

The Impact of Portfolio Manager Ownership on the Pricing of Closed-End Funds*

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Abstract

We examine the relationship between portfolio manager ownership, closed-end fund premiums/discounts, and future returns. Using a sample of 592 closed-end funds, representing 95% of the entire industry, we find that fund manager ownership has a positive and economically significant impact on fund premiums and future fund performance measured using both NAV and price returns. Furthermore, a number of board level characteristics, including the fraction of independent directors and directors on the board with financial expertise, are related to premiums and returns. These findings add to our understanding of the closed-end fund discount puzzle and suggest that the disclosure of portfolio manager ownership is beneficial for investors.

Closed-end funds have been the subject of significant attention on part of both academics and professionals in the asset management industry. Much of the focus has been on a number of apparent anomalies in pricing of closed-end funds, with a particular emphasis on the closed-end fund discount, whereby the vast majority of closed-end funds trade at a discount to their Net Asset Value (NAV). However, when first issued, closed-end funds are sold at a premium to NAV, which turns into a discount in subsequent months. Moreover, some funds trade at a premium during certain stages of their life. Both rational and irrational explanations for the discount have been put forth. Dimson and Minio-Kozerski (1999) divide the rational explanations into four categories: (a) Biases in NAV, (b) Agency costs, (c) Tax timing, and (d) Market segmentation.¹ They argue that while these explanations have some merit, they cannot account for all the cross-sectional and time-series variation in the observed discount. Instead, they argue that investor-sentiment based explanations may have more merit (see, for example Lee, Shleifer, and Thaler (1991)).

In two recent important papers, Berk and Stanton (2007) and Cherkes, Sagi, and Stanton (2009) argue that rational explanations for the discount may have been dismissed prematurely. Both articles show that many of the features of the data can be explained by simple models where the discount/premium emerges through the trade-off between compensation and either ability (Berk and Stanton (2007) or enhanced liquidity (Cherkes, Sagi, and Stanton (2009)). According to Berk and Stanton (2007), closed-end funds are initially sold at a premium because expected managerial ability exceeds the underlying costs of operating the fund. If actual ability turns out to be less than expected, the premium turns into a discount; however, if ability is better than expected, the premium may initially persist, but managers will demand an increase in compensation, which will eventually cause the premium to revert to a discount. This behavior is anticipated by the market, and therefore completely rational.

¹ Biases in NAV refer to cases where the NAV is not computed accurately because of lack of liquidity in the market for the underlying assets or non-synchronous trading. Agency costs reduce the market value of the fund below the NAV because the managers of the fund do not operate the fund in the best interest of the investors, thereby dissipating some value. Tax timing refers to the fact that direct ownership of the assets in the fund would allow an investor to better optimize taxes than indirect ownership via the fund. Market segmentation implies that assets are valued differently across markets, which can explain why closed-end funds that trade in one market but own assets that trade in another market can have a market value different from the underlying value of their assets.

Ability will lead to persistence in returns computed based on NAVs, but no persistence in market returns. Cherkes, Sagi, and Stanton (2009) argue that closed-end funds provide liquidity benefits because they generally hold illiquid assets. Time variation in this benefit can explain time variation in the premium; when the premium is very high, new funds are launched because the premium offsets the IPO costs. All investors in their model are rational and they do not earn abnormal returns.

The goal of this paper is to shed more light on the pricing of closed-end funds. Specifically, we examine the impact of portfolio manager ownership on the closed-end fund discount and on subsequent returns. We also examine the impact of a number of fund board attributes not previously studied in the literature on discounts and returns.

We take advantage of the new SEC rules that require both open-end and closed-end funds to report the investments of portfolio managers in their respective funds. These data need to be reported within broad ownership ranges. We gather this information for all closed-end funds in existence in the U.S. during the period 2005-2006. Since the disclosure requirements have been recently enacted and we need post disclosure performance data, we employ only one ownership datapoint for each fund.

Thirty percent of all closed-end fund managers have an ownership stake in their fund, representing, on average, about \$60,000 or 0.04% of the fund's market value (based on ownership computed using the low-end of the disclosed ownership range). While this average is relatively small, there is substantial cross-sectional variation in ownership across investment objectives with sector and domestic equity funds having ownership of approximately \$180,000 and \$210,000, translating into a percentage stake of 0.05% and 0.08%, respectively. Domestic bond fund managers are at the other end of the spectrum with average ownership of only \$30,000 or 0.01% of the fund's market value.

We document a positive relationship between the fund premium at the time of the ownership disclosure and the fraction of the fund's assets held by its portfolio manager(s). These findings are robust to the inclusion of a variety of control variables documented in prior research to be important determinants of the closed-end fund premiums/discounts. From an economic perspective, the impact of ownership is substantial. Increasing the ownership percentage by one standard deviation is associated

with an increase in the fund premium of approximately 1.7%, which is large compared to the median discount of about 4.4%. Our findings continue to hold when we relate the premium to the ownership of each individual portfolio manager and estimate the model with manager fixed effects. Thus, our results are not driven by unobserved heterogeneity across portfolio managers.

Our findings are consistent with several explanations. First, ownership may reflect managerial ability: in that case, the positive relation between ownership and the premium suggests that ability is priced (consistent with Berk and Stanton (2007)). Second, ownership reduces agency costs: the interests of portfolio managers with higher ownership stakes are more aligned with those of other shareholders in the fund, which translates into an increase in the price relative to NAV. Third, managers have better information about the future performance of the fund; hence, they retain or obtain higher stakes in funds that are expected to perform well, which translates into a lower discount. We believe that the third explanation is the most plausible. If ability or agency explanations were the predominant reasons for the positive relation between ownership and the fund premium, then this relation should weaken after controlling for past performance (a measure of ability) and other measures of agency costs. We do not find that to be the case. While past performance and other measures of agency costs are related to the premium, the magnitude of the ownership effect remains economically large after controlling for performance and other measures of agency. Additional evidence against the agency cost interpretation is that the relation between ownership and fund premiums also holds when ownership is measured in dollars instead of as a percentage of the fund's market value. Since agency arguments are based on the fraction of the gains/losses that accrue to the agents versus the principals, one would not necessarily expect dollar ownership to matter.

Consistent with all of the above explanations, we also find a strong positive relation between portfolio manager ownership and future NAV returns, future price returns and four-factor alphas, even in models estimated with manager fixed effects.

Another contribution of this paper is that it sheds light on a number of other factors related to closed-end fund discounts and returns. For instance, funds run by multiple managers trade at a larger

discount to NAV while funds with higher quality boards, i.e. boards whose members have more expertise in the financial industry, trade at a smaller discount. In addition, future price returns are positively related to the level of independence of a fund's board and the fraction of fund board members with financial expertise. Finally, both price and NAV returns are negatively related to board size. Many of these relationships have not been documented in the prior literature.

The remainder of the paper is organized as follows. In Section I, we discuss various reasons why portfolio manager ownership and fund governance characteristics may be related to the closed-end fund discount and to future returns. In section II, we describe the data collection procedure and present summary statistics on fund manager ownership. In Section III, we discuss our findings and Section IV provides concluding thoughts.

I. Hypotheses

A. The relationship between fund manager ownership, premiums, and returns

There are four potential reasons why portfolio manager ownership may be related to fund premiums and returns.

First, ownership may be a reflection of managerial ability. More adept managers may decide to purchase a larger stake in their respective funds. In addition, they may receive higher compensation which they subsequently invest in the fund, either voluntarily or because it is a policy of the fund management company.² If ability is priced and ownership is a reflection of ability, then we would expect the discount to be smaller for funds whose managers have more capital at stake in the fund. This effect should weaken when we control for past performance and for the tenure of the portfolio managers, because past performance and tenure are both measures of ability.³ Finally, if ownership reflects ability,

²A number of open-end investment management companies have made it a requirement for their fund managers to purchase shares in the funds they manage (Wall Street Journal, 2006).

³Tenure could also indicate that managers are entrenched, leading to a negative relation between the fund premium and managerial tenure.

then higher ownership will also translate into higher future NAV returns, but not into price (i.e., market) returns (if markets are efficient).⁴

Second, higher ownership may help mitigate agency problems between fund managers and shareholders, leading to improved performance. The expectation of improved performance increases the price of the fund relative to its NAV, leading to a lower discount. As with the previous argument, this effect should weaken after controlling for past performance, given that reduced agency problems would also have affected performance in the past. The agency cost explanation further implies improved future NAV returns when ownership is higher, but not price returns (in an efficient market). In addition, agency-based explanations rely on the percentage ownership, and not the dollar level of ownership (see Jensen and Meckling (1976)); this prediction allows us to compare the agency cost explanation to the alternatives, which relate more to dollar ownership than to percentage ownership.

Third, fund managers who are better informed about the future prospects of the fund management company or its underlying assets may retain or obtain higher ownership stakes. If prospective investors become aware of this, they would purchase more shares and hence increase the price of the fund relative to its NAV. This information hypothesis also applies to expected future performance and is not related to past performance, which implies that controlling for past performance should not weaken the relation between ownership and the fund discount. This argument, like the ability and agency hypotheses, implies a positive relation between future NAV performance and ownership.⁵

Fourth, if the magnitude of the discount relative to NAV is caused by investor irrationality, and if discounts are eventually expected to decline, then managers could capitalize on this behavior by buying larger stakes in funds with larger discounts. This would lead to a positive relation between ownership and

⁴ NAV (price) returns are based on changes in Net Asset Values (market prices) and distributions made by the fund. Section II.B. describes the computation of these return measures in more detail.

⁵ The distinction between ability and information appears to be subtle; the best way to illustrate what we have in mind is to draw the analogy with industrial corporations. Managers with higher ability are better skilled at finding positive NPV projects. Managers with an informational advantage may know about future earnings releases, upcoming restructurings, etc, which are all transactions that affect the share price.

fund discounts, and a positive relation between future returns (both NAV and price returns) and ownership.

B. Fund governance and other determinants of fund discounts

The notion that the closed-end fund discount may be related to agency problems is not new. For example, Barclay, Holderness, and Pontiff (1993) find that the presence of large 5% blockholders in closed-end funds is positively related to the NAV discounts; they argue that large blockholders derive significant pecuniary and non-pecuniary benefits from their ownership stakes. These benefits are priced by the market and lead to the discount. This argument is the opposite of the one we propose in the previous subsection where greater portfolio manager ownership aligns their incentives with those of the shareholders, leading to lower discounts. Clearly, if ownership becomes very large, portfolio managers may become entrenched, (see Morck, Shleifer, and Vishny (1988)) leading to inferior performance; we examine this possibility in our analyses. Moreover, we also control for the presence of large blockholders in our models.

Khorana, Wahal, and Zenner (2002) provide further evidence supporting the agency cost interpretation. They document that rights offerings in closed-end funds result in large increases in investment advisor compensation and increases in pecuniary benefits to affiliated entities. As a result, fund premiums turn into discounts over the course of the offering.⁶

Two other variables have been employed to capture the agency relationship between closed-end fund managers and the investors: expenses and payout ratios. Higher expense ratios have a negative impact on the performance of the fund, thereby reducing the price of the fund relative to net asset values. Higher payout ratios, on the other hand, reduce resources under managerial control and may increase the price of the fund relative to NAV. Cherkes, Sagi, and Stanton (2009) provide support for both effects. In the same vein, Johnson, Lin and Song (2006) find that after adopting policies stipulating minimum

⁶ Note that these findings are also consistent with the liquidity-based argument discussed by Cherkes, Sagi and Stanton (2009).

dividend yields, funds experience a reduction in discounts; the average discount for funds with large distributions (minimum dividend yield of 10% or greater) is about 58% smaller than the average discount for funds without such policies.

There is also some work studying the relation between fund board characteristics, fees, and the discount. Del Guercio, Dann, and Partch (2003) document lower expense ratios for closed-end funds with smaller and more independent boards and those boards receiving lower compensation. While they find that funds with larger boards trade at higher discounts to NAV, the degree of board independence or the presence of large blockholders does not influence the discounts in their sample.

Other research on the effectiveness of fund boards for open-end mutual funds includes Tufano and Sevick (1997), Ding and Wermers (2007), and Khorana, Servaes, and Wedge (2007). Tufano and Sevick (1997) find that smaller fund boards that consist of more independent directors negotiate lower fees. Ding and Wermers (2007) report that funds with more independent boards perform better. Khorana, Servaes, and Wedge (2007), on the other hand, do not find a robust relationship between various board characteristics (size, independence, and compensation) and subsequent performance. While the evidence on the role of boards in explaining fund performance is mixed, it is clearly important to control for these board attributes in our analyses. We also include two additional board variables that have received more recent attention. First, we control for the number of other directorships held by the board members outside the fund complex. Boards whose members have lots of outside commitments may be less effective in monitoring (Fich and Shivdasani (2006)). Second, we measure the fraction of board members that have financial expertise. Agrawal and Chadha (2005) find that companies are less likely to have to restate their earnings if their board members have financial expertise. We investigate whether the impact of financial expertise is also important in explaining the pricing and performance of closed-end funds.

Performance may also be affected by the amount of time the fund managers can dedicate to the funds. Two aspects of fund organization are important in this regard. If more managers share responsibility for managing the fund, the effort of each manager may be diluted and the impact of manager ownership on discounts and performance may be reduced. In addition, when managers have

responsibility for multiple funds, the performance of each individual fund may be affected because of the relative lack of attention. This would manifest itself in a higher discount and lower NAV returns (but not price returns in an efficient market).

II. Data, Methodology, and Descriptive Statistics

A. Ownership information

The SEC requires all closed-end funds to disclose the dollar range of their portfolio managers' ownership stakes, subsequent to December 31, 2005. This disclosure appears in fund annual reports in form N-CSR, which includes basic information such as name, title, tenure and business experience of portfolio managers, and their ownership in their respective funds. We gather managerial ownership data for all funds that filed form N-CSR during the period January 2006 through March 2007. Since there is a lag between the disclosure date and the filing date, the actual managerial ownership corresponds to the period October 2005 through December 2006. Out of the universe of 630 closed-end funds, we are able to identify 592 funds (approximately 95% of all closed-end funds) with available managerial ownership information. Our primary data sources for the remainder of the data are the 2006 Morningstar Principia Closed-End-Funds database and Lipper/Reuters.

Similar to disclosure requirements for open-end mutual funds, closed-end funds are required to disclose the dollar ownership of each portfolio manager in the following ranges: \$0, \$1-\$10,000, \$10,001-\$50,000, \$50,001-\$100,000, \$100,001-\$500,000, \$500,001-\$1,000,000, or above \$1,000,000. Based on this information, we compute fund manager ownership by summing up (for those funds with multiple managers) how much each individual manager owns in the funds under management. Using the methodology employed by Khorana, Servaes, and Wedge (2007), we use both the lowest value and midpoint of the ranges to estimate the dollar ownership, except for ownership levels above \$1 million, where we employ the low end of the range. Percentage ownership is calculated by dividing the dollar ownership by the market value of the fund at the end of the month for which the ownership data are disclosed.

Table 1 reports summary statistics on manager ownership. Panel A uses the lowest value of the range to compute fund manager ownership, while Panel B employs the midpoint of the range. Two results stand out. First, only 30% of the portfolio managers invest in their own funds. This low proportion is mainly due to domestic and international bond funds, where the likelihood of any ownership is 22% and 19% respectively.⁷ The average dollar ownership is \$60,085 (based on the low end of the range) and \$93,573 (based on the midpoint). On a percentage basis, ownership ranges between 0.04% and 0.05% of total fund assets. For open-end funds, managers own \$96,663 based on the low-end of the reporting range (\$149,570 based on the midpoint) in their funds, equivalent to 0.04% (0.08%) of total fund assets (see Khorana, Servaes, and Wedge (2007)).

Second, sector fund and domestic equity fund managers are more likely to invest in their funds, resulting in higher dollar and percentage holdings. Average dollar holdings range from \$179,774 (Panel A) to \$360,682 (Panel B) for sector funds and from \$211,804 (Panel A) to \$235,082 (Panel B) for domestic equity funds. The dollar figures translate into percentage ownership of between 0.05% and 0.09%.

B. Fund premia/discounts and performance measures

We rely primarily on monthly data from Lipper/Reuters to compute various return and premium/discount measures. The fund premium/discount is computed as $(\text{price}/\text{NAV})-1$. For fund returns, two measures are employed, the price return and the NAV return. For any time period t , returns are calculated as follows:

$$\text{Price return}_t = (P_t + \text{DIST}_t) / P_{t-1}$$

$$\text{NAV return}_t = (\text{NAV}_t + \text{DIST}_t) / \text{NAV}_{t-1}$$

⁷ Out of the 409 domestic bond funds, 267 are state municipal bond funds. For this subcategory, portfolio manager ownership is zero for all but 21 funds. We have re-computed all statistics in this paper and re-estimated all models after excluding state municipal bonds funds. All our findings persist, generally with higher statistical and economic significance.

where P_t is the price of the closed-end fund at the end of period t , NAV_t is the net asset value per share after adjusting for expenses, dividends and capital gain distributions; $DIST_t$ is the cash distribution (capital gains and dividends distribution) during period t .

The return measures computed above are raw measures of a fund's performance and do not allow for a comparison across funds with different investment objectives. Hence, we also construct objective-adjusted measures of the price and NAV return for each fund. The median fund return in each objective is employed to make this adjustment, using the following 27 categories: balanced, bank-loan, convertible, financial, health, hybrid bond, intermediate-term bond, international bond, international equity, large blend, large growth, large value, long-term bond, metals, mid-blend, mid-growth, mid-value, multi-sector bond, short-term bond, small-blend, small-growth, small-value, specialty natural resources, state municipal bond, real estate, technology, and utilities. We also compute the objective-adjusted discount, computed as the discount minus the median discount in the corresponding investment objective.

Even after adjusting for the median level of performance in the investment objective, there may still be risk differentials across funds within an objective. We therefore also measure excess returns based on a four-factor model. We employ price returns in the four-factor model, but our findings are very similar if we employ NAV returns instead. Since we have limited data for the post-ownership period, and only have data at the monthly frequency, we estimate the model over a 36 month window starting 24 months before the ownership disclosure. The alpha from such a regression would therefore capture abnormal performance both before and after the disclosure of ownership, while our goal is to investigate whether ownership can be employed to predict future performance. To overcome this problem, we estimate the following model for each fund:

$$Return_{it} = \alpha_0 + \alpha_1(post\ dummy) + \sum \beta_i(Factor_{jt}) + \varepsilon$$

where i refers to the specific fund, j refers to the factor, and t refers to the month in the 36-month window starting 24 months before the disclosure period (we require at least 30 months of data to estimate the model). Monthly risk-adjusted abnormal returns in the post-disclosure period are computed by adding the

post alpha (α_1) to the intercept (α_0). We then multiply the monthly annual return by 12 to obtain a measure of the annual abnormal return. Thus, the factor loadings are estimated using some data before the ownership date, but the estimate of excess performance is for the post-ownership period only.

To estimate the multi-factor models, we use different sets of factors for equity funds and bond funds. For equity funds, we employ the three Fama/French (1992) factors: excess return on the CRSP value-weighted index, the difference in returns between small and large stock portfolios and the difference in returns between high and low book-to-market equity portfolios. We augment these factors by a momentum factor (Carhart (1997)). For bond funds, we use the excess return on the Lehman Brothers government/corporate bond index, the excess return on the mortgage-backed securities index, the excess return on the long-term government bond index, and the excess return on the intermediate-term government bond index. These factors are the same as those employed by Blake, Elton, and Gruber (1993). Balanced funds are excluded from this analysis, because it is difficult to specify an appropriate factor model for these funds. We have retained international funds in the analyses, even though the factors employed are based on domestic U.S. returns. All of our findings persist if international funds are also excluded from models that employ four-factor alphas as the dependent variable.

C. Governance and other manager- and board specific variables

Our regression models include a large number of governance-related variables, and especially variables related to fund board effectiveness. Specifically, we gather information on board size, the number of independent and non-independent directors, as well as the following information on each director: financial expertise, number of other directorships held, and compensation received from the fund. This information is gathered from Form DEF 14A. Financial expertise is defined as having a CPA, CFA, experience in corporate financial management (for example, as chief financial officer, treasurer, controller or vice president of finance) or in the money management industry.

We also collect information on the number of portfolio managers, and the number of registered investment companies managed by those managers. Finally, we gather data from the SEC on the presence of 5% blockholders in each fund.

D. Other explanatory variables

We gather information on other explanatory variables from Morningstar Principia Closed-End-Fund CDs and Lipper/Reuters. These variables include fund age, fund expenses, and the payout ratio, defined as dividend and capital gains distributions divided by the fund's NAV.

E. Summary statistics

Table 2 compares the funds with manager ownership to those without any ownership. We start by examining the fund premium and various measures of performance. We measure the premium at the end of the month during which ownership is disclosed to ensure that such information is imbedded in the price of the fund. Funds with managerial ownership trade at higher premiums when measured on an objective-adjusted basis. The mean (median) objective-adjusted premium is 3.02% (0.46%) versus 1.49% (-0.41%) for the ownership and non-ownership samples, respectively.

Both the price and NAV returns are higher in the years before and after the ownership date for funds with manager ownership. Mean (median) NAV returns after the ownership disclosure are 11.55% (9.31%) and 8.16% (4.97%) for the two samples, and the corresponding price-based returns are 13.39% (12.10%) and 8.97% (5.35%), respectively. When we adjust the return for the median performance in the objective, however, the differences in performance between the two groups are no longer significant both before and after the ownership date. When we adjust for risk using four-factor alphas, the significant difference in performance after the ownership date re-emerges. Alphas in the year after the ownership date for funds with non-zero ownership are 2.20%, on average (median of 0.89%), compared to -0.09% (median of -1.11%) for funds without manager ownership.

Next we compare fund characteristics. We find that funds with managerial holdings tend to be larger, but more expensive. Funds with positive ownership also make larger dividend and capital gains distributions.

Finally, we compare board and governance characteristics. While the median number of managers overseeing the fund is the same across the two samples, managers with non-zero ownership manage six other investment companies with a corresponding value of 13 for the zero ownership sample. Thus, the managers of funds with ownership oversee a smaller portfolio of funds and can therefore devote more of their time and effort to each fund. We do not find a significant difference in the fraction of funds with block ownership across funds with and without manager ownership. In fact, the median fund has no blockholders at all.

In terms of board specific characteristics, funds with managerial ownership have smaller boards: 8 versus 9 board members for the median fund, but their boards are less independent (although the difference is small: 80% versus 86% independent board members for the median fund).

We also find that funds with managerial ownership are monitored by more focused boards in terms of their oversight responsibilities. First, the boards of funds with managerial ownership oversee fewer portfolios (median=24) within the fund family compared to boards of funds without managerial ownership (median=71). Second, the average number of other directorships held by the board members outside of the fund complex is smaller for funds with managerial ownership: 1.17, on average, (median=1) compared to 1.44, on average, (median=1.67) for funds without ownership.

Board members of funds with (without) managerial ownership each receive median compensation of \$6,882 (\$2,133) from the fund annually. The difference in pay between the two groups may be explained by the fact that boards with managerial ownership oversee larger funds. In addition, they oversee fewer funds. If board members are paid a fee for all the services provided to the fund management company, it is also likely that they will be paid more per fund if they oversee fewer funds.

Next, we analyze board expertise, defined by the fraction of a fund's board members with relevant financial experience. We find that 59% (69%) of board members of funds with (without) managerial ownership have financial expertise.

Overall, the univariate comparisons presented in this section indicate that closed-end funds with portfolio manager ownership trade at a higher objective-adjusted premium and have better subsequent performance as measured by four-factor alphas when compared to funds without ownership. However, these groups of funds also differ from each other along a number of other dimensions. It is therefore important to control for these differences to isolate the effect of portfolio manager ownership.

III. Results

A. Managerial ownership and closed end fund discounts

As discussed previously, a plethora of factors have been put forth to explain fund premiums and discounts. Our study contributes to this literature by examining the role of managerial ownership in influencing this relationship, after controlling for these factors. An additional contribution of our work is that our models include many governance variables that have not been studied before.

As mentioned earlier, we compute the fund premium at the end of the month during which the level of ownership is disclosed. As such, we are certain that the ownership information is public and imbedded in the price of the fund. In our models, we employ both the raw premium and the objective-adjusted premium, computed as the difference between the fund premium and the premium of the median fund in the matched investment objective.

Panel A of Table 3 reports the results of the multivariate models, estimated using OLS. All models that employ the unadjusted premium as the dependent variable also include 27 objective dummies to control for the influence of specific objectives on the premium. For example, Cherkes, Sagi and Stanton's (2009) argument that the premium is influenced by differences in liquidity between the fund and the underlying assets will be captured by these dummies. In model 1, we only include the fraction of the fund owned by the portfolio manager(s), assuming that the level of ownership is at the low end of the

disclosed range.⁸ The fund premium is positively and significantly related to the percentage ownership stake of the fund manager(s). The magnitude of the ownership coefficient is large (20.26) and its economic impact is substantial: increasing the ownership percentage by one standard deviation (0.073%) leads to an increase in the premium of 1.48%, which is large given that the median premium in the sample is -4.4%.

In model 2, we also include past performance and various fund characteristics. Including these variables has little effect on the economic and statistical significance of the coefficient of fund manager ownership. Four of the five control variables are also significant. Premiums are higher (discounts are smaller) when the fund has performed well in the past. If past NAV returns are a good predictor of future returns, investors will bid up the price of funds that performed well relative to their NAVs, leading to an increase in the premium. This result is consistent with Berk and Stanton's (2007) argument that ability is priced, and with the evidence of Bleaney and Smith (2003). Larger funds trade at a smaller premium, a finding consistent with Chen, Hong, Huang, and Kubik (2004) who document that fund size adversely affects performance for a sample of open-end funds, especially those funds investing in small and illiquid stocks. Fund age is negatively related to the premium; funds start out trading at a premium, which slowly erodes over time and turns into a discount (see, for example, Weiss (1989)). Finally, consistent with Cherkes, Sagi, and Stanton (2009), we find a higher premium for funds that make larger distributions. We find no evidence that the fund premium is related to the fund's expense ratio.

In model 3, we also include an indicator variable to capture block ownership above 5%, the number of portfolio managers running the fund, the (log of the) total number of investment companies managed by the portfolio manager(s), and the average tenure of the portfolio managers. Portfolio manager ownership continues to be significant in this specification. Moreover, the magnitude of its coefficient remains virtually unchanged compared to model 2. In addition, the premium is lower when more managers oversee the fund; this negative impact is not surprising if we believe that team management

⁸ All results reported in this paper continue to hold if we assume that ownership is at the mid-point of the disclosed range (except for ownership above \$1 million, where we continue to assume that ownership is at the low end of the range).

dilutes individual incentives. We also find a higher premium for funds whose managers have been at the helm of the fund for a longer period of time. Given the negative relationship between tenure and performance (see Khorana (1996)), managers with longer tenure are likely to have performed better. Thus, this result provides further evidence for the view that ability is priced. Consistent with Del Guercio, Dann, and Partch (2003), block ownership is not related to the premium.

Finally, in model 4, we also include various board characteristics. Inclusion of these variables has little effect on the importance of portfolio management ownership; it remains positive and significantly related to the premium. Two of the board characteristics are also significant. Funds with more independent boards trade at a lower premium, which appears to be counterintuitive. One possibility is that causality is reversed: funds with higher discounts attract more outside directors, whose expertise is required to turn the fund around, a phenomenon documented by Hermalin and Weisbach (1988) for corporate boards. We also find a positive relationship between the premium and the fraction of board members with financial expertise. The impact of board expertise has not been studied previously in either the open-end or closed-end fund literatures. It is not only statistically significant but also economically important. Increasing the fraction of the board with financial expertise from its 25th percentile (0.43) to its 75th percentile (0.875) increases the fund premium by 1.4 percentage points. This is substantial compared to the median discount in the sample of 4.4%. The positive impact of financial expertise indicates that investment advisors in the closed-end fund industry need to pay closer attention to the background and qualifications of their board members.⁹

In model 5, we adjust the premium by subtracting the median premium in the investment objective; objective dummies are therefore not included in this model. Measuring the premium on an objective adjusted basis reduces the coefficient on ownership, but it remains statistically and economically important. The impact of the other explanatory variables changes little, except that we find a positive relationship between the premium and the number of funds overseen by the manager. This result appears

⁹ In unreported models, we also included manager ownership squared as an explanatory variable to determine whether the premium declines for large levels of ownership. This is not the case; the squared term is never significantly different from zero.

counterintuitive, but may be due to the fact that better managers are rewarded with more management responsibilities. Thus, the number of investment companies overseen may just be another proxy for ability.

So far, we have interpreted our findings to imply that portfolio manager ownership affects closed-end fund premiums. An alternative interpretation is one of reverse causality in that portfolio managers acquire larger stakes in funds that trade at a higher premium. We believe that such an interpretation is less likely to be valid because we measure fund premiums at the point when the level of ownership is disclosed, which could be several months after the period for which ownership is reported. Nevertheless, if the premium persists over time, the reverse causality interpretation cannot be completely ruled out. In model 6, we therefore include the premium at the end of the month for which ownership is reported as an additional control variable. We revert back to the raw-unadjusted premium as the dependent variable, but our findings are very similar if we employ the objective-adjusted premium instead. If the level of ownership is driven by the contemporaneous premium, then the coefficient on the contemporaneous premium will capture this effect, and we will no longer find that ownership significantly affects the premium at the time of disclosure. However, we continue to find that ownership has a positive and significant impact on the premium in this specification.

Models 7 through 9 employ different measures of portfolio manager ownership. In model 7, we measure manager ownership using a dummy set equal to one if ownership is positive, and zero otherwise. Our findings persist: the premium is 2.36 percentage points higher when managers own part of the fund. In model 8, we measure the percentage ownership computed using the midpoint of the dollar ownership range. Again, we find a positive effect. The coefficient is smaller than in the equivalent model where we use the low point of the ownership range (model 4); of course, the ownership percentage using the median of the range is higher, so the net effect is similar. We employ the log of dollar ownership (plus 1) in Model 9. Again, we find a positive and significant coefficient.

Overall, the findings reported in Table 3 indicate that fund premiums are positively influenced by portfolio manager ownership. This is consistent with all of the three arguments we put forth: ability,

agency, and information. However, our findings do not weaken when we include past performance, which should also be a reflection of ability and/or the lack of agency problems, in our regressions models. This evidence is therefore the most supportive of the information argument, because information is less likely to be related to past performance. One other piece of evidence also supports the information argument over the agency argument: the impact of ownership persists when it is measured in dollars, while the agency explanation applies more to percentage ownership.¹⁰

One concern with the above analysis is that ownership is endogenous. However, many of the explanatory variables included in the regression models are variables that may also affect ownership, such as prior performance, the size of the fund, fund age, and investment objective. Controlling for these effects is equivalent to estimating a model of ownership as a function of these factors, computing the residual, and including the residual in the model explaining fund premiums. Thus, through the inclusion of these control variables, we implicitly address the endogeneity concern.

Even after including the determinants of ownership as control variables in the regression, it is still possible that ownership proxies for unobservable managerial characteristics that may also affect the premium. For example, some managers may be more risk averse and invest lower amounts in the funds they manage. This risk aversion may also lead to a suboptimal investment strategy in the fund, leading to larger discounts. To address this possibility, we take advantage of the fact that many of the managers in our sample run more than one closed-end fund, and estimate a model with manager fixed effects. However, as pointed out previously, many funds have more than one fund manager, making it impossible to simply include manager dummies in the regressions. We therefore restructure our dataset such that the unit of observation is no longer a fund, but a manager's investment in a specific fund. For example, if a fund has 2 managers, we include that fund twice in the dataset, once with the ownership of the first manager and once with the ownership of the second manager. This restructured dataset contains 1191

¹⁰ A small number of equity funds in our sample (20) have adopted a minimum dividend payout policy. As we reported, Johnson, Lin, and Song (2006) find that these funds trade at a smaller discount. We find that this is the case for our sample as well. More importantly, inclusion of a minimum dividend payout dummy in our models has no impact on the magnitude or significance of the effect of portfolio manager ownership.

fund/fund manager observations. The control variables are the same as in prior specifications, except that we measure tenure and the number of other investment companies managed for each manager separately instead of averaging these variables across all portfolio managers. Standard errors are clustered at the fund level to account for lack of independence of individual fund observations.

The results are reported in Panel B of Table 3. We present three specifications using 3 different measures of ownership, while including all control variables in each model. For the sake of brevity, we do not report the coefficients on the fund governance variables. Even in a manager fixed-effects specification, we continue to find that fund manager ownership has a positive impact on the premium. The coefficients on percentage ownership and the ownership dummy are very similar in magnitude to those in the models without manager fixed effects, while the coefficient on dollar ownership is smaller in magnitude, but remains statistically significant. These findings indicate that our results are not caused by unobservable heterogeneity across managers.

B. Explaining future fund performance

In Panel A of Table 4, we investigate whether future performance is related to fund manager ownership. Unlike for open-end funds, for closed-end funds we can examine both the price return and the NAV return of the fund where the price return is a measure of the investor's earned return on the fund while the NAV return is a measure of the actual returns generated by the fund's portfolio manager(s). We present models for objective-adjusted NAV returns and price returns, as well as for four-factor alphas. As mentioned previously, the alphas are computed based on price returns.

For each of the performance measures, we present three models. The first model only includes the fraction of the fund owned by portfolio managers and objective dummies. The second specification includes fund manager ownership and all the control variables, while the third model employs the log of the dollar ownership of the portfolio managers (based on the low end of the reported range) instead of fractional ownership, and the control variables.

Across all three performance measures we find that returns increase with the fraction of the fund owned by portfolio managers. However, this is not the case when ownership is measured in dollars instead; while the coefficient on dollar ownership is positive for all three performance measures, the effect is only significant in the model that uses the four-factor alpha as the dependent variable. The magnitude of the coefficient of the percentage ownership does not decline when control variables are added to the model. In fact, it increases substantially in two of the three sets of models. The positive impact of ownership on performance is consistent with all three arguments proposed in Section 2: (a) ownership proxies for ability and managers with superior ability perform better; (b) ownership reduces agency costs, and funds whose managers have lower agency costs perform better; (c) ownership is higher for managers with more positive information about future performance. The fact that the importance of ownership does not decline when we add control variables and both past performance and manager tenure (which should capture both ability and agency) suggests that the information explanation has more merit. However, the information explanation should also bear out when we look at dollar ownership, but this is only the case for four-factor alphas. If the alphas capture risk-adjusted performance better than objective-adjusted measures, then our findings provide the strongest support for the superior information argument.¹¹

The impact of ownership on future performance is also economically important. Increasing the ownership percentage by one standard deviation (0.073%) increases objective adjusted price returns by 1.61%, which is 17% of the standard deviation of price returns (9.63%) (based on the model with all control variables included).

¹¹ In all the specifications reported in Table 4, we measure performance over the 12-month period after the ownership dates. Investors would not be able to mimic such an investment strategy, however, because the level of ownership is disclosed with a lag. In unreported models, we have also estimated models using performance over the 12-month period after disclosure of ownership as the dependent variable. We continue to find a significant positive relationship between the fraction of the fund owned by the managers and subsequent returns. These findings are available from the authors upon request.

With respect to the control variables, there is evidence of performance persistence in NAV returns, but not in price returns or alphas. There is negative relation between the fund premium and future performance in all models, consistent with the evidence presented in Pontiff (1995).

Fund size is negatively related to fund performance in certain specifications, consistent with Chen, Hong, Huang, and Kubik (2004). Performance is also poorer when the portfolio managers oversee more investment companies; this effect is always significant for four-factor alphas and for objective-adjusted price returns. Thus, the dilution of effort that accompanies the increase in the number of funds overseen appears to have a negative impact on performance.

In terms of the various measures of board composition and quality, the variables with the strongest statistical significance levels are board size and independence. Funds with more independent boards have better subsequent price returns and alphas. From an economic perspective, increasing board independence by one standard deviation (7.68%) leads to an increase in objective-adjusted price returns of 0.97% (based on model 5), which is about 10% of its standard deviation. Board size has a negative impact on future returns, but only the impact on price and NAV returns is significant. This effect is consistent with Tufano and Sevick (1997) who suggest that there are organizational complexities and inefficiencies embedded in larger boards. Finally, funds whose board members have greater financial expertise exhibit larger four-factor alphas. The other board-related variables (other directorships held by board members and director compensation) are insignificant in all specifications.

In Panel B of Table 4, we change the unit of observation from the fund to each individual manager's investment in the fund, which allows us to estimate models with manager fixed effects. As in Panel B of Table 3, we cluster standard errors at the fund level in this estimation to address the lack of independence of observations. Fund manager ownership, tenure, and number of investment companies managed are measured for each fund manager separately; the other explanatory variables are measured at the fund level. We present two models for each of the three performance measures, one model using the percentage ownership, the other using dollar ownership. Again, for sake of brevity, we do not report the coefficients on the The findings are very similar to those reported in Panel A of Table 4: the percentage

ownership has a significant influence on subsequent performance in all specifications, while dollar ownership only matters for four-factor alphas. If anything, the regression coefficients are larger than those in Panel A of Table 4. This evidence indicates that, as in the premium regressions, the unobserved heterogeneity across fund managers is not influencing the results.

In summary, managerial ownership is positively related to fund future performance, even after controlling for a number of factors previously examined in the literature, and for a number of new factors. A strong governance structure (small boards with more independent directors who have financial expertise) also improves returns for investors.

IV. Concluding remarks

This paper demonstrates that portfolio manager ownership has a substantial impact on the closed-end fund discount and subsequent returns. Higher ownership leads to lower discounts and better subsequent performance. These findings continue to hold when we consider each manager's investment in each fund as an individual observation and control for unobservable heterogeneity across managers. While prior work has shown that portfolio manager ownership is related to subsequent performance for open-end funds, the results on the relationship between fund manager ownership and the closed-end fund discount have not been previously documented.

We explore several explanations for our findings. Ownership may be a reflection of ability, but the effect of ownership does not decline when we include other measures of ability; hence, that explanation is not fully supported by the data. Ownership may be a measure of agency costs, but, as with ability, including other measures of agency costs does not weaken the effect of ownership on discounts and performance. Finally, ownership may be higher for managers that have better information about the future performance of the fund. This explanation relies more on dollar ownership than on percentage ownership; we do find that dollar ownership has a positive influence on the premium, but dollar ownership only affects future performance when measured using four-factor alphas. Given that four-factor alphas may measure excess performance better than objective-adjusted returns, our findings are

most consistent with the notion that managers maintain higher ownership stakes where they have better information about improved future fund performance. From the perspective of the fund investor, our findings are useful no matter what ultimately drives the underlying relationships.

We also uncover a number of other factors that are related to fund discounts and performance. Funds trade at a higher premium (lower discount) when past performance has been superior, when they are younger and smaller, have fewer managers with longer tenure, when there are fewer outsiders on the board, and when board members have greater financial expertise. Future returns are higher for funds with smaller boards, consisting of more independent directors with greater financial expertise.

Collectively, our results indicate that closed-end fund investors should pay close attention to portfolio manager ownership and other aspects of fund governance in making their fund selection decisions.

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Table 1
Summary statistics of manager holdings in closed-end funds

This table reports the dollar amount and percentage of managers' ownership in their funds during a disclosure period of October 31, 2005 and December 31, 2006. All funds are categorized into the following objectives: balanced, domestic bond, domestic equity, international bond, international equity and sector. Mean, 50th, 75th, 90th, and 100th percentiles of manager ownership are reported. Since funds only report the range of each manager's fund ownership (\$0, \$1-\$10,000, \$10,001-\$50,000, \$50,001-\$100,000, \$100,001-\$500,000, \$500,001-\$1,000,000, or above \$1,000,000), we sum them up for all managers in each fund. Panel A assumes that each manager holds the lowest value of the range, while Panel B assumes the midpoint of the range. For the over \$1 million range, we set manager ownership at the bottom of the range. Percentage of managerial ownership is the percentage of all managers' total ownership in a fund scaled by its total assets. % own refers to the percentage of managers with positive ownership.

Panel A. Summary statistics of manager holdings (based on lowest value of range)

Fund Type	N	% own	Managerial ownership (in dollars)					Managerial ownership (in percentage)				
			Mean	50th	75th	90th	100th	Mean	50th	75th	90th	100th
All funds	592	0.30	60,085	0	2	100,002	2,000,002	0.04	0.00	0.00	0.03	9.94
Balanced	8	0.63	130,001	5,001	15,003	1,000,001	1,000,001	0.10	0.00	0.01	0.80	0.80
Domestic bond	409	0.22	29,096	0	0	50,001	2,000,002	0.01	0.00	0.00	0.02	0.62
Domestic equity	61	0.57	211,804	1	70,003	1,000,001	2,000,002	0.08	0.00	0.02	0.14	1.85
International bond	21	0.19	7,143	0	0	1	100,001	0.00	0.00	0.00	0.00	0.03
International equity	49	0.24	33,674	0	0	110,002	1,000,001	0.21	0.00	0.00	0.03	9.94
Sector	44	0.70	179,774	50,001	225,004	600,002	1,000,002	0.05	0.01	0.04	0.12	0.70

Panel B. Summary statistics of manager holdings (based on midpoint of range)

Fund Type	N	Managerial ownership (in dollars)					Managerial ownership (in percentage)				
		Mean	50th	75th	90th	100th	Mean	50th	75th	90th	100th
All funds	592	93,573	0	10,000	300,000	2,000,002	0.05	0.00	0.00	0.08	9.94
Balanced	8	141,875	17,500	50,000	1,000,001	1,000,001	0.11	0.01	0.03	0.80	0.80
Domestic bond	409	51,137	0	0	75,000	2,000,002	0.02	0.00	0.00	0.04	0.83
Domestic equity	61	235,082	5,000	135,000	1,000,001	2,000,002	0.09	0.00	0.03	0.20	1.85
International bond	21	18,333	0	0	5,000	300,000	0.01	0.00	0.00	0.02	0.08
International equity	49	56,122	0	0	330,000	1,000,001	0.22	0.00	0.00	0.09	9.94
Sector	44	360,682	75,000	640,000	1,000,001	1,500,000	0.09	0.03	0.09	0.28	0.70

Table 2
Summary statistics for funds with and without fund manager ownership

This table reports summary statistics for funds with and without fund manager ownership. Premium is computed as (fund price-NAV)/NAV. Premium (month of disclosure) refers to the fund premium at the end of month during which the level of ownership is disclosed. Obj-adj premium is computed as the fund premium minus the premium of the median fund with the same investment objective. Obj-adj return is computed as the fund return less that of the median fund with the same investment objective. -12 months (+12 months) refers to the 12 month period before (after) the ownership date. Alpha is the abnormal fund return estimated using separate four-factor models for equity and bond funds computed over the 2-year period before the ownership date (prior alpha) and the 1 year period after the ownership date (post alpha). Payout ratio is the sum of dividend and capital gains distributions during the year for which ownership is disclosed, divided by the NAV of the fund. Manager tenure is the log of the average tenure of all managers managing the fund. Number of investment co. managed is the average number of investment companies managed by the portfolio managers. Number of other directorships refers to the average number of other directorships outside the fund complex held by fund board members. Board member compensation is the average dollar amount each board member receives from the fund. Board member with expertise is the fraction of a fund's board members with relevant financial expertise. All performance measures are in percent. *, **, *** indicates that the difference between funds with and without ownership is significant at the 10%, 5%, and 1% levels. A t-test is conducted for differences in means and a rank sum test for differences in medians.

	With fund manager ownership		Without fund manager ownership	
	Mean	Median	Mean	Median
<i>Performance</i>				
Premium (month of disclosure)	-2.70	-5.08	-2.82	-4.26
Obj-adj premium (month of disclosure)	3.02**	0.46**	1.49**	-0.41**
NAV return -12 month	9.06***	7.39***	6.99***	5.26***
NAV return +12 month	11.55***	9.31***	8.16***	4.97***
Price return -12 month	8.57*	7.16**	6.76*	4.94**
Price return +12 month	13.39*	12.10***	8.97***	5.35***
Obj-adj NAV return -12 month	0.70	0.30	0.80	0.04
Obj-adj NAV return +12 month	-0.04	0.20	0.44	0.05
Obj-adj price return -12 month	0.69	0.11*	-0.38	-0.91*
Obj-adj price return +12 month	-0.65	-0.47	0.12	-0.69
Prior alpha	-3.29	-3.14**	-2.18	-1.95**
Post alpha	2.20**	0.89***	-0.09**	-1.11***
<i>Fund characteristics</i>				
Fund age	11.21	4.00***	10.70	13.00***
Total assets	539***	336***	284***	183***
Expenses	1.41***	1.20***	1.19***	1.15***
Payout ratio	7.93***	7.30***	6.46***	5.45***

	With ownership		No ownership	
	Mean	Median	Mean	Median
<i>Board and other governance characteristics</i>				
N of portfolio managers	2.60 ^{***}	2.00 ^{***}	2.05 ^{***}	2.00 ^{***}
Manager tenure	6.38	3.65 [*]	5.99	4.70 [*]
N of investment co. managed	8.99 ^{***}	6.00 ^{***}	23.66 ^{***}	13.00 ^{***}
Block ownership	0.29	0.00	0.27	0.00
Board size	7.59 ^{***}	8.00 ^{***}	8.58 ^{***}	9.00 ^{***}
Percent of board independence	0.81 ^{***}	0.80 ^{***}	0.86 ^{***}	0.86 ^{***}
Portfolios overseen by board	52.84 ^{***}	24.00 ^{***}	92.25 ^{***}	71.38 ^{***}
N of other directorships	1.17 ^{***}	1.00 ^{***}	1.44 ^{***}	1.67 ^{***}
Board member compensation	10,438 ^{***}	6,882 ^{***}	4,606 ^{***}	2,133 ^{***}
Board member with expertise	0.59 ^{***}	0.57 ^{***}	0.69 ^{***}	0.68 ^{***}

Table 3
Determinants of fund premium

Panel A presents OLS regressions of the fund premium as a function of fund manager ownership and control variables. The unit of observation is the fund, and ownership for all fund managers is combined. Panel B presents OLS regressions of the fund premium as a function of each individual manager's ownership, manager fixed effects and control variables. The unit of observation is a fund/fund manager combination. The dependent variable in all models is the raw fund premium, as defined in Table 2, except for model 5 of Panel A where the dependent variable is the objective-adjusted premium, computed as the raw fund premium less the premium of the median fund with the same investment objective. The premium is measured at the end of the month during which the level of ownership is disclosed. Ownership percentage (low) is the percentage of the fund owned by the portfolio manager(s), assuming ownership is at the low end of the disclosed range. Ownership dummy is a dummy variable set equal to one if fund manager ownership is positive and zero otherwise. Ownership percentage (midpoint) is the percentage of the fund owned by the portfolio manager(s), assuming ownership is at the midpoint of the disclosed range, except for ownership above \$1 million, where we employ the low end of the range. Log of dollar ownership is the natural log of dollar ownership of the portfolio manager(s), assuming ownership is at the low end of the disclosed range. Premium (ownership date) is the premium in the month for which ownership is disclosed. The other explanatory variables are defined in Table 2 and are measured as close as possible to the time of disclosure of ownership. In Panel B, the standard errors are clustered at the fund level, and the coefficients on the fund governance variables are not displayed. Numbers reported in parentheses are p-values.

Panel A. Fund-level regressions

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
	Premium	Premium	Premium	Premium	Obj-adj premium	Premium	Premium	Premium	Premium
Ownership percentage (low)	20.26 (0.00)	24.81 (0.00)	24.04 (0.00)	23.69 (0.00)	11.43 (0.02)	14.43 (0.00)			
Ownership dummy							2.36 (0.01)		
Ownership percentage (midpoint)								13.57 (0.00)	
Log of dollar ownership (low)									0.34 (0.00)
Premium (ownership date)						0.93 (0.00)			
Obj-adj NAV return (-12, 0)		0.11 (0.06)	0.08 (0.17)	0.11 (0.07)	0.14 (0.02)	0.01 (0.83)	0.12 (0.05)	0.12 (0.05)	0.12 (0.05)
Log fund age		-1.43 (0.00)	-2.33 (0.00)	-1.94 (0.00)	-1.41 (0.00)	-0.60 (0.01)	-1.74 (0.00)	-1.90 (0.00)	-1.80 (0.00)

Log TNA	-0.79 (0.02)	-0.59 (0.09)	-0.90 (0.03)	-1.17 (0.00)	0.08 (0.67)	-1.19 (0.00)	-0.89 (0.03)	-1.30 (0.00)
Expense ratio	1.37 (0.11)	1.53 (0.07)	0.98 (0.26)	0.92 (0.23)	0.89 (0.02)	0.93 (0.29)	1.00 (0.25)	0.69 (0.43)
Payout ratio	1.00 (0.00)	0.97 (0.00)	0.94 (0.00)	0.87 (0.00)	0.02 (0.75)	0.95 (0.00)	0.94 (0.00)	0.94 (0.00)
Block ownership dummy		0.76 (0.34)	0.05 (0.96)	-0.08 (0.92)	0.78 (0.05)	0.46 (0.60)	0.20 (0.81)	0.52 (0.54)
N of fund managers		-0.94 (0.00)	-0.93 (0.00)	-0.80 (0.00)	-0.09 (0.50)	-1.03 (0.00)	-1.02 (0.00)	-1.04 (0.00)
Manager tenure		1.41 (0.00)	1.25 (0.00)	1.23 (0.00)	0.06 (0.78)	1.25 (0.00)	1.22 (0.01)	1.20 (0.01)
Log N of investment co. managed		0.48 (0.21)	0.53 (0.18)	0.73 (0.03)	-0.21 (0.23)	0.68 (0.09)	0.61 (0.13)	0.65 (0.10)
Board size			0.11 (0.58)	-0.00 (0.99)	0.23 (0.01)	0.15 (0.48)	0.15 (0.46)	0.15 (0.47)
Pct of board independence			-12.56 (0.01)	-8.49 (0.09)	5.10 (0.03)	-10.58 (0.04)	-11.77 (0.02)	-10.04 (0.05)
N of other directorships			-0.17 (0.64)	0.08 (0.81)	0.23 (0.18)	-0.26 (0.48)	-0.21 (0.57)	-0.24 (0.52)
Pct of board with expertise			3.09 (0.02)	3.73 (0.00)	1.29 (0.03)	3.05 (0.02)	3.19 (0.02)	3.26 (0.01)
Log of board compensation			0.56 (0.11)	0.44 (0.21)	0.40 (0.01)	0.65 (0.07)	0.60 (0.09)	0.63 (0.07)
Intercept	-3.11 (0.00)	-4.60 (0.07)	-5.13 (0.08)	0.40 (0.95)	3.14 (0.61)	-9.88 (0.00)	-1.53 (0.81)	-1.17 (0.85)
Objective Dummies	Included	Included	Included	Included	Excluded	Included	Included	Included
N	575	558	549	544	544	544	544	544
Adjusted R ²	0.07	0.22	0.25	0.27	0.22	0.85	0.25	0.26

Panel B. Fund/fund manager level regressions

	Model 1	Model 2	Model 3
Ownership percentage (low)	18.28 (0.06)		
Ownership dummy		2.21 (0.01)	
Log of dollar ownership (low)			0.19 (0.03)
Obj-adj NAV return (-12, 0)	0.26 (0.06)	0.26 (0.06)	0.26 (0.06)
Log fund age	-0.29 (0.76)	-0.14 (0.88)	-0.13 (0.88)
Log TNA	-1.28 (0.01)	-1.41 (0.01)	-1.45 (0.01)
Expense ratio	-0.16 (0.87)	-0.12 (0.90)	-0.16 (0.88)
Payout ratio	1.07 (0.00)	1.08 (0.00)	1.08 (0.00)
Intercept	-10.20 (0.52)	-10.42 (0.50)	-10.62 (0.50)
Fund governance variables	Included	Included	Included
Objective dummies	Included	Included	Included
Manager dummies	Included	Included	Included
N	1191	1191	1191
Adjusted R ²	0.67	0.67	0.66

Table 4
Explaining future fund performance

This table reports the results of OLS regressions where the dependent variable is fund performance over the 12 month period after the ownership date. Obj-adj return is computed as the fund return less that of the median fund with the same investment objective. Alpha is the abnormal fund return estimated using separate four-factor models for equity and bond funds respectively. The model is estimated over a 36 month period starting 24 months before the ownership date, but the alpha is estimated separately for the 12 month period after the ownership date. (0 +12) refers to the 12 months period after the ownership date, (-12, 0) refers to the 12 month period before the ownership date, and (-24, 0) refers to the 24 month period before the ownership date. The other explanatory variables are defined in Tables 1, 2, and 3. In Panel A, the unit of observation is a fund. In Panel B, the unit of observation is each fund /fund manager combination. Panel B includes manager fixed effects. In Panel B, the standard errors are clustered at the fund level, and the coefficients on the fund governance variables are not displayed. P-values are reported in parentheses.

Panel A. Fund-level regressions

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
	Obj-adj NAV return (0, +12)			Obj-adj price return (0, +12)			Alpha (0, +12)		
Ownership percentage (low)	12.88 (0.00)	12.35 (0.00)		17.07 (0.01)	22.12 (0.00)		25.36 (0.00)	37.21 (0.00)	
Log of dollar ownership (low)			0.00 (0.97)			0.09 (0.34)			0.32 (0.01)
Obj-adj NAV return (-12, 0)		0.19 (0.00)	0.20 (0.00)						
Obj-adj price return (-12, 0)					0.01 (0.89)	0.01 (0.81)			
Alpha (-24, 0)								0.00 (0.97)	-0.01 (0.92)
Premium		-0.11 (0.00)	-0.11 (0.00)		-0.48 (0.00)	-0.48 (0.00)		-0.37 (0.00)	-0.38 (0.00)
Log fund age		-0.10 (0.79)	-0.05 (0.88)		-0.82 (0.15)	-0.77 (0.19)		-0.51 (0.50)	-0.19 (0.80)
Log TNA		-0.09 (0.75)	-0.16 (0.60)		-0.92 (0.05)	-1.11 (0.02)		-0.89 (0.13)	-1.32 (0.03)
Dividend payout ratio		0.37 (0.00)	0.37 (0.00)		0.36 (0.01)	0.36 (0.01)		-0.18 (0.29)	-0.15 (0.39)

Block ownership dummy		-0.23 (0.72)	-0.02 (0.97)		0.55 (0.59)	0.97 (0.34)		2.57 (0.04)	3.26 (0.01)
N of fund managers		0.02 (0.92)	-0.00 (0.99)		0.37 (0.27)	0.30 (0.38)		0.74 (0.08)	0.59 (0.17)
Manager tenure		0.37 (0.27)	0.42 (0.20)		0.45 (0.39)	0.53 (0.33)		-0.35 (0.57)	-0.30 (0.63)
Log N of investment co. managed		-0.20 (0.49)	-0.16 (0.59)		-0.88 (0.06)	-0.77 (0.10)		-1.33 (0.02)	-1.12 (0.05)
Board size		-0.32 (0.03)	-0.34 (0.03)		-0.49 (0.04)	-0.51 (0.04)		-0.29 (0.33)	-0.26 (0.39)
Pct of board independence		3.13 (0.41)	2.96 (0.45)		12.73 (0.04)	13.10 (0.03)		14.57 (0.05)	17.07 (0.03)
N of other directorships		-0.01 (0.97)	-0.08 (0.79)		0.55 (0.21)	0.45 (0.32)		-0.16 (0.76)	-0.33 (0.54)
Pct of board with expertise		0.75 (0.45)	0.63 (0.53)		2.19 (0.16)	2.09 (0.19)		5.20 (0.01)	5.14 (0.01)
Log of board compensation		-0.37 (0.15)	-0.38 (0.14)		0.07 (0.87)	0.04 (0.91)		-0.05 (0.93)	0.06 (0.90)
Intercept	0.09 (0.73)	0.11 (0.98)	1.03 (0.82)	-0.31 (0.46)	-6.91 (0.33)	-5.99 (0.41)	0.13 (0.78)	-5.54 (0.54)	-7.87 (0.39)
Objective dummies	Included	Included	Included	Included	Included	Included	Included	Included	Included
N	567	546	546	567	546	546	521	512	504
Adjusted R ²	0.06	0.14	0.12	0.03	0.19	0.17	0.19	0.28	0.27

Panel B. Fund/fund manager level regressions

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
	Obj-adj NAV return (0, +12)		Obj-adj price return (0, +12)		Alpha (0, +12)	
Ownership percentage (low)	10.90 (0.00)		23.66 (0.02)		67.36 (0.06)	
Log of dollar ownership (low)		0.01 (0.88)		0.11 (0.36)		0.25 (0.04)
Obj-adj NAV return (-12, 0)	0.15 (0.24)	0.16 (0.21)				
Obj-adj price return (-12, 0)			0.05 (0.69)	0.06 (0.60)		
Alpha (-24, 0)					0.23 (0.02)	0.21 (0.04)
Premium	-0.10 (0.04)	-0.11 (0.03)	-0.41 (0.00)	-0.43 (0.00)	-0.42 (0.00)	-0.41 (0.00)
Log fund age	-1.48 (0.01)	-1.47 (0.02)	-2.47 (0.06)	-2.43 (0.06)	-0.61 (0.56)	-0.32 (0.78)
Log TNA	0.03 (0.92)	-0.04 (0.89)	-0.33 (0.60)	-0.54 (0.41)	1.14 (0.11)	0.83 (0.25)
Intercept	5.79 (0.51)	10.02 (0.27)	12.11 (0.46)	21.16 (0.15)	38.10 (0.02)	30.77 (0.03)
Fund governance variables	Included	Included	Included	Included	Included	Included
Objective dummies	Included	Included	Included	Included	Included	Included
Managers dummies	Included	Included	Included	Included	Included	Included
N	1212	1212	1212	1212	1062	1062
Adjusted R ²	0.78	0.78	0.68	0.67	0.78	0.76