private information scenario implies that directors should be able to pick funds that outperform the funds that they do not invest in.

A possible concern about our work is that director holdings may be due to fund family policies, perhaps through deferred compensation plans, which are sometimes set up by mutual funds to minimize the tax burden faced by directors. While in such cases one would expect tax considerations to drive at least some directors investment decisions, ownership would still improve monitoring of fund directors if they respond rationally to the incentives imposed on them. Director ownership through deferred compensation plans could challenge the private information mechanism, but we rule out this interpretation of our results in section 5.

## 3. Fund Boards and Director Ownership

### 3.1. Data Collection

Our sources of mutual fund data are (1) the Center for Research in Security Prices (CRSP) Mutual Fund database and (2) the SEC Edgar database. The CRSP database contains monthly data on net returns and net asset values, and annual data on expense ratios, total load fees, turnover and proportion of assets allocated to stocks for virtually all mutual funds since January 1, 1962. This database is essentially free of survivorship bias, e.g., Elton, Gruber and Blake (2001) and Evans (2004). The SEC Edgar database contains electronic versions of all the forms that mutual funds are required, by law, to file with the SEC. We purchased access to a large data vendor's depositary of SEC filings for the period 1996-2004.

We use the SEC Edgar database to create a new database of mutual fund director holdings in the funds they oversee. Starting January 31, 2002, mutual funds are required to disclose in a Statement of Additional Information (SAI) detailed information about each member of their board of directors, including the term of office and the length of time served, whether or not the director is independent, the number of portfolios in the fund complex overseen by the director, the dollar range of equity securities in the fund (beneficially) owned by the director, the aggregate dollar range of equity securities in all registered investment companies overseen by the director in the family of investment companies, and the total dollar amount of cash compensation received by each independent director for the fund complex. This information must be disclosed in any SAI filed by the fund; it is available to the public through the SEC but is typically not furnished by funds to shareholders except upon explicit request.

The SEC provides strict formatting standards that mutual funds must abide by. Unfortunately, the vast majority of mutual funds do not follow these formatting standards and consequently there is no formatting consistency across mutual funds. This means that the SEC forms that contain SAIs cannot be parsed electronically, such that we collect the relevant information by hand.

First, because of the labor intensity of hand-collecting this data, we limit ourselves to the actively managed equity funds that belong to the top 25 equity mutual fund families as of January 1996.

While a similar analysis could be performed on bond funds, this paper follows the standard in the literature in narrowing its focus to equity funds. Specifically, we collect basic information on all the funds that are in the CRSP database as of January 1996. We then eliminate index funds and all funds that do not have a strategic insight fund objective code of aggressive growth, growth, growth and income or balanced, or that are less than 50% invested in stocks. We then rank management companies by their total net asset values in those funds, and keep only funds that belong to the 25 largest equity mutual fund families. To avoid double counting fund returns, we follow the practice of calculating value-weighted average returns for funds with multiple share classes, see, e.g., Wermers (2000). Second, we match the funds from the CRSP database with the SEC data. Because the two databases use different fund numbering systems, this requires matching fund names from CRSP with the central index key (CIK) that the SEC Edgar database uses to identify funds. Third, for every CIK that corresponds to a fund identified in the second step, we search the SEC Edgar database for all SAIs filed in 2002, the first year that funds were required to disclose fund ownership stakes by directors. Some funds that existed in 1996 do not survive until 2002 and are thus not included in our analysis. Fourth, we manually collect from the matched SAIs the information about the members of the boards of directors that we use in our analysis, including directors' ownership of fund shares data. In the end, we are left with 134 funds across 19 families for which we have director data. Out of these 134 funds, 31 funds do not have any non-independent directors, there are 27 funds with missing non-independent director ownership data, and there are 8 funds with incomplete return histories.

The appendix provides descriptive information on the main variables of interest for the mutual funds included in the analysis. While our sample is arguably small, the next section shows that, on the major dimensions of board composition, our sample looks very much like the larger sample of mutual fund boards from 1992 that Tufano and Sevick (1997) analyze. Thus, while our sample limits our ability to draw general inferences about the mutual fund industry, there is reason to believe that it is generally representative of the boards of directors of the larger US mutual funds.

Our choice of a January 1996 start date deserves some comment, given that we only observe director ownership as of December 2001. This is motivated by the fact that one of the issues we investigate is whether ownership is related to prior performance. This is an important question, as it helps us to better understand the link between ownership and performance and to interpret our results as not being driven by directors ex-ante picking what they expect to be the best performing funds. Still, there are two potential issues regarding the start date that need to be addressed. First, we select the largest funds; these are likely to have performed well, and if performance is persistent, our sample will have funds that perform better than funds not included. This problem would actually be more serious if we had used December 2001 data for fund selection. Second, there is the issue of survivorship bias. Again, this is only relevant if the funds that survived over

the 1996 - 2002 period outperform over the 2002 - 2004 period. However, even if these two issues bias the estimated level of outperformance of all funds, what matters for our analysis is the cross-sectional variation in the performance of the funds in our sample. So, even if we overstate the performance of all the funds in our sample, we can still analyze the cross-sectional variation with respect to director ownership.

### 3.2. Director Holdings

Table 1 contains basic descriptive statistics on the variables of interest, board composition and director holdings. Panel A shows that the average board in our sample has 9.47 members, 1.94 of whom are not independent. We confirm the finding in Tufano and Sevick (1997) that there is substantial variation in board characteristics across funds, with boards ranging from 3 to 25 members and non-independents ranging from 0 to 6. Non-independent members of the board account for about 20% of the total on average in our sample, and the percentage of independents always exceeds 50%. Thus, while we use a different sample than Tufano and Sevick (1997), board size and composition in our sample is very much in line with theirs. The main difference is that the average proportion of independent board members is 71% in their (1992) sample, which reflects the move toward greater independence of mutual fund boards in recent years.

Funds are not required to disclose the exact dollar amount of director holdings, but only a range: either no investment, or an investment of $1 to $10,000, $10,001 to $50,000, $50,001 to $100,000 or more than $100,000. We convert these ranges into dollar amounts by assuming that the lowest possible dollar amount is always invested, e.g., we record an investment in the range of $10,001 to $50,000 as an investment of $10,001.[8] Therefore these numbers are very conservative estimates of ownership stakes. Panel B contains basic information on director holdings in both individual fund shares and aggregate fund family shares.

In the average mutual fund, independent directors hold an average of $8,058 in each fund overseen, for a total of $67,170 invested in all the funds overseen by the directors in the family of mutual funds. For non-independent directors, these amounts are even larger: $23,027 and $88,075 respectively. On average therefore, the stakes of non-independent directors are more substantial, which is consistent with the conjecture that non-independent directors may need stronger ownership incentives if there is indeed an economic meaning to the legal distinction between independent and non-independent directors. Importantly, there is substantial variation in some, but not all, of these amounts across funds. Specifically, both average independent director fund family holdings and average non-independent director individual fund holdings vary

[8] Our results are robust to using different numbers of portfolios. Other ways of computing average ownership measures, e.g., sorting on the ratio of ownership to director compensation, produce very similar results.

significantly, ranging from $0 to over $100,000, but the cross sectional variation in average fund family holdings by non-independent directors is much less pronounced.

Panel C shows that a substantial number of directors do not invest at all in the funds they oversee: in the average individual mutual fund, 68.36% of independent directors and 59.04% of non-independent directors have no shares. In the average fund family, we find that the percentages of independent and non-independent directors without any shares in any funds in the family are 20.76% and 6.28% respectively. There is a great deal of variation across funds in the proportion of directors with zero holdings; this is true for both independent and non-independent directors. There is also variation across fund families in the proportion of independent directors holding nothing, but the variation in the proportion of non-independents holding nothing is much smaller.

In addition to what is described in panel C, it is worth pointing out that in 31.82% (35.53%) of the individual funds in our sample no independent (non-independent) director holds anything, and that in only 10.61% (17.11%) of the funds all independent (non-independent) directors have at least a dollar invested. These low percentages suggest a low correlation between holdings across directors, which is informal evidence against the private information hypothesis. At the fund family level, in 3.82% (0%) of fund families all independent (non-independent) directors hold nothing, and in 48.85% (88.31%) all independent (non-independent) directors have at least a dollar invested.

## 4. Board Characteristics and Fund Performance

In this section, we analyze the returns of various portfolios created by sorting funds according to different board characteristics. Director ownership is measured as of December 31, 2001. Performance is measured using monthly fund returns from January 2002 to June 2004, for a total of 30 months.

We categorize funds in our sample according to three variables: (1) average fund family ownership by independent directors, (2) average individual fund ownership by independent directors, and (3) average individual fund ownership by non-independent directors. Table 1 reports some summary statistics on these three variables, and on an additional variable, namely the average family ownership of non-independent directors. As was pointed out earlier, there is almost no variation across funds in this additional variable, as most non-independent directors have family ownership in the highest range, so we do not consider this variable further.

For each variable, we sort funds into four groups based on the quartiles of the variable (see Table 1, Panel B). Thus funds in which the average family level investment by independent directors is greater than $95,000 are classified as funds with high independent family ownership, and funds in

which the average family level investment by independent directors is less than $38,334 are considered funds with low independent family ownership. Funds with independent family ownership between $38,334 and $72,857 and those with independent family ownership between $72,858 and $95,000 are the other two categories. Similarly, we also divide funds into four quartiles based on the other two variables.

We construct three separate sets of quartile portfolios (one set per governance variable) and three long/short portfolios that buy funds with high values of the particular governance variable (fourth quartile) and sell funds with low values of that governance variable (first quartile). We note that, since it is not possible to literally short funds, the long/short strategies should not be viewed as trading strategies, but merely as a convenient way to calculate differences in performance. For each portfolio we construct and report both value weighted and equally weighted returns.

To ensure that our results are not driven by differences in risk or style we calculate abnormal returns using a four factor model that includes the three Fama-French (1993) factors and a momentum factor, as in Carhart (1997) and Jegadeesh and Titman (1993). The estimated abnormal return is the constant $\alpha$ in the regression

$$R_t = \alpha + \beta_1 \cdot MKT_t + \beta_2 \cdot SMB_t + \beta_3 \cdot HML_t + \beta_4 \cdot UMD_t + \varepsilon_t ,$$

where $R_t$ is the excess return over the risk free rate to a portfolio in month $t$, and $MKT_t$, $SMB_t$, $HML_t$ and $UMD_t$ are, respectively, the excess return on the market portfolio and the return on three long/short portfolios that capture size, book-to-market, and momentum effects.

In addition to standard t-statistics, we also calculate bootstrap empirical p-values, lest we overly rely on standard statistical assumptions for our relatively short sample. For each sort, we run 1,000 bootstraps, each time randomly assigning funds to portfolios, and we compare the actual t-statistics to the empirical distribution of the t-statistics from these bootstraps. Non-normality of mutual fund returns may drive a wedge between the bootstrap and asymptotic p-values and we therefore conservatively require statistical significance at the 5% level according to the bootstrap empirical p-values.

Table 2 contains our results on the relation between mutual fund performance and the three board characteristics. In addition, it also considers the proportion of independent directors on the board. Panel A considers the performance of portfolios formed on the basis of average ownership in fund *family* shares by independent directors. We find that, over the period January 2002 to June 2004, funds with low independent family ownership earn value weighted annual abnormal returns (alphas) of -2.54%, with a t-statistic of -2.95 and a bootstrap empirical p-value of 0.02. This abnormal underperformance is very significant, both economically and statistically.

Panels B and C consider the performance of portfolios formed on the basis of average ownership in individual fund shares by non-independent directors (panel B) and independent directors (panel C). Funds with low non-independent director fund ownership earn value weighted annual abnormal returns of -2.48% with a t-statistic of -2.63 (bootstrap empirical p-value of 0.07), again economically large and moderately statistically significant. Similarly, funds with low independent director fund ownership earn value weighted annual abnormal returns of -2.01%, with a t-statistic of -3.01 and a bootstrap empirical p-value of 0.02.

The results from the equally weighted sorts in Table 2 are generally similar but weaker. Independent director fund ownership becomes insignificant. This is consistent with ownership being more important in larger funds, which we confirm in section 5.

We also perform double sorts on individual and family ownership, and find that the worst underperformance is in funds with low director ownership that belong to families with low director ownership (unreported). As another robustness check, we construct an alternative ownership variable, based on the percentage of directors with zero ownership. Results based on this measure are qualitatively consistent with, but weaker than, the results presented in Table 2.

Given the recent SEC rule requiring that 75% of board members be independent and the debate that this has sparked in the industry, it may be of interest to examine whether sorting funds according to the proportion of independent directors produces a spread. Panel D clearly shows that there is little evidence that the proportion of independent directors matters unconditionally: the alpha of the long/short portfolio is only 85 basis points, with a t-statistic of 0.63. We revisit this issue below in more detail.

Finally, we consider a regression analysis to support our results based on portfolio sorts. We use a two-step methodology in which we regress individual fund abnormal returns on board characteristics, accounting for the estimation risk of the alphas. In the first step, we estimate fund alphas by running time series regressions of fund returns on the three Fama-French factors and a momentum factor. In the second step, we regress these fund-specific alphas on ownership variables, with and without controls for fund-specific characteristics (distribution type, objective type and size), and compute t-statistics that incorporate the first step estimation risk of the alphas. Specifically, we assume heteroskedastic errors with the residual variance of each fund-specific alpha proportional to its own variance in the first step. The results in Table 3 show that independent director family ownership stakes and non-independent director fund ownership stakes are both significantly associated with higher fund-specific alphas, with t-statistics of 3.44 and 3.12 respectively. Higher fund alphas are not significantly related to independent-director ownership in individual fund shares. Including controls for fund characteristics produces similar results, though with somewhat diminished statistical significance. Overall, even though the

regression setup imposes a linear relationship, we find that the two-step alpha regression methodology produces results generally consistent with the equally weighted sorts.

In sum, for independent directors we provide evidence of both an individual fund effect and a fund family effect. For non-independent directors, we identify a significant individual-fund ownership effect. This is an important finding in light of the emphasis that regulators and researchers have placed on the role of independent directors. This finding makes good economic sense, since non-independent directors are, by the very nature of their legal classification, strongly involved in the life of the fund and perhaps more likely to need incentives to act in the interest of fund shareholders. Our results point to an important role for non-independent directors, as long as the incentives are in place to make their interests aligned with those of the shareholders of the funds they oversee.

Analyzing the abnormal returns of the individual quartiles, we do not find a monotonic relation between ownership and performance. Our results are primarily driven by the very poor performance of funds in the lowest ownership category: funds in which no directors own any shares (quartile 1 according to Panel B in Table 1) earn robustly large and statistically significant negative alphas between -2% and -2.5% per year, regardless of the specific measure of director ownership. Besides the lowest-quartile portfolios, none of the other abnormal returns are statistically significant according to the bootstrap empirical p-values.

While we devise further tests in the subsequent analysis to attempt to distinguish between the two mechanisms and alternative interpretations of our findings, it is clear that information of zero or low director ownership should be viewed as an alarming signal for mutual fund investors, regardless of the hypothesis and interpretation.

## 5. Testing the Economic Mechanisms

The results so far provide evidence of a link between director ownership and risk-adjusted fund performance. This relation could be driven by two distinct mechanisms, as described in section 2, namely the incentive alignment mechanism and the private information mechanism. According to the incentive alignment mechanism, directors with stakes in the funds they oversee have direct incentives to act in a way that benefits shareholders by ultimately improving fund performance, either directly in the case of affiliated directors or through effective monitoring in the case of independent directors. In contrast, the private-information hypothesis involves directors ex ante selecting and investing in funds that, according to their private signals and information, are expected to provide superior performance.

### 5.1. Private Information

An important implication of the model in section 2 is that, while both the private information mechanism and the incentive alignment mechanism predict underperformance of low ownership funds at the fund level, the two mechanisms generate very different predictions at the director level. Specifically, the model shows that the private information channel implies that directors, on average, choose funds that outperform the funds they do not invest in.

To test this hypothesis, we form two portfolios for each director who owns shares in at least some, but not all, of the funds he or she oversees. The first portfolio is a value-weighted investment in the funds in which the director has invested, and the second is a value-weighted investment in the funds in which the director has not invested. For each director, we then compare the average returns and alphas of the two portfolios.

We have data on 307 directors, 113 of whom have ownership in some, but not all, of the funds they oversee. This requirement is added to allow us to focus on testing the private information mechanism and differentiate from the fund level results. On average, each of these directors oversees 6.5 funds and has zero ownership in 3.4 funds.

Table 4 reports the mean performance measures between the two director-level portfolios, averaged across all directors. In stark contrast to the predictions of the private information hypothesis, the average difference in both alphas and raw returns is negative, implying that on average directors pick funds that underperform the funds they do not invest in (though in the case of raw returns the difference is not statistically significant). This result is robust to a variety of alternative specifications (e.g., equal weighting and weighting by director compensation).

These results are not inconsistent with our earlier finding that funds with lowest-quartile director ownership underperform, as highlighted by the model in section 2. Those results hold at the fund level and are different from the analysis here, which focuses on the patterns at the director level. Since there is considerable variation in ownership across directors, we obtain very different results at the director level. In particular, the underperformance at the fund level was driven by funds in the lowest quartile of director ownership, i.e., funds with zero ownership. The analysis in Table 4 on the other hand specifically focuses on the subset of directors that have some ownership in some funds, and zero in others, in order to test the private information hypothesis.[9]

To investigate the possibility that directors may have information about funds in a complex other than the funds they oversee, we consider the performance of funds in which directors are not

[9] Table 4 suggests that the fund level results are driven by directors without ownership in any fund they oversee. This is also consistent with the results for director ownership at the family level.

board members and may have holdings, by subtracting from each director's family holdings the sum of the fund-specific holdings across all funds in the family. While this ownership variable is potentially subject to large measurement error, untabulated results show that funds that directors do not oversee and in which they may have ownership underperform funds that they do not invest in (though without statistical significance after adjusting for the Fama-French and momentum factors).[10]

Also, if directors pick funds they expect to outperform, and if there is any persistence in mutual fund performance, one might expect directors to pick funds that have done well in the past, and to avoid funds that have performed poorly. We test this hypothesis by relating director ownership to past performance. Specifically, for all 307 directors for whom we have ownership data, we regress log director ownership on past annual abnormal return (over 1997 – 2001).

Table 5 reports the results of these regressions. The t-statistics that we report employ a robust cluster variance estimator (e.g., Andrews, 1991, Petersen, 2007, and Rogers, 1993). The $R^2$s in these regressions are low, and neither coefficient on past abnormal performance is statistically significant or economically large. There is little evidence that directors choose funds that have performed well in the past or avoid funds that have performed poorly.

Our data do not allow us to test directly for performance chasing by directors, as this requires a time series of ownership. Table 5 does show some weak evidence that non-independent director ownership is positively related to past abnormal performance. A regression of log non-independent director ownership on raw (rather than abnormal) past returns produces a somewhat larger coefficient on past returns of 0.31 with a robust cluster t-statistic of 2.01, which may be partially due to a mechanical relation between past raw returns and ownership levels. However, this positive relation between non-independent director ownership and past raw returns is not robust to the inclusion of other variables (as in Table 8). Importantly, even with performance persistence, our 2002-2004 performance results are unaffected by this mechanical effect, as they are concentrated in funds with zero ownership.

### 5.2. Incentive Alignment

Having ruled out the private information hypothesis by considering director level portfolios, as suggested by our model, we now use proxies for the importance of appropriately incentivizing directors to show that the relation between director ownership and fund performance is indeed concentrated in funds in which incentive alignment is expected to be more important.

[10] This analysis only considers directors whose family ownership exceeds aggregate ownership across all funds in the family where they are directors (suggesting that they may have investments in funds in the family that they do not oversee) and whose fund-specific ownership is zero in at least one fund overseen. We then compare the performance of funds with possible ownership to that of zero ownership funds.

We consider double sorts on director ownership and variables related to the importance of having appropriately incentivized directors. We sort funds on director ownership and either turnover, idiosyncratic volatility, fund size, or board independence. Idiosyncratic volatility and turnover proxy for fund strategy risk and active management. Size follows from the finding of Chen et al. (2004) that returns tend to decline with fund size, which they attribute to liquidity and organizational diseconomies of scale, suggesting that incentive alignment may be more valuable in larger funds. Turnover and idiosyncratic volatility are measured over the period 1997 to 2001. Fund size is measured as fund total net asset value as of December 31, 2001. All the double sorts are value weighted.

### 5.2.1. Conditioning on Turnover, Idiosyncratic Volatility and Fund Size

The two-way sorts construct $2 \times 4 = 8$ different portfolios. For each measure of the importance of having appropriately incentivized directors, we sort funds into two groups based on the measure (either turnover, idiosyncratic volatility, or fund size) and into four groups based on individual fund ownership by either independent or non-independent directors. To save space, Table 6 only reports results for the low ownership portfolios and the long/short portfolios that buy high ownership funds and sell low ownership funds (the full results are available upon request).

When conditioning on turnover, we find large abnormal returns for long/short portfolios based on director ownership in individual fund shares, but only when turnover is high. The alphas are 2.59% and 3.99% for independent and non-independent director ownership, respectively. Although both measures of ownership are economically significant, the bootstrap empirical p-values indicate that statistical significance only obtains for non-independent directors. This is perhaps not surprising: if there is a meaningful distinction between independent and non-independent directors, the incentive alignment mechanism would predict stronger impact of incentives on non-independent directors, who are likely to be involved in running the fund, which is exactly what we find.

Individual fund portfolios alphas are also interesting: in funds where incentive alignment is important (high turnover) but lacking (lowest ownership quartile) we find very negative abnormal returns of -3.35% and -3.40% for both types of directors.
For non-independent directors, conditioning on idiosyncratic volatility yields even stronger results. Funds with high idiosyncratic volatility and zero non-independent director ownership (quartile 1) are characterized by an abnormal return of -4.32%. The portfolio that sells these funds and simultaneously buys funds with high idiosyncratic volatility and highest-quartile ownership earns a statistically and economically significant abnormal return of 5.22%. In contrast, the abnormal return on the corresponding long/short portfolio of low-volatility funds is less than 1%

and insignificant. Funds where having appropriately incentivized directors is important, but where non-independent directors have no ownership incentives, underperform substantially.

The abnormal returns for the long/short portfolios based on independent director ownership go in the right direction (larger abnormal return when idiosyncratic volatility is high, i.e., when monitoring is expected to be most important and difficult), but we do not obtain statistical significance. The evidence is again stronger for non-independent directors, which is consistent with the view that affiliated directors are more likely to directly impact performance.[11]

If incentive alignment is more important in larger funds (e.g., because of diseconomies of scale), the link between director ownership and performance should be stronger in larger funds. The results in the last two columns of Table 6 support this prediction, as is clear from the significant alphas on long/short portfolios of large funds, for both independent and non-independent directors. The long/short portfolios of small funds have statistically insignificant abnormal returns. Consistent with the other findings and with the monitoring mechanism, the long/short results are primarily driven by the poor performance of large funds with zero ownership (alphas of -2.05% and -2.54% for independent and non-independent directors, respectively).

### 5.2.2. Conditioning on Board Independence

We conduct a two-way sort on the percentage of non-independent directors and fund ownership by all directors (both independent and non-independent). Table 7 shows that director ownership only matters when the percentage of non-independent directors is high. A portfolio that buys funds with high director ownership and sells funds with the low director stakes earns an economically and statistically significant abnormal return of 2.81%, but only when the percentage of non-independent directors is high. This long-short result is again driven by the very substantial underperformance (alpha of -3.25%) of funds that have a high fraction of non-independent directors and where ownership is in the lowest quartile.

Thus the lack of incentives in the form of ownership is most problematic when there are few independents. Relating to recent changes in SEC policy, it seems that adequately incentivizing non-independent directors is as important as regulating the fraction of independent directors.

[11] The private information mechanism may also suggest that director ownership should be more strongly related to performance in funds with high turnover or idiosyncratic volatility. However the director level results suggested by our model rule out the private information mechanism. Further, unreported results show no difference in persistence when conditioning on either turnover or idiosyncratic volatility. Hence directors could not have exploited information about these variables in an effort to chase return persistence. Also, we find no significant unconditional relation between fund performance and idiosyncratic volatility. Therefore these proxies for the importance of incentive alignment are not related to fund performance and the alphas reported in Table 6 must be driven by director ownership.

Our finding that funds that lack needed director incentives underperform begs the question of how these funds survive in equilibrium: why would investors continue to provide capital to funds that make poor decisions and that are not being scrutinized by directors? This lack of reaction of mutual fund investors to poorly incentivized directors in underperforming funds is closely related to the well-documented puzzle that some investors in underperforming funds fail to react to the underperformance by withdrawing, e.g., Berk and Xu (2004) demonstrate empirically that it is precisely this heterogeneity in investor response that generates persistence of negative performance even in a rational model without agency problems (Berk and Green (2004)).

### 5.2.3. Determinants of Director Ownership

If mutual fund shareholders benefit from director ownership because of improved incentives, then ownership should be set at the appropriate level to alleviate agency problems. Ownership should then vary across funds according to cross-sectional differences in marginal costs and benefits of improved director incentives.

In Table 8, we regress log director ownership as of December 31, 2001 (and director compensation) on fund size, turnover and idiosyncratic volatility (both computed over 1997-2001), as well as several control variables (family size, number of funds in the family, fund expense ratio and annual abnormal return over 1997-2001). If board characteristics, including director ownership, are endogenously and optimally determined, one would expect a positive relation between fund size, past turnover or idiosyncratic volatility on the one hand, and current director ownership.[12] The t-statistics that we report employ a robust cluster variance estimator that assumes independence across fund families but not within them, as some fund families have policies regarding director ownership.

Several interesting results emerge. First, these fund characteristics jointly explain a significant portion of the variation in ownership across funds: the $R^2$s in the ownership regressions are close to 25%. Second, consistent with some degree of performance maximization, fund size is an important determinant of fund ownership: the individual fund-level ownership of both independent and non-independent directors is positively related to individual fund size but not to family size (though in the case of non-independent director ownership this is not statistically significant). Similarly, director ownership is positively related to idiosyncratic volatility (though again in the case of non-independent director ownership this is not statistically significant).

[12] Directors may not be able to hold shares in funds that are primarily institutional. CRSP started disclosing the fund type only in 2003, thus we cannot be certain that funds are institutional or not before that. However, this information does not change for any of the funds in our sample between 2003 and 2006. Only 14 of the 134 funds are institutional-only as of 2003. The correlation between independent director fund ownership and an institutional-only fund dummy is -0.08, which is insignificant (t-statistic 0.9). For non-independent directors this correlation has the "wrong" sign.

Fourth, past turnover does not appear to matter[13]. We obtain similar results when we include total fund loads in the regressions in Table 8.

## 6. Board Characteristics, Shareholder Fees and Fund Performance

An important finding in the mutual fund literature is that shareholder fees are a major determinant of mutual fund performance. Among others, Blake, Elton and Gruber (1993), Carhart (1997), Elton et al. (1993), Jensen (1968), and Malkiel (1995) document this empirical regularity over various time periods, types of funds and methods of accounting for risk and style. The result that emerges from this literature is that a 1% increase in annual expense ratios typically lowers performance by 0.8% to 2.2% per year.

Our findings so far support the claim that effective governance is related to fund performance. In this section we ask to what extent this effect is driven by fees. This is an important question, because one of our objectives in this paper is to better understand the economic role of mutual fund boards. Previous research in this area has focused almost exclusively on the relation between board characteristics and shareholder fees. This is perhaps not surprising, given the literature on the relation between performance and fees, and the fact that boards of directors do play the important role of negotiating the terms of the advisory contract. However, as we have argued earlier in the paper, there is reason to believe that directors do more. Specifically directors have the important monitoring role of resolving a wide array of conflicts of interests between the advisory firm and the fund's shareholders. Also, affiliated directors are executives of the fund and can have a direct impact on performance. In this section, we attempt to quantify the role of effective governance beyond its relation to shareholder fees.

Our analysis proceeds in two parts. In the first part, we examine the relation between fund fee levels and our governance variables, after controlling for fund specific factors and fund board characteristics known to affect fees. In the second part we then investigate to what extent the relation between director ownership and fund performance is driven by fees.

### 6.1. Expense Ratio Regressions

Following Tufano and Sevick (1997) and Del Guercio, Dann and Partch (2003), we test whether effective governance is associated with lower expense ratios. We begin by replicating their result that expense ratios are negatively related to assets under management, positively related to board size[14], and negatively related to the proportion of independent members on the board. Column 1

[13] These results are robust to using raw rather than abnormal mutual fund performance, and to using raw rather than idiosyncratic fund volatility. Also, the correlation between turnover over 1997-2001 and 2002-2004 is only 54%.
[14] Yermack (1996) also finds that small boards are more effective than large ones in U.S. industrial corporations.

in Table 9 contains the evidence. We also find evidence that even after controlling for assets under management, the number of funds in the family matters, as does average turnover. The negative coefficients on fund assets, family assets and number of funds in the family point to economies of scale in the mutual fund industry and it appears that at least part of these savings are passed on to investors in the form of lower fees. The positive relation between fees and turnover is consistent with that identified by Wermers (2000). Overall the evidence in Table 9 is entirely consistent with the results of Tufano and Sevick (1997) and Del Guercio, Dann and Partch (2003) that effective governance is associated with lower shareholder fees.

We then add our director ownership measures as explanatory variables, individually at first and then together.[15] Several important results emerge from this analysis. First, independent director ownership (both at the fund and family level) has no impact on expenses. In contrast, non-independent director ownership is highly significant both economically and statistically. Adding log non-independent director fund ownership increases the $R^2$ from 33.4% to 56.3%. Economically, a one standard deviation increase in log non-independent director fund ownership (equal to 5.4) is associated with a decrease in the expense ratio of 9.8 basis points, or about 8.4% of the average expense ratio of 116 basis points. Second, controlling for non-independent director ownership, none of the other governance variables except board size remain significant or even have the expected sign.

Consistent with earlier results, incentivizing non-independent directors is found to have major implications for fund performance, while independent director ownership seems less important and in fact unrelated to expense ratios across funds.

### 6.2. Before-Fee Fund Performance

To assess the importance of governance beyond its relation to fees, we again form portfolios by sorting funds on governance variables. This is reminiscent of our analysis in Table 2 but the difference is that we now consider gross, i.e., before-fee, returns, whereas in the previous sections we were looking at returns net of fees. This is a simple approach that has the advantage that any performance differential identified in gross returns cannot, by definition, be due to the link between ownership and fees. To calculate returns before expenses, we first calculate monthly expense ratios as annual expense ratios reported by CRSP divided by 12.[16] Second, for each fund we add the monthly expense ratio back to each monthly net return and then estimate abnormal

[15] We also estimated models with quadratic terms to capture the possible non-linear effects of ownership on fees but they were insignificant.

[16] We continue to follow the standard practice of calculating a value-weighted average of returns for funds with multiple share classes as in, e.g., Wermers (2000). Fees are thus added back to each share class.

returns exactly as we do in the previous sections, using the Fama-French (1993) three-factor model augmented by a momentum factor (Carhart, 1997).[17]

Our results are reported in Table 10. Panel A considers the before-fee performance of portfolios of funds sorted on the basis of average ownership in fund family shares by independent directors. Panels B and C report results on the before-fee performance of portfolios of funds sorted on average individual fund ownership by non-independent directors and independent directors, respectively. The average annual expense ratio for each portfolio is also reported.

Two important results emerge from this analysis. First, looking at the average expense ratios, we find that funds whose non-independent directors have zero ownership indeed have higher expense ratios than funds whose directors have some ownership, consistent with the regression results. We now also find some evidence of a negative relation between average expense ratios and independent director ownership (either at the family or at the fund level).

Second, the long/short portfolios that buy funds in which directors have high ownership and sell funds in which they have little ownership still generate economically large average abnormal *before-fee returns*. For example, a long/short portfolio constructed by sorting funds on average ownership by non-independent directors in individual fund shares produces average before-fee abnormal returns of 1.73% per year, with a t-statistic of 2.00 and a bootstrap empirical p-value of 0.06. Based on net returns, the same portfolio generates average abnormal returns of 2.11% per year with a t-statistic of 2.44 and a bootstrap empirical p-value of 0.03 (see Table 2). Therefore, of the 211 basis point spread, only about 38 basis points, or 18% of the spread, can be attributed to fees. For independent directors, the fraction of the long/short abnormal return that can be attributed to fees is only 11% when sorting by fund ownership and 22% when considering family ownership. The long/short abnormal before-fee returns are statistically significant in this case, with bootstrap empirical p-values of 0.03 (independent director family ownership) and 0.04 (independent director fund ownership).

Summarizing, fees account for part of the performance of director ownership based long/short portfolios, but they clearly do not explain the spread exhaustively, and in fact only explain a remarkably small portion of it. These results are consistent with the view that directors have roles that extend beyond negotiating advisory fees with the fund sponsor.

[17] We verified that expense ratios are not affected by these factors, by adding betas with respect to the four factors of our asset pricing model to the expense ratio regression, and find that none of these are statistically significant.

## 7. Conclusion

We investigate whether director ownership, as a proxy for effective governance, is associated with superior mutual fund performance. To this end, we use a unique database on ownership by directors in the funds they oversee to analyze whether effective mutual fund governance is related to performance. The main result is that director ownership stakes are important for fund performance. Specifically, low ownership funds significantly underperform. We show that funds with higher ownership by non-independent directors have lower fees. However this can only explain a small part of the relation between ownership and performance.

We posit two hypotheses to explain the link between low director ownership and poor fund performance: lack of director incentives to act in the best interests of shareholders and private information used by directors when deciding in which funds to invest. We show that directors on average invest in funds that do not outperform the funds that they do not invest in, which renders the private information explanation untenable. We further show that the link between director ownership and fund performance is driven by the underperformance of funds that would benefit from improved alignment incentives in the form of director ownership, but where those incentives are missing.

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Appendix

This appendix provides descriptive information on the main variables of interest for the mutual funds included in the analysis. The sample construction procedure is described in section 3.1. Briefly, we start with all the funds that are in the CRSP database as of January 1996. We eliminate all funds that are not actively managed equity funds and then rank management companies by their total net asset values in those funds, and keep only those funds that belong to the 25 largest equity mutual fund families. For each fund we then search the SEC Edgar database for director ownership information. Funds were first required to disclose director ownership stakes in 2002. Some funds that existed in 1996 do not survive until 2002 and are thus not included in the analysis. Our final sample consists of 134 mutual funds and 307 directors in 19 fund complexes.

For each complex, column 1 gives the number of funds, column 2 gives the total NAV of the funds (in $millions, as of December 2001), column 3 gives the standard deviation of the NAVs of the funds in the family (in $millions, as of December 2001), column 4 gives the average expense ratio (over 2002:1 - 2004:6), column 5 gives the average turnover, column 7 gives the average proportion of independent directors, column 8 the average fund ownership by non-independent directors, column 9 the average fund ownership by independent directors, column 10 the average family ownership by independent directors, and column 11 the average total compensation by independent directors.

| | *1* | *2* | *3* | *4* | *5* | *6* | *7* | *8* | *9* | *10* | *11* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Alliance Capital Management Corp | 6 | $31,417 | $6,176 | 1.81% | 102.13% | 8.33 | 13.99% | $0 | $24,445 | $97,858 | $208,184 |
| Delaware Management Co | 6 | $2,890 | $541 | 1.50% | 80.37% | 8.67 | 18.98% | $0 | $9,048 | $45,715 | $78,658 |
| Dreyfus Service Corp | 18 | $19,778 | $1,227 | 1.06% | 68.97% | 6.94 | 1.23% | $50,001 | $2,926 | $47,411 | $205,142 |
| Federated Securities Corp | 10 | $10,490 | $1,281 | 1.39% | 61.59% | 12.00 | 25.14% | $17,000 | $3,556 | $94,388 | $136,513 |
| Fidelity Management Research | 17 | $282,556 | $22,798 | 0.84% | 106.71% | 14.50 | 22.94% | $48,646 | $14,596 | $99,837 | $260,894 |
| American Express Financial Advisors | 10 | $54,365 | $8,045 | 1.22% | 95.14% | 13.90 | 21.07% | $12,500 | $2,367 | $92,334 | $124,511 |
| Kemper Financial Services Inc | 3 | $3,919 | $2,077 | 1.42% | 60.00% | 12.00 | 25.00% | $1,111 | $1,852 | $84,445 | $187,707 |
| New York Life Securities | 7 | $7,342 | $1,261 | 1.65% | 55.85% | 7.86 | 40.00% | $31,429 | $10,286 | $54,001 | $54,450 |
| Merrill Lynch Funds Distributor Inc | 3 | $10,016 | $5,238 | 1.30% | 44.59% | 10.67 | 12.63% | $50,001 | $3,572 | $56,390 | $221,119 |
| New England Funds LP | 4 | $2,223 | $561 | 1.97% | 125.27% | 9.00 | 22.22% | $13,751 | $7,143 | $72,858 | $64,643 |
| Oppenheimer Funds Inc | 7 | $32,427 | $5,588 | 1.33% | 97.23% | 10.29 | 8.87% | $0 | $12,715 | $64,144 | $98,089 |
| Bisys Fund Services Inc | 7 | $1,578 | $199 | 1.27% | 61.29% | 5.57 | 20.71% | $37,501 | $278 | $17,381 | $18,488 |
| Putnam Management Company Inc | 2 | $8,407 | $1,689 | 1.33% | 100.68% | 13.00 | 23.08% | $5,001 | $19,001 | $100,001 | $212,500 |
| SEI Financial Management Corp | 10 | $13,648 | $1,542 | 0.95% | 80.09% | 6.10 | 33.93% | $7,223 | $1,000 | $28,125 | $62,540 |
| Smith Barney Asset Management | 6 | $16,690 | $1,341 | 1.25% | 57.15% | 7.67 | 20.90% | $2,500 | $8,786 | $32,993 | $66,495 |
| State Street Research and Mgmt Co | 2 | $3,093 | $1,839 | 1.06% | 85.72% | 8.00 | 12.50% | N/A | $17,143 | $71,429 | $83,693 |
| Vanguard Group of Investment Co | 9 | $191,428 | $26,431 | 0.34% | 33.36% | 6.89 | 20.90% | $43,751 | $17,222 | $100,001 | $99,157 |
| Van Kampen American Capital | 5 | $14,913 | $510 | 1.13% | 74.64% | 9.20 | 32.67% | $8,667 | $619 | $42,953 | $120,411 |
| Munder Capital Management Inc. | 2 | $1,857 | $593 | 0.98% | 26.80% | 7.00 | 14.29% | N/A | $8,334 | $38,334 | $74,125 |
| sum: | 134 | $709,038 | mean: | 1.25% | 74.61% | 9.35 | 20.58% | $19,358 | $8,678 | $65,295 | $125,122 |

**Table 1**
**Mutual fund board characteristics**

The tables below report data at the individual fund level for the 25 largest equity mutual fund sponsors as of December 2001. Panel A reports the distribution of board size and the number and percentage of non-independent directors. Panel B reports the distribution of director ownership stakes. Since funds do not report exact dollar ownership, but rather ranges ($0, $1 to $10,000, $10,001 to $50,000, $50,001 to $100,000 or more than $100,000), we convert these ranges into dollar amounts by assuming that the lowest possible dollar amount is always invested. For each fund in the sample, we then compute the average amount invested by the fund's directors. Panel B describes the distribution of those averages across funds. Panel C reports fund level descriptive statistics on the percentage of directors with zero ownership in the funds they oversee.

*Panel A: Size of Boards and Percentage of Independents*

| | Number of: | | Non-Independent |
|---|---|---|---|
| | Board Members | Non-Independents | Percentage |
| Mean | 9.47 | 1.94 | 19.96 |
| Std. Dev | 3.62 | 1.21 | 11.05 |
| Minimum | 3 | 0 | 0 |
| 25$^{th}$ percentile | 7 | 1 | 14.29 |
| Median | 9 | 2 | 22.22 |
| 75$^{th}$ percentile | 12 | 3 | 25 |
| Maximum | 25 | 6 | 42.86 |

*Panel B: Director Holdings*

| | Independent Director Holdings in: | | Non-Independent Director Holdings in: | |
|---|---|---|---|---|
| | Individual Fund | Fund Family | Individual Fund | Fund Family |
| Mean | 8,058 | 67,170 | 23,027 | 88,075 |
| Std. Dev | 12,711 | 30,767 | 30,478 | 22,656 |
| Minimum | 0 | 0 | 0 | 1 |
| 25$^{th}$ percentile | 0 | 38,334 | 0 | 75,001 |
| Median | 1,112 | 72,858 | 3,334 | 100,001 |
| 75$^{th}$ percentile | 14,000 | 95,001 | 50,001 | 100,001 |
| Maximum | 62,001 | 100,001 | 100,001 | 100,001 |

**Table 1, continued**

*Panel C: Directors with Zero Holdings*

| | Per Individual Fund: Percent of Directors Holding Nothing | | Per Fund Family: Percent of Directors Holding Nothing | |
|---|---|---|---|---|
| | Independent | Non-Independent | Independent | Non-Independent |
| Mean | 68.36 | 59.04 | 20.76 | 6.28 |
| Std. Dev | 32.93 | 36.51 | 27.29 | 17.53 |
| Minimum | 0 | 0 | 0 | 0 |
| $25^{th}$ percentile | 50 | 33.33 | 0 | 0 |
| Median | 78.57 | 50 | 10 | 0 |
| $75^{th}$ percentile | 100 | 100 | 33.33 | 0 |
| Maximum | 100 | 100 | 100 | 66.67 |

**Table 2**
**Portfolios formed on governance variables: One-way sorts**

Annualized mean return (in %), abnormal return (in %), its t-statistic and bootstrap empirical p-value for portfolios formed on three measures of director incentives (panels A through C), and the proportion of independent directors on the board (panel D). For each governance variable, we sort funds into portfolios based on the quartiles of the variable and report the performance of the four portfolios and a long/short portfolio. The indices (1), (2), (3), and (4) refer to the sorted portfolios, with higher values of the indices designating portfolios of funds with higher values of the indicated governance variable, e.g., '(1)' designates the portfolio of funds in the first quartile of the variable (with low values of the variable). The long/short portfolio is long '(4)' and short '(1)'. We report the results for both value weighted (VW) and equally weighted (EW) portfolios.

*Panel A: Portfolios formed on the basis of average ownership in fund family shares by independent directors (*N=*132)*

| | *VW Returns* | | | | | *EW Returns* | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Mean Return | Alpha | t-stat | p-value | | Mean Return | Alpha | t-stat | p-value |
| (1) | 0.35 | -2.54 | -2.95 | 0.02 | (1) | -0.30 | -2.85 | -4.86 | 0.01 |
| (2) | 1.63 | -1.21 | -1.50 | 0.38 | (2) | 0.78 | -2.21 | -2.85 | 0.32 |
| (3) | 0.17 | -2.07 | -2.22 | 0.13 | (3) | 1.77 | -2.10 | -2.24 | 0.61 |
| (4) | 1.76 | -0.24 | -0.47 | 0.76 | (4) | 2.51 | -0.76 | -1.00 | 0.99 |
| Lg/Short | 1.41 | 2.30 | 2.88 | 0.01 | Lg/Short | 2.81 | 2.10 | 3.99 | 0.01 |

*Panel B: Portfolios formed on the basis of average ownership in individual fund shares by non-independent directors (*N=*76)*

| | *VW Returns* | | | | | *EW Returns* | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Mean Return | Alpha | t-stat | p-value | | Mean Return | Alpha | t-stat | p-value |
| (1) | 0.21 | -2.48 | -2.63 | 0.07 | (1) | 1.79 | -2.09 | -2.24 | 0.51 |
| (2) | 3.38 | 0.23 | 0.14 | 0.93 | (2) | 1.71 | -1.20 | -0.85 | 0.94 |
| (3) | 3.09 | 0.24 | 0.20 | 0.90 | (3) | 1.60 | -1.61 | -1.94 | 0.63 |
| (4) | 1.11 | -0.37 | -0.51 | 0.76 | (4) | 2.07 | -0.41 | -0.70 | 0.96 |
| Lg/Short | 0.90 | 2.11 | 2.44 | 0.03 | Lg/Short | 0.28 | 1.68 | 1.75 | 0.15 |

**Table 2, continued**

*Panel C: Portfolios formed on the basis of average ownership in individual fund shares by independent directors (*N=*132)*

| | *VW Returns* | | | | | *EW Returns* | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Mean Return | Alpha | t-stat | p-value | | Mean Return | Alpha | t-stat | p-value |
| (1) | 0.14 | -2.01 | -3.01 | 0.02 | (1) | 0.55 | -2.28 | -3.79 | 0.04 |
| (2) | 0.61 | -1.17 | -1.31 | 0.45 | (2) | 0.68 | -2.28 | -2.67 | 0.42 |
| (3) | 2.91 | -0.21 | -0.19 | 0.90 | (3) | 2.55 | -0.99 | -1.02 | 0.98 |
| (4) | 1.32 | -0.60 | -1.17 | 0.50 | (4) | 1.22 | -2.10 | -2.85 | 0.33 |
| Lg/Short | 1.18 | 1.42 | 2.27 | 0.05 | Lg/Short | 0.67 | 0.17 | 0.38 | 0.74 |

*Panel D: Portfolios formed on the basis of proportion of independent directors on the board (*N=*133)*

| | *VW Returns* | | | | | *EW Returns* | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Mean Return | Alpha | t-stat | p-value | | Mean Return | Alpha | t-stat | p-value |
| (1) | 0.97 | -1.01 | -2.35 | 0.10 | (1) | 0.90 | -2.09 | -2.84 | 0.31 |
| (2) | 0.33 | -2.13 | -2.90 | 0.03 | (2) | 1.33 | -2.65 | -2.95 | 0.26 |
| (3) | 1.46 | -0.36 | -0.57 | 0.73 | (3) | 1.90 | -1.24 | -1.64 | 0.86 |
| (4) | 3.20 | -0.16 | -0.11 | 0.94 | (4) | 1.06 | -1.88 | -2.01 | 0.77 |
| Lg/Short | 2.24 | 0.85 | 0.63 | 0.68 | Lg/Short | 0.16 | 0.21 | 0.27 | 0.86 |

**Table 3**
**Two-step alpha regressions**

Results of regressions of fund-specific abnormal returns on board characteristics, taking into account the estimation risk of alphas. We first estimate fund-specific alphas by running time series regressions of fund returns on the three Fama-French factors and momentum. We then regress these fund-specific alphas on various board characteristics and compute t-statistics that incorporate the first step estimation risk of the alphas, assuming heteroskedastic errors with the residual variance of each fund-specific alpha proportional to its own variance. We use standard OLS coefficient estimates because a full WLS estimation is not feasible here (since we have more funds than months). Institutional fund is a dummy variable equal to one if the fund is only open to institutions, income objective is a dummy variable equal to one if the fund is an income fund (or a growth income fund), aggressive growth objective is a dummy equal to one if the fund is an aggressive growth fund, and fund size is a quartile dummy variable. Robust clustered t-statistics are in parentheses.

| Independent Variables | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| Intercept | -1.59 | -1.04 | -0.65 | -1.54 | -2.17 | -0.63 | -1.08 | -0.63 |
| | (-4.45) | (-0.78) | (-1.84) | (-2.99) | (-4.38) | (-1.13) | (-1.45) | (-1.13) |
| Independent director | 0.43 | | | | 0.35 | | | |
| family ownership | (3.44) | | | | (2.41) | | | |
| Non-independent | | 0.39 | | | | 0.38 | | |
| director fund ownership | | (3.12) | | | | (1.79) | | |
| Independent director | | | 0.05 | | | | -0.30 | |
| fund ownership | | | (0.42) | | | | (-1.18) | |
| Compensation | | | | 0.36 | | | | 0.76 |
| | | | | (2.21) | | | | (3.74) |
| Institutional Fund | | | | | -0.15 | -1.16 | -0.03 | -0.46 |
| | | | | | (-0.36) | (-2.75) | (-0.03) | (-1.31) |
| Income Objective | | | | | -1.12 | -1.91 | -1.06 | -2.00 |
| | | | | | (-3.33) | (-4.98) | (-2.02) | (-5.40) |
| Aggressive Growth | | | | | -0.55 | -0.24 | -0.73 | -1.60 |
| Objective | | | | | (-0.51) | (-0.24) | (-0.63) | (-1.61) |
| Fund Size | | | | | 0.43 | 0.19 | 0.65 | 0.17 |
| | | | | | (2.41) | (0.96) | (2.63) | (0.81) |
| N | 132 | 76 | 132 | 75 | 132 | 76 | 132 | 75 |
| $R^2$ | 0.029 | 0.035 | 0.001 | 0.020 | 0.118 | 0.114 | 0.075 | 0.191 |

**Table 4**
**Performance of directors' investments**

We form two portfolios for each director who owns shares in at least some, but not all, of the funds he or she oversees. The first portfolio is a value-weighted investment in the funds in which the director has invested, and the second is a value weighted investment in the funds in which the director has not invested. For each director, we then compare the average returns and the alphas of these two portfolios (ownership portfolio minus no-ownership portfolio). Column 1 reports the average difference across all directors in the performance measures (raw returns and alphas), column 2 reports the standard deviations, and column 3 the t-statistics. We have data on 307 directors, out of which 113 have ownership in some, but not all, of the funds they oversee.

| Performance Variables | Mean | Std. Dev. | t-stat |
|---|---|---|---|
| Raw returns | -0.33 | 5.36 | -0.65 |
| Alphas | -1.28 | 3.78 | -3.60 |

**Table 5**
**Performance chasing**

OLS regressions of log director ownership as of December 31, 2001 on the annualized abnormal return of the fund in the five years 1997-2001. The t-statistics in parentheses employ a robust cluster variance estimator.

| Independent Variables | Log Independent director fund ownership | Log Non-independent director fund ownership |
|---|---|---|
| Intercept | 4.55<br>(6.85) | 3.96<br>(3.36) |
| Past abnormal return | 0.07<br>(0.76) | 0.27<br>(1.90) |
| N | 131 | 70 |
| $R^2$ | 0.005 | 0.030 |

**Table 6**
**Portfolios formed on ownership and proxies for the importance of appropriately incentivizing directors: Two-way sorts**

This table analyzes how proxies for the importance of appropriately incentivizing directors interact with director ownership in individual fund shares. The proxies are turnover, idiosyncratic volatility and fund size. Turnover and idiosyncratic volatility (standard deviation of residuals from the four factor model) are measured over 1997-2001. Fund size is fund total net asset value as of December 31, 2001. For each incentive proxy, we sort funds into $2 \times 4 = 8$ different portfolios, two groups based on the incentive proxy and four groups based on director ownership. These double sorts are independent. For each double sort we report the annualized value weighted return (in %), abnormal return (in %), its t-statistic and bootstrap empirical p-value for the two low ownership portfolios as well as the two long/short portfolios that buy high ownership funds and sell low ownership fund. The index (*i*) refers to the sorted portfolios, with higher values of the index designating portfolios of funds with higher values of the indicated variable. The long/short portfolios are denoted '(4) - (1)'. The sample includes *N*=132 funds with ownership data for independent directors and *N*=76 funds with ownership data for non-independent directors.

| | | Turnover | | Idios. Volatility | | Fund Size | |
|---|---|---|---|---|---|---|---|
| | | (1) | (4) – (1) | (1) | (4) – (1) | (1) | (4) – (1) |
| Independent directors | | | | | | | |
| Mean Return | (1) | 0.19 | 0.80 | 0.98 | -0.24 | 0.99 | 2.03 |
| | (2) | -0.04 | 2.08 | -0.39 | 2.90 | 0.06 | 1.24 |
| Alpha | (1) | -1.53 | 1.01 | -1.71 | 1.14 | -1.54 | -1.85 |
| | (2) | -3.35 | 2.59 | -2.21 | 1.64 | -2.05 | 1.49 |
| t-stat | (1) | -2.36 | 1.35 | -1.91 | 1.47 | -1.97 | -1.32 |
| | (2) | -2.95 | 1.93 | -2.03 | 1.43 | -2.99 | 2.26 |
| p-value | (1) | 0.10 | 0.29 | 0.20 | 0.26 | 0.18 | 0.32 |
| | (2) | 0.04 | 0.10 | 0.17 | 0.28 | 0.04 | 0.06 |
| Non-independent Directors | | | | | | | |
| Mean Return | (1) | -0.41 | -0.04 | 0.20 | -1.11 | 2.28 | -0.19 |
| | (2) | 1.02 | 2.34 | 0.05 | 4.40 | -0.02 | 1.12 |
| Alpha | (1) | -1.83 | 0.75 | -2.12 | 0.94 | -1.87 | 1.31 |
| | (2) | -3.40 | 3.99 | -4.32 | 5.22 | -2.54 | 2.17 |
| t-stat | (1) | -1.92 | 0.90 | -2.38 | 0.91 | -1.31 | 0.66 |
| | (2) | -2.24 | 2.52 | -2.13 | 2.68 | -2.71 | 2.51 |
| p-value | (1) | 0.19 | 0.53 | 0.12 | 0.51 | 0.40 | 0.66 |
| | (2) | 0.13 | 0.05 | 0.16 | 0.04 | 0.07 | 0.05 |

**Table 7**
**Portfolios formed on board independence and fund ownership: Two-way sorts**

This table analyzes how board independence interacts with director ownership. We sort funds into $2 \times 4 = 8$ different portfolios, two groups based on the percentage of board members who are not independent and four groups based on the combined ownership of both independent and non-independent directors. These double sorts are independent. We report the annualized value weighted return (in %), abnormal return (in %), its t-statistic and bootstrap empirical p-value for the 8 portfolios as well as two long/short portfolios. The index (*i*) refers to the sorted portfolios, with higher values of the index designating portfolios of funds with higher values of the indicated variable. The long/short portfolios are denoted '(2) – (1)' and '(4) - (1)'. *N*=107.

| | | Ownership in individual fund shares | | | | |
|---|---|---|---|---|---|---|
| | % non-indep. | (1) | (2) | (3) | (4) | (4) – (1) |
| Mean Return | (1) | 0.17 | -0.36 | 2.15 | 0.99 | 0.82 |
| | (2) | -1.53 | 3.91 | 3.23 | 1.26 | 2.79 |
| | (2) – (1) | -1.69 | 4.27 | 1.08 | 0.27 | |
| Alpha | (1) | -1.45 | -2.23 | -0.90 | -1.13 | 0.32 |
| | (2) | -3.25 | 0.45 | 0.30 | -0.43 | 2.81 |
| | (2) – (1) | -1.80 | 2.69 | 1.20 | 0.70 | |
| t-stat | (1) | -1.19 | -2.45 | -0.86 | -2.32 | 0.30 |
| | (2) | -2.59 | 0.21 | 0.26 | -0.66 | 2.44 |
| | (2) – (1) | -1.60 | 1.20 | 1.10 | 1.12 | |
| p-value | (1) | 0.46 | 0.10 | 0.61 | 0.11 | 0.84 |
| | (2) | 0.08 | 0.89 | 0.87 | 0.69 | 0.04 |
| | (2) – (1) | 0.20 | 0.36 | 0.41 | 0.41 | |

**Table 8**
**Governance variables and the importance of monitoring**

OLS regressions log ownership and log compensation on fund and family characteristics. The first two columns regress log director ownership in fund shares as of December 31, 2001 on fund characteristics that proxy for the difficulty or the importance of monitoring, namely log fund size, idiosyncratic volatility, and turnover (both computed over 1997-2001). Control variables are log family size, number of funds in family, expense ratio, and past abnormal return. Column 3 regresses log non-independent director family level compensation on log family assets, and the same control variables. The t-statistics in parentheses employ a robust cluster variance estimator.

| Independent Variables | Log Independent director fund ownership | Log Non-independent director fund ownership | Log Compensa-tion |
|---|---|---|---|
| Intercept | -11.76 | 6.35 | 8.23 |
| | (-2.14) | (0.54) | (6.49) |
| Log of fund assets | 1.23 | 0.83 | 0.04 |
| | (3.07) | (1.53) | (0.96) |
| Past return volatility | 3.53 | 2.83 | 0.05 |
| | (2.46) | (1.68) | (0.04) |
| Turnover | -0.23 | -0.64 | -0.08 |
| | (-0.31) | (-0.53) | (-0.41) |
| Log of family assets | -0.37 | -0.23 | 0.24 |
| | (-0.65) | (-0.17) | (1.77) |
| Number of funds in family | -0.13 | 0.04 | 0.04 |
| | (-1.40) | (0.13) | (1.41) |
| Expense ratio | -0.22 | -4.42 | 0.43 |
| | (-0.22) | (-2.80) | (1.90) |
| Past abnormal return | -0.04 | 0.07 | -0.02 |
| | (-0.50) | (0.51) | (-1.22) |
| Compensation | 0.98 | -0.13 | |
| | (2.28) | (-0.09) | |
| N | 131 | 70 | 132 |
| $R^2$ | 0.258 | 0.237 | 0.360 |

**Table 9**
**Expense ratio regressions**

Analysis of expense ratios charged by the top 25 equity mutual fund sponsors as a function of fund and sponsor characteristics, as well as the incentive structure of the board of directors. The table reports results of OLS regressions. The dependent variable is the expense ratio, measured as the average annual expense ratio of a fund over the period January 2002 to June 2004. Sponsor- and fund- assets under management are both taken as of December 2001. Board size, proportion of independent directors, director ownership, and the number of funds in the fund family are as of December 2001. The average turnover is computed over the 5-year period 1997-2001. The t-statistics in parentheses employ a robust cluster variance estimator.

| Independent Variables | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| Intercept | 2.53 | 2.50 | 2.76 | 2.43 | 2.61 |
| | (7.54) | (7.10) | (6.08) | (7.90) | (5.94) |
| Log of individual fund assets | -0.00 | -0.01 | 0.05 | -0.00 | 0.04 |
| | (-0.09) | (-0.22) | (1.98) | (-0.09) | (1.86) |
| Log of fund family assets | -0.16 | -0.16 | -0.26 | -0.17 | -0.28 |
| | (-2.28) | (-2.24) | (-5.86) | (-2.35) | (-6.38) |
| Number of funds in family | -0.02 | -0.02 | 0.01 | -0.02 | 0.01 |
| | (-1.22) | (-1.22) | (0.48) | (-1.17) | (1.11) |
| Average turnover | 0.23 | 0.23 | 0.22 | 0.24 | 0.22 |
| | (2.70) | (2.65) | (3.33) | (2.81) | (3.23) |
| Board size | 0.03 | 0.03 | 0.05 | 0.03 | 0.05 |
| | (2.28) | (2.21) | (3.57) | (2.13) | (3.46) |
| Proportion of independent directors | -0.54 | -0.50 | 0.31 | -0.50 | 0.66 |
| | (-1.16) | (-1.21) | (0.33) | (-1.13) | (0.80) |
| Log of independent director fund | | 0.00 | | | 0.01 |
| ownership | | (0.61) | | | (1.55) |
| Log of non-independent director | | | -0.02 | | -0.02 |
| fund ownership | | | (-1.70) | | (-2.12) |
| Log of independent director family | | | | 0.02 | 0.01 |
| ownership | | | | (0.78) | (0.82) |
| N | 127 | 126 | 73 | 127 | 73 |
| $R^2$ | 0.334 | 0.389 | 0.563 | 0.369 | 0.595 |

**Table 10**
**Board characteristics and before-fee returns**

Annualized mean before-fee return (in %), abnormal before-fee return (in %), its t-statistic and bootstrap empirical p-value for portfolios formed on three measures of director ownership (panels A through C). For each ownership measure, we sort funds into portfolios based on the quartiles of the measure and report the performance of the four portfolios and a long/short portfolio. The indices (1), (2), (3), and (4) refer to the sorted portfolios, with higher values of the indices designating portfolios of funds with higher director ownership, e.g., '(1)' designates the portfolio of funds in the first quartile of ownership (with low ownership). The long/short portfolio is long '(4)' and short '(1)'.

*Panel A: Portfolios formed on the basis of average ownership in fund family shares by independent directors*

| | Returns Before Fees | | | | Fees |
|---|---|---|---|---|---|
| | Mean Return | Alpha | t-stat | p-value | |
| (1) | 1.50 | -1.38 | -1.60 | 0.03 | 1.14 |
| (2) | 2.80 | -0.04 | -0.05 | 0.96 | 1.18 |
| (3) | 1.42 | -0.81 | -0.87 | 0.36 | 1.23 |
| (4) | 2.43 | 0.41 | 0.80 | 0.40 | 0.69 |
| Long/Short | 0.93 | 1.78 | 2.22 | 0.03 | -0.45 |

*Panel B: Portfolios formed on the basis of average ownership in individual fund shares by non-independent directors*

| | Returns Before Fees | | | | Fees |
|---|---|---|---|---|---|
| | Mean Return | Alpha | t-stat | p-value | |
| (1) | 1.42 | -1.27 | -1.35 | 0.14 | 1.22 |
| (2) | 4.17 | 0.86 | 0.52 | 0.60 | 0.78 |
| (3) | 3.89 | 1.04 | 0.89 | 0.36 | 0.80 |
| (4) | 1.93 | 0.45 | 0.63 | 0.53 | 0.85 |
| Long/Short | 0.52 | 1.73 | 2.00 | 0.06 | -0.37 |

*Panel C: Portfolios formed on the basis of average ownership in individual fund shares by independent directors*

| | Returns Before Fees | | | | Fees |
|---|---|---|---|---|---|
| | Mean Return | Alpha | t-stat | p-value | |
| (1) | 1.00 | -1.13 | -1.70 | 0.02 | 0.86 |
| (2) | 1.63 | -0.07 | -0.07 | 0.94 | 1.03 |
| (3) | 3.83 | 0.58 | 0.53 | 0.60 | 0.93 |
| (4) | 2.05 | 0.13 | 0.26 | 0.80 | 0.76 |
| Long/Short | 1.05 | 1.26 | 2.03 | 0.04 | -0.10 |