Performance-Based Turnover on Corporate Boards

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December 2016

Abstract

We document an economically significant relation between director turnover and prior firm performance. This relation manifests in idiosyncratic stock returns consistent with relative performance evaluation and the monitoring of actions attributable to directors. The director turnover-performance sensitivity increases substantially throughout the 2000s, and varies with a number of governance characteristics, most notably with the presence of an active external blockholder. Directors who exit firms following poor performance are significantly less likely to obtain new directorships in the future. In sum, the threat of replacement for poor firm performance is an increasingly significant incentive for the directors of public corporations.

Keywords: Director turnover, firm performance, board seats, replacement directors
JEL Classification: G34, J23

1. Introduction

The fiduciary role of the corporate board of directors is to monitor and advise management and, more generally, to represent the interests of shareholders in a firm's business dealings (Fama, 1980, Fama and Jensen, 1983). Over the past three decades, boards of public corporations have faced increasing scrutiny over their effectiveness by institutional investors, regulators, and other stakeholders (Parrino, Sias, and Starks, 2003, Linck, Netter, and Yang, 2009). This heightened scrutiny is predicated on the expectation that directors have significant influence over firm decision making and performance.

Agency theory posits that directors should be exposed to the threat of replacement for poor performance as an incentive mechanism to align their interests with those of shareholders. The existing literature provides abundant evidence for a significant and negative turnover-performance sensitivity for executives of public firms, however, we know considerably less about whether board members also experience elevated rates of turnover following poor performance. In the first paper to systematically address the issue, Yermack (2004) documents an economically significant relation between director turnover and contemporaneous stock returns for directors with two or fewer years of service, but not for more seasoned directors.

While turnover for poor performance is a sensible incentive mechanism, there are a number of plausible reasons that a sensitivity of director turnover to firm performance may not obtain. For example, it is well known that board members exercise a substantial degree of discretion in determining board composition and their own tenure through the nominating and proxy process. Consistent with this, Yermack (2004) suggests that director turnover may be limited because no higher authority exists to discipline seasoned directors for poor performance. Other researchers have argued that directors' own reputational concerns can substantially influence turnover in the

context of firm performance. Fahlenbrach, Low, and Stulz, (2015) document that reputational costs motivate some directors to resign prior to the realization of poor firm performance, which may confound the sensitivity of director turnover to past firm performance. Masulis and Mobbs (2014) also find that directors with multiple board seats are less likely to relinquish a directorship in firms that are relatively more prestigious, even after conditioning on firm performance. Finally, the collective actions of boards may hinder performance attribution to any individual director.

In this paper, we estimate the sensitivity of turnover to firm performance for non-executive directors of U.S. public companies from 2000 to 2011. Our sample is drawn from Management Diagnostic's BoardEx database and covers virtually all U.S. publicly traded firms. Our results indicate that directors are more likely to turn over following the realization of poor stock and accounting performance. Directors of firms in the lowest quartile of industry-adjusted stock returns in a given year are 1.0 percentage points more likely to exit in the next year. Similarly, for directors of firms in the lowest quartile of industry-adjusted accounting returns, the likelihood of turnover in the next year is 1.5 percentage points higher. These effects are economically meaningful given an unconditional annual turnover rate of 7.6% for directors in our sample. The results are similarly significant at the board level. For example, relative to a 7.2% unconditional rate of proportional board turnover, firms in the lowest quartile of industry-adjusted stock returns experience a 2.4 percentage point increase in the proportion of departing directors in the next year.

Following Jenter and Kanaan (2015), we decompose stock returns into their idiosyncratic and industry components and find that the turnover-performance relation for directors manifests only in the idiosyncratic component of returns. This result is consistent with strong-form relative performance evaluation (RPE) and suggests that director turnover is a function of poor performance directly attributable to the board rather than a firm's industry or the market.

To examine the disciplinary nature of director turnover, we investigate the employment outcomes for directors that leave a board. Prior studies such as Fama (1980) and Kaplan and Reishaus (1990) suggest that CEOs face lost future wages if they shirk responsibility or perform poorly. For the threat of replacement to be a meaningful incentive for directors, we expect to observe a negative relation between director turnover and future career opportunities, particularly when turnover occurs in the context of poor performance. We examine the change in the number of board seats held by a director, as well as the probability that a director gains an additional board seat, over a three-year window after turnover. Directors are 41% less likely to gain a new directorship after they leave a board relative to directors that retain their positions. Most importantly, we find that this relation only holds for turnover preceded by poor firm performance.

Our study examines the secular variation in the sensitivity of director turnover to firm performance during a period that witnessed substantial changes in institutional ownership and regulation. Kaplan and Minton (2012) document an increase in blockholdings over the decade of the 2000s, and find that external blockholdings are associated with a higher turnover-performance sensitivity for CEOs between 2000 and 2007. In addition, the implementation of the Sarbanes-Oxley Act of 2002 (SOX), and contemporaneous changes in exchange listing standards, increased financial disclosure requirements and mandated a structural shift towards boards comprised largely of unaffiliated outside directors. Linck et al. (2009) assert that these changes increased the scrutiny over director decisions and their accountability for firm performance. Consistent with this Guo and Masulis (2015) relate an increasing sensitivity of turnover to performance for CEOs during the 2000s to changes in the composition of boards over the first half of the decade.

To illustrate the time-series pattern in director turnover, we estimate the sensitivity of turnover to the idiosyncratic component of returns using a rolling two-year window over our

sample period. The results plotted in Figure 1, relay a nearly fourfold increase in the estimated sensitivity from 2000 to 2005. Accounting for selection, we find that the presence of an active blockholder or hedge fund substantially increases the turnover-performance sensitivity for directors. This effect is increasing over time, most notably during the first half of the decade. Finally, we consider the time series variation in the turnover-performance sensitivity across various measures of performance. While the overall incidence of director turnover is unchanged over the sample period, there is a notable shift away from industry-induced performance turnover observed during the pre-SOX period to idiosyncratic performance turnover post-SOX. This finding is consistent with an increase in the quality of information and monitoring.

We consider three potential alternative interpretations for our findings. One is that directors may voluntarily step down to preserve their remaining reputational capital. Given the structure of our tests, it is likely too late for directors to detach their reputation from past performance, however, directors may anticipate further poor firm performance and exit to avoid additional reputational damage. Contrary to the conjecture above, we find no evidence that firm performance continues to decline after directors depart following poor performance.

Another alternative explanation is that highly qualified directors may voluntarily exit to provide a costly, yet credible, signal of quality by disassociating themselves from the poorly performing firm. If this is the case, we would expect that these directors should be more likely to experience a net gain in future directorships relative to directors that do not leave the board. We find that departing directors actually experience a net loss in the number of future directorships.

Finally, we explore whether our findings are a byproduct of the coincidental turnover between CEOs and directors documented in Hermalin and Weisbach (1988), Farrell and Whidbee

(2000) and Yermack (2004). While our results confirm these earlier findings, we also document that a substantial turnover-performance sensitivity persists in the absence of CEO turnover.

Prior research including Weisbach (1988) and Denis, Denis and Sarin (2997) shows that certain features of corporate governance moderate the turnover-performance sensitivity for executives. We document that corporate governance has a direct impact on the likelihood of director turnover. Directors are less likely to turn over in firms with weak internal governance such as CEO-chair duality or if they joined the board during the tenure of the CEO. Conversely, directors have a higher likelihood of turnover at firms with an active blockholder and when a director receives fewer 'for' proxy votes.

The turnover-performance sensitivity for directors is also moderated by select governance characteristics. Directors on busy boards are 2.0 percentage points less likely to turn over after poor stock performance. This result is consistent with either stemming the departure of highly qualified directors or with a distracted board's failure to monitor. Consistent with our time series results, we also find that directors of firms with an active blockholder are nearly three times more likely to turn over after relatively poor performance. This result suggests that active investors represent a primary channel through which directors are disciplined for poor performance.

The positive incentives associated with a turnover-performance sensitivity for directors may be partially attenuated by the expected cost of replacing the skill and experience of directors that exit. Using the methodology of Knyazeva, Knyazeva, and Masulis (2013) we consider whether the depth of the local supply of prospective directors moderates a firm's turnover-performance sensitivity. Our evidence indicates that local supply is positively correlated with the absolute level of director turnover, but is not correlated with the sensitivity of turnover to performance. Given the importance of reputation in the director labor market, we posit that firms

with poor performance and coincident director turnover will find it difficult to hire qualified directors in the near future. Consistent with this, higher performing firms tend to attract higher quality replacements after director turnover, while firms with poor prior performance, on average, hire directors that are not superior to the directors that they replace. These findings suggest that poorly performing firms are handicapped in the director labor market just at the time when they would most benefit from director experience. Overall, our results suggest that the threat of turnover for poor firm performance is a significant incentive for directors with meaningful economic consequences in the director labor market.

2. Related Literature

Our paper builds on the prior literature that examines how incentive mechanisms in the labor market align the interests of corporate agents with those of shareholders. Yermack (2004) notes that direct compensation, including stock and option grants as well as the threat of turnover, provide the most significant economic incentives for directors. The author considers the relation between director turnover and firm performance for 734 Fortune 500 directors appointed between 1994 and 1996 with tenure of five or less years. For these newly appointed directors, he documents a negative relation between director turnover and contemporaneous stock performance, but no relation for accounting or lagged performance. Notably, this turnover-performance sensitivity obtains for directors in their first two years of service, but not for more seasoned directors.

Fahlenbrach et al. (2015) find that some directors anticipate future poor performance and step down in advance to protect their reputation. Consistent with director discretion, Masulis and Mobbs (2014) note that individuals are less likely to leave one of multiple directorships if it is a relatively more prestigious seat, even after controlling for firm performance. Further, directors

allocate greater effort on their more prestigious boards; a result that is consistent with a positive sensitivity of turnover to performance if effort is observable.[1]

Our work is closely related to the literature on turnover and incentives for corporate executives. Weisbach (1988) and Parrino (1997) find a negative relation between firm performance and CEO turnover. Kaplan and Minton (2012) and Peters and Wagner (2014) find that CEO turnover and its sensitivity to firm performance has increased since 2000. Jenter and Kanaan (2015) show that CEO turnover is a function of both idiosyncratic firm performance, and a component of performance that is common to the firm's industry peers.

While this paper considers the broad implications of firm-specific performance on the career outcomes of outside directors, other researchers have focused on director departures in a variety of specific contexts. Harford (2003) finds that a majority of the directors of 91 takeover targets from 1988 to 2001 lose their board seat after completed deals. Farrell and Whidbee (2000) examine director turnover that coincides with 66 forced CEO departures from 1982 to 1992 and show an increased likelihood of outside director turnover following forced CEO turnover. Fos and Tsoutsoura (2014) document a higher incidence of director turnover in the context of 396 proxy contests from 2000 to 2010. Brochet and Srinivasan (2014) find that independent directors named in securities litigation from 1996 to 2010 are more likely to leave. Finally, Ertimur, Ferri, and Maber (2012) note that compensation committee members of 186 firms that engaged in option backdating experience a greater rate of turnover than non-compensation committee members.

An additional contribution of this paper is the examination of consequences of turnover for departing directors and the firms they leave. Yermack (2004) documents a positive relation

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[1] The majority of the directors in our sample (over 60%) hold only one board seat in a given year; thus for the average director, relative directorship prestige is a not an issue. Throughout the paper, we control for the impact of the number of contemporaneous directorships held on the turnover-performance sensitivity for individual directors.

between performance and the number of board seats obtained by outside directors in the future. Coles and Hoi (2003) find that directors who rejected provisions of Pennsylvania Senate Bill 1310 were more likely to gain additional directorships. Fich and Shivdasani (2007) show that directors of firms facing lawsuits experience a decline in the number of other board seats they hold. Harford and Schonlau (2013) find that the likelihood of future directorships is positively correlated with the experience of directors in acquiring firms. Finally, Ertimur, Ferri, and Maber (2015) document that director's experience a decrease in the number directorships following proxy contests.

3. Data and summary statistics

The director data for this study is drawn from Management Diagnostic's BoardEx database from 2000 through the end of 2011. The BoardEx database covers virtually all U.S. publicly traded firms and includes 430,993 director-firm-year observations during our sample period.[2] We merge the sample of director-firm-year observations with Compustat to obtain firm-level accounting data, with the Center for Research of Stock Prices (*CRSP*) database for stock returns, and with the Thomson Reuters Institutional Ownership database. After excluding director-firm-year observations with missing values for returns, book value of assets and institutional ownership, the sample consists of 388,695 director-firm-year observations.

We follow a director from one firm-year board report date on BoardEx to the next, where a report date corresponds to a firm's fiscal year end. Directors no longer listed at a subsequent report date are considered as having left a board. We exclude turnover attributable to death (reported by BoardEx) and also eliminate 40,465 director-firm-year observations where there is no subsequent report date. As we require a follow-on report date, none of our turnover

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[2] Yermack (2004) examines director turnover at Fortune 500 firms, while Fahlenbrach et al. (2015) and Masulis and Mobbs (2013) examine director departures from S&P 1500 firms.

observations are due to acquisition, delisting, or privatization. We remove 64,723 director-firm-year observations where the director is an officer of the firm. BoardEx provides information on director characteristics including age, tenure, committee membership, and past and current employment and directorships. We exclude 2,445 director-year observations (0.87% of the director-firm-year observations in our final sample) with missing values for age and tenure as these are essential control variables for this study.[3]

The final sample consists of 281,062 director-firm-year observations and 21,275 observations of director turnover yielding an unconditional turnover rate of 7.57%. The sample includes 5,802 unique firms and 43,351 distinct directors. At the firm level, the sample has 39,975 firm-year observations of which 14,220 are associated with at least one director turnover event.

Panel A of Table 1 summarizes four measures of lagged firm performance.[4] Industry-adjusted stock return is a sample firm's annual buy-and-hold return minus the buy-and-hold return for the median firm in the same Fama-French 48 industry.[5] Industry-adjusted ROA is a sample firm's operating income scaled by the total book value of assets, minus the median scaled operating income for firms in the same Fama-French 48 industry. Following Bushman, Dai, and Wang (2010) and Jenter and Kanaan (2015), we estimate the industry-induced component of stock returns as the fitted value from cross-sectional regressions using one-year lagged annual buy-and-hold returns of the sample firms on the corresponding median Fama-French 48 industry return. Idiosyncratic stock returns are then estimated as the residual value from this fitted value.

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[3]BoardEx expanded its coverage of firms in 2003. To address this, we repeat our main analyses using only a sample of S&P 1500 firms, using only observations in 2003 or later, and using a constant composition sample that consists only of firms that survive through the entire sample period. In all cases, we obtain results that are qualitatively similar to those presented in the paper.

[4] A full summary of the construction of the variables used in this paper is provided in the Appendix.

[5] We also evaluate stock price performance relative to a value-weighted market index and our results are statistically and economically equivalent to those presented in the paper.

Panel B summarizes characteristics of directors, boards, and outside blockholders as of the fiscal year-end before a turnover event. The first eight rows of variables are director characteristics. Summary statistics for these variables are computed as the average (median) for all of the director-firm-year observations in the sample. We compute director age as the average (median) age for the full sample, which is 60.49 (61.0) years. The average tenure of a director is 7.34 years. Nearly one third of the directors hold more than one public directorship at a point in time, and roughly 4% gain a new directorship. Just over 20% of the director-firm-year observations are individuals who also hold a position as a CEO at another public company. One in ten director-firm-year observations are female, while 17.63% are "busy" which we define, following Fich and Shivdasani (2006), as directors who hold three or more public directorships. On average, over one third of director-firm-year observations are co-opted, defined following Coles, Daniel, and Naveen (2014), as directors with tenure less than that of the current CEO.

Panel B also includes measures of internal and external governance. Fifty (fifteen) percent of firm-years have a current (former) CEO who is also Chair. On average, over 22% of observations have an active blockholder in a given firm-year.[6] The average board has 8.65 directors and 71.63% are outsiders. Panel C reports firm characteristics that are used as controls in our analyses. Roughly 10% of the firm-year observations exhibit CEO turnover in the current fiscal year. The average firm in our sample is 19.32 years old with a market capitalization of $3.9 billion, and the average annualized volatility of monthly stock returns is 0.47.

In Panel D, we compare lagged firm performance for subsamples of turnover and non-turnover firm-years. Turnover by one or more non-executive directors occurs in roughly 36% of

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[6] In keeping with Clifford and Lindsey (2016) we define an active blockholder as an outside shareholder who files a 13D disclosing at least a 5% stake with intentions to affect the firm or management. We thank the authors for sharing the blockholder classifications used in this study.

the firm-years. Firm-year observations with turnover are associated with relatively poor firm performance in the year prior as compared to firm-year observations with no turnover. The average industry-adjusted stock return before a turnover event is 10.68%, which is 1.12 percentage points lower than the average industry-adjusted stock return for a firm-year observations with no turnover. Similar differences obtain for idiosyncratic stock returns.

4. The Sensitivity of Director Turnover to Firm Performance

4.1 Director-level estimates

Table 2 summarizes logistic regressions modeling the likelihood that an individual director experiences turnover in a given firm-year as a function of prior firm performance, attributes of the director, and the firm.[7] The regressions include year fixed effects to capture any unmodeled macroeconomic trends. Standardized coefficients are reported with coefficient p-values in parentheses. The standardized coefficient relates the modeled effect on the likelihood of director turnover for a one standard deviation change in a continuous variable, or for a change from 0 to 1 for an indicator variable. The unconditional rate of turnover rate is 7.6%. Models 1-3 incorporate continuous measures of prior firm performance. In Model 1, the coefficient on industry-adjusted stock return is negative and statistically significant, where a one standard deviation decrease in industry-adjusted returns is associated with an increase in the likelihood of director turnover of 0.5 percentage points. In Model 2, the coefficient on industry-adjusted ROA is also negative and significant with a one standard deviation decrease in industry-adjusted ROA associated with a 2.5 percentage point increase in the probability of turnover.

Model 3 estimates the sensitivity of director turnover to industry-induced and idiosyncratic stock returns. The coefficient associated with industry-induced returns captures the sensitivity of

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[7] These specifications largely follow those in the director turnover models summarized in Fahlenbrach et al. (2015).

turnover to performance that is presumably beyond the control of the board. The coefficient on idiosyncratic stock return relays the sensitivity that can be ascribed to the decisions of the firm's directors and managers. Director turnover is uncorrelated with industry-induced stock returns, but is negatively and significantly correlated with idiosyncratic stock returns, suggesting that director turnover is uniquely a byproduct of relative performance evaluation. A one standard deviation decrease in idiosyncratic performance increases the likelihood of turnover by 0.5 percentage points. This result is interesting in the context of Jenter and Kanaan (2015) who find evidence consistent with relative performance evaluation for CEOs, but also note that CEOs are often fired for subpar industry-induced performance.

In Models 4-6 of Table 2, we estimate director turnover as a function of measures of lagged firm performance constructed as indicator variables equal to one if the sample firm-year performance falls in the lowest quartile for a given year. Our intent is to identify disciplinary turnover, thus our focus here is on director turnover for the worst performing firms. The inferences drawn from Models 1-3 of the table are unchanged in these specifications although the economic effects of performance are magnified. The results in Model 4 suggest that the likelihood of turnover for directors of firms in the lowest quartile of industry-adjusted stock performance is 1.0 percentage points higher than the likelihood of turnover for those on boards in the top three quartiles of performance. Similarly, a director of a firm in the lowest quartile of industry-adjusted ROA is 1.5 percentage points more likely to turn over than a director in the top three quartiles. When we sort annual stock returns into quartiles of industry-induced and idiosyncratic stock returns, director turnover is sensitive to only the idiosyncratic component of returns.

The regressions in Table 2 also control for a variety of director characteristics including reputation and experience. We include two indicator variables to control for the effects of

retirement including near retirement age (65-71) and the average mandatory retirement age of 72 (or older) following Cline and Yore (2016). As expected, the likelihood of director turnover is positively correlated with age. Characteristics related to experience and reputation are also significantly related to turnover. Directors that hold more than one directorship are less likely to turn over, consistent with the value of connections and reputation. In addition, directors who gained an additional directorship in the prior year are more likely to turn over, suggesting that additional responsibilities and limited attention may force directors to curb their directorships held. While studies find that CEO experience is positively correlated with the likelihood of gaining board seats, our results indicate that CEO experience is uncorrelated with turnover.

All coefficients associated with committee membership (audit, compensation, and nominating) are significantly negative. Audit committee has the greatest economic significance suggesting that directors on this committee are 3.3 percentage points less likely to turn over.[8] Female directors are 0.2 percentage points less likely to leave a board than male directors, which is consistent with their scarcity in the director labor market and the hypothesized benefits of board diversity outlined in Adams and Ferreira (2009). Co-opted directors are, all else equal, 1.9 percentage points less likely to turn over. The rate of turnover is lower for larger firms and for boards with more outside directors, and is increasing in the volatility of returns and board size.

4.2 Board-level estimates

If director turnover is disciplinary and related to prior performance, this relation should manifest in a higher proportion of directors leaving after poor accounting and stock price performance. Table 3 reports Tobit regressions modeling the proportion of non-executive directors

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[8] Anecdotal evidence suggests that audit committee members have taken on increased responsibilities, especially post-SOX. With these increased duties, the supply of qualified individuals has decreased. See R. Teitelbaum, and D. Johnson, "Board Face Recruiting Challenges – Audit-committee Workloads Often Make it Tough to Find Members" *The Wall Street Journal*, December 15, 2015.

that turn over in a given firm-year as a function of lagged firm performance and board and firm characteristics.[9] The unconditional rate of turnover is 7.2% of the average outside board seats in a given year, approximately 0.45 directors per year. In Models 1-3, we use the continuous measures of firm performance. In Model 1 (2), the coefficient estimate on industry-adjusted stock return (ROA) is negative and significant, suggesting that as firm performance decreases boards experience higher proportional turnover. For example, a one standard deviation decrease in ROA is associated with a 0.95 percentage point increase in the fraction of board seat turnover in the following fiscal year.[10] Model 3 delineates returns by industry-induced and idiosyncratic stock performance. Consistent with our findings at the director level, the relation between proportional turnover and performance holds only for the idiosyncratic component of returns.

Models 4–6 of Table 3 estimate proportional turnover using our quartile measures of lagged performance. The coefficients suggest that relatively poor firm performance results in a higher proportion of outside director turnover. The coefficient on low industry-adjusted performance in Model 4 is positive and statistically significant where firms in the lowest quartile of stock performance exhibit a 2.4 percentage point higher proportion of board turnover. Boards in the lowest quartile of industry-adjusted ROA experience 3.8 percentage points more turnover. The proportional turnover-performance sensitivity is significant only for the idiosyncratic component of returns. We report the effects of firm- and board-level characteristics on the proportion of director turnover in Models 1-6 and document results similar to those in Table 2.[11]

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[9] For robustness, we estimate Poisson count regressions modeling the number of directors that turn over in a given firm-year and find statistically and economically similar results.

[10] The marginal effect is calculated by multiplying the coefficient value (0.053) by the standard deviation of industry-adjusted ROA (0.18).

[11] We replicate Table 3 with the following director-level variables averaged at the firm-year level: director age, gain new seat, hold additional seats, current CEO elsewhere, and female. To evaluate the robustness of these results we re-estimate models in Table 3 using firm fixed effects. The sign and significance of each of our turnover-performance results are unchanged in any of these alternative specifications (untabulated).

Our findings in Table 3 suggest a negative and economically significant relation between performance and the proportion of directors that turn over from a board the following year. This turnover-performance sensitivity is robust to various measures of performance. Collectively, Tables 2 and 3 provide evidence that directors, and boards as a whole, are disciplined through turnover following poor firm performance.

4.3 Post-turnover outcomes in the director labor market

While the direct costs of turnover include the loss of expected future compensation and benefits we also consider the indirect costs of turnover in terms of future directorships in other public firms. For the threat of replacement to be meaningful, we should observe post-turnover career consequences in the labor market for directors, particularly following poor performance.

To provide evidence on labor market outcomes we examine the change in the number of directorships and the probability of gaining a new board seat over a three-year window following each firm-year. Models 1-3 of Table 4 summarize OLS regressions of the change in number of public board seats over the three-year window and 4-6 outline logistic regressions of the likelihood of obtaining a new public directorship. All specifications control for director characteristics and firm-year fixed effects enabling a comparison of these outcomes for directors that do and do not turn over for a given firm in a given year. The average change in the number of board seats over a three-year period is -0.04, while the unconditional probability of gaining a directorship is 21.5%.[12]

Model 1 of Table 4 reveals a significant negative relation between turnover and the change in the number of a director's future seats. Notably, this relation manifests for directors who experience turnover from firms in the lowest quartile of prior performance (Model 2), but not for

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[12] In order to utilize firm-year fixed effects, for each firm-year at least one director on the board must experience a change in future board seats or gain a new seat in the following three years. Otherwise, all observations within a given firm-year are completely determined and excluded from these analyses.

those in the highest quartile (Model 3). These results are consistent with the notion that directors who turn over following poor firm performance are penalized in the director labor market. Models 4-6 yield a similar conclusion. Directors that turn over are 8.8 percentage points less likely to gain a future seat relative to those that remain in a turnover year. Model 5 suggests that the negative relation between turnover and the likelihood of gaining a new directorship is most pronounced for directors that turn over following very poor firm performance. These directors experience a 70% decrease in the unconditional probability of gaining a future board seat.

4.4 The sensitivity of director turnover to performance over time

Our sample period is characterized by substantial changes in institutional ownership and regulation. Kaplan and Minton (2012) document an increase in blockholdings over the decade of the 2000s and find that the presence of a blockholder is associated with a higher turnover-performance sensitivity for CEOs between 2000 and 2007. In addition, the implementation of the Sarbanes-Oxley Act of 2002 (SOX), and contemporaneous changes in exchange listing standards, increased financial disclosure requirements and mandated a structural shift towards boards comprised largely of unaffiliated outside directors. Linck et al. (2009) assert that these changes increased the scrutiny over director decisions and their accountability for firm performance. Consistent with this, Guo and Masulis (2015) tie an increasing sensitivity of turnover to performance for CEOs to changes in the composition of boards over the first half of the decade.

To illustrate the secular variation in turnover, we estimate the sensitivity of director turnover to the idiosyncratic component of returns using Model 6 of Table 2 for rolling two-year windows over the sample period. As summarized in Figure 1, there was a nearly fourfold increase in the estimated sensitivity from 2000 to 2005. In Figure 2, we illustrate the proportion of firm-years in our sample with an active blockholder and with a hedge fund (active or passive) with at

least a 5% ownership stake. We focus on hedge funds given the findings in Brav, Jiang, Partnoy and Thomas (2008) that CEO turnover increases with hedge fund activism. While the proportion of firms with at least one active blockholder remains relatively constant over time, hedge fund ownership nearly triples during the sample period.

In Figure 3, we plot the turnover-performance sensitivity for firm-years with active blockholders and hedge funds over our sample period. As in Figure 1, we estimate the sensitivity for rolling two-year windows over the sample period. The coefficients are derived from a term interacting an indicator variable for the presence of a blockholder and lagged idiosyncratic returns, in a model otherwise identical to Model 6 of Table 2. It is possible that a correlation between an ownership block and the turnover-performance sensitivity is not causal, but rather the byproduct of unmodeled selection. We account for selection when comparing the sensitivity for firms using a propensity score matching methodology following Heckman, Ichimura, and Todd (1997), and Smith and Todd (2005).[13] The propensity score computes the predicted value (probability) of being in the treatment group versus the control group based on observable determinants. We perform a one-to-many (up to three) match to our treatment group using modeled parameters derived from Denes, Karpoff and McWilliams (2016) who survey the characteristics of firms that attract active blockholders.[14] The sensitivities outlined in Figure 3, are derived for the subsample of 66,872 treated and control director-firm-year observations.

The results in Figure 3 suggest that the increase in the turnover-performance sensitivity for directors during the first half of our sample period is amplified for the subsample of firms with an active investor or hedge fund owner. The sensitivity declines for these firms during the middle of

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[13] A similar matched firm approach is adopted by Ertimur, Ferri and Muslu (2011) in the context of active shareholders.
[14] Independent variables in our propensity score model include lagged stock returns, ROA, the market-to-book ratio, leverage, institutional ownership, firm size, dividend yield, sales growth, liquidity, and year and industry fixed effects.

the decade, but then increases after 2008, most dramatically for firms owned by hedge funds. The trend in this figure and Figure 1 is consistent with Jenter and Kanaan (2015) who find that firm performance during market downturns is more informative about the relative quality of a CEO than performance during market upturns, particularly for the worst performing firms.

Finally, we consider time series variation in the turnover-performance sensitivity across various measures of accounting and stock price performance. Table 5 presents linear probability models of the likelihood of director turnover as a function of lagged firm performance and controls for director and firm characteristics.[15] Following Linck et al. (2009), we estimate changes over time using a post-SOX cutoff defined as 2003 onward. We focus on our binary measures of relative performance for ease of interpretation, although the economic and statistical significance are identical when we use continuous performance measures. Results in Model 1 (2) indicate that a relation between director turnover and industry-adjusted stock (accounting) returns existed prior to 2003, but is not significantly different after. Model 3 decomposes returns into industry-induced and idiosyncratic components. While the coefficient on low industry-induced return is positive and statistically significant pre-SOX, it essentially disappears post-SOX. The interaction between low idiosyncratic return and the post-SOX time period is positive and significant indicating that the turnover-performance sensitivity associated with idiosyncratic returns significantly increased from the pre to post-SOX era. This result is consistent with enhanced informativeness of stock prices coinciding with the implementation of SOX documented in Brochet (2010).

4.5 Potential alternative explanations for the turnover-performance sensitivity

In this section, we consider three alternative explanations for the negative relation between director turnover and past firm performance. One explanation is that directors voluntarily leave to

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[15] Cornelli, Kominek and Ljungqvist (2012) and Guo and Masulis (2015) also use a linear probability model to estimate the likelihood of CEO turnover and interpret interaction terms.

preserve their remaining reputational capital. As noted in Fahlenbrach, et al. (2015), voluntary turnover by directors seeking to preserve their reputation is more likely to occur before the realization of poor performance. Given the structure of our tests, it is likely too late for directors to elude attribution for poor performance. Nevertheless, directors anticipating further poor performance may seek to avoid further damage; thus we should observe continued poor performance when directors leave after poor performance. A second explanation is that directors voluntary leave to disassociate themselves from the poorly performing firm, providing a costly, but credible signal of their quality to the labor market. In this case, directors leaving boards after poor performance should be more likely to experience a net gain in future directorships relative to directors that remain. Finally, Hermalin and Weisbach (1988), Farrell and Whidbee (2000), and Yermack (2004) link director departures to contemporaneous CEO turnover. It is conceivable that our director turnover-performance sensitivity is driven largely by coincident CEO departures and a wholesale change in the management of the firm.

We perform two untabulated tests to examine directors' reputational concerns. In univariate tests, we evaluate firm performance in the years after the departure of one or more directors. Focusing on firms in the lowest quartile of lagged industry-adjusted stock performance, those with turnover earn significantly higher future stock returns than an equally-weighted portfolio of sample firms in the same Fama-French 48 industry and decile of firm size that did not experience turnover. For example, firms with director departures experience two-year stock returns that are 4.8 percentage points higher than firms without director turnover. This result suggests that, if anything, firm performance improves following director turnover. We also evaluate future performance in a multivariate setting, controlling for firm and board characteristics and find no evidence that performance continues to decline after director departures in the context

of poor performance. In sum, our results do not suggest that reputational concerns can explain the sensitivity of director turnover to lagged firm performance.

Our results in Section 4.3 are inconsistent with a signaling explanation. Directors who turn over after poor firm performance are significantly less likely to gain future directorships and experience a net loss of board seats at other public firms. Thus, on average, directors that leave boards following poor performance are penalized, not rewarded, in the director labor market.

To consider if our results are driven by contemporaneous CEO turnover, we examine if there are differences in the turnover-performance sensitivity of directors in years where there is also CEO turnover. We run regressions (untabulated) similar to those in Tables 2 and 3, and include interaction terms between a CEO turnover indicator and our lagged performance measures. At the director and firm level, the coefficients on low stock return and its interaction with CEO turnover are positive and significant, suggesting that the turnover-performance sensitivity is almost twice as high for directors in years after CEO turnover. Our results, however, are not driven solely by coincident CEO turnover given that the coefficient on low stock return is also positive and significant. Models using industry-adjusted ROA or idiosyncratic stock return yield similar conclusions. While these findings fit with the prior literature, a substantial turnover-performance sensitivity persists for directors in the absence of CEO turnover.

5. Corporate Governance and Director Turnover

Prior studies of executive turnover have highlighted the important effects of a variety of governance features. In our context, the association between the director turnover-performance sensitivity and governance attributes is of substantial interest because board characteristics themselves are recognized as governance features that can have a significant effect on the sensitivity of executive turnover to performance. For directors, however, it remains unclear which

internal or external governance features might impact director turnover generally, or more specifically the sensitivity of director turnover to firm performance.

In this section, we examine if governance features, proxy voting, and ISS recommendations alter the likelihood of director turnover and the turnover-performance sensitivity. We consider three internal governance features associated with heightened agency conflicts that may insulate directors from internal monitoring. The first is co-option, defined by director-firm-years in which a director's tenure is less than that of the current CEO. The second is board busyness, measured as the percentage of directors holding three or more public directorships. The third are measures of CEO duality where the current (or former) CEO is also board chair. Institutions and other large external shareholders increase the likelihood of executive turnover.[16] We therefore also consider the effect of active blockholders defined as an outside shareholder who files a 13D disclosing a minimum 5% equity stake with the intention to affect change in a firm or its management.[17]

To establish the effects of governance on turnover, Models 1-3 of Table 6 summarize logistic regressions estimating the likelihood of director turnover in a given firm-year as a function of lagged firm performance, director characteristics, and governance measures. Models 4-6 present the results of Tobit estimates of proportional turn over. We restrict our sample to the 109,331 director-firm-year and 14,560 firm-year observations with available data on active blockholders. For brevity, we only report coefficients of our low performance indicator variables and suppress output related to both the director and firm controls, although the coefficients have the same sign and significance as in Tables 2 and 3.

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[16] See for example Denis, Denis and Sarin (1997); Huson, Parrino and Starks (2001); and Goyal and Park (2002).
[17] A number of papers examine the effects of active blockholders on a variety of corporate policies, CEO turnover, and firm value. For example, see Brav et al. (2008) and Klein and Zur (2009).

Results in Table 6 indicate that, after controlling for governance features, the director turnover-performance sensitivity remains negative across all performance measures. The coefficient estimate for co-option is negative in all models, suggesting that co-option insulates directors from turnover. Directors appointed under the current CEO are, all else equal, 2.3 percentage points less likely to turn over. The positive and significant coefficient for busyness suggests that directors on a busy board are more likely to turn over; a result that indicates that directors with more external responsibilities and limited attention are more likely to leave a board.

The results in Models 1-3 do not suggest that duality for sitting CEOs alters the likelihood of turnover, however, a director is 0.6 percentage points less likely to turn over if the board chair is the former CEO. Given the longer tenure of the former CEO, this may reflect long-run co-option. Consistent with external monitoring, the likelihood of director turnover is higher with an active blockholder. The coefficient in Model 1 suggests an active blockholder increases the likelihood of turnover by 1.2 percentage points.[18] Results from Models 4-6 largely mirror those in Models 1-3 in the context of proportional board turnover.

In Models 1-3 of Table 7, we investigate the impact of corporate governance through proxy voting and ISS recommendations against voting for an individual director. Fischer, Gramlich, Miller and White (2009) contend that director elections provide information about how board performance is perceived by investors. Votes withheld and an ISS recommendation against serve as a measure of performance attribution for an individual director. In Models 1-3, our sample is restricted to 52,228 director-firm-year observations between 2003 and 2010 with voting data for the prior annual meeting from ISS. Excess withheld is an indicator equal to one if a director

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[18] In unreported results, we replace the existence of an active blockholder with the appearance of a new active blockholder in the year prior and find a similar economic effect.

receives fewer 'for' votes than the average director on a board (excluding the director of interest).[19] ISS against is an indicator equal to one if ISS recommends against voting for a director. For each model, the coefficient on excess withheld is positive indicating that directors who receive fewer 'for' votes than average are 1.2 percentage points more likely to turn over. This result is consistent with Fischer et al. (2009) who find that lower approval is associated with turnover in the following year. Cai, Garner and Walkling (2009) show that ISS recommendations impact director voting, however, our results suggest that recommendations do not have an independent effect on turnover.

Cai et al. (2009) find that director meeting attendance is a significant determinant of director voting and Masulis and Mobbs (2014) utilize attendance as a proxy for director effort. In Models 4-6 of Table 7, we consider the effects of attendance on turnover for a sample of 28,796 director-firm-year observations with both voting data from ISS and information on director attendance from RiskMetrics. While less than 1% of directors in our sample miss more than 75% of their meetings in a given year, the results in Models 4-6 suggest that those that do are roughly 2.5 to 2.6 percentage points more likely to leave the board in the following year.

While various aspects of corporate governance are unconditionally correlated with the rate of director turnover, we also consider whether governance moderates the turnover-performance sensitivity of directors. Table 8 outlines linear probability models estimating the likelihood of turnover for individual directors. Each model includes a single governance measure, labeled in the model headers, and an interaction term between governance and a low stock return indicator variable equal to one if a firm's lagged industry-adjusted stock return is in the lowest quartile. In the last two rows we incorporate variables associated with the presence of an active blockholder

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[19] Following Cai, Garner and Walkling (2009), we define the level of "excess" votes as the votes a director receives minus the average for all directors simultaneously considered for election. We find a similar relation between director voting and turnover using either the percentage or total number of "against" votes instead.

as well as the effects tied to the arrival of a new blockholder in the firm's ownership structure in the year prior. As in Section 4.4, we account for selection for the presence of, or arrival of, an active blockholder using a propensity score matching methodology that estimates the probability of being in the treatment group versus the control group based on observable determinants.

The independent effects of the governance features in Table 8 mirror those in Table 6. For example, co-opted directors are less likely to experience turnover, while directors of firms with active blockholders are more likely to turn over. The results in Table 8 also suggest that governance features can moderate the sensitivity of director turnover to performance. While co-opted directors are insulated from turnover, this effect is significantly attenuated after poor firm performance. Similarly, while directors serving on busy boards are more likely to turn over, this effect is lower following poor performance when their experience and reputation are particularly useful attributes. The positive association between director turnover and active blockholders is most pronounced after poor firm performance. This effect is observed for both existing blocks and new active blocks and suggests that active investors may be a significant external channel through which the turnover performance relation obtains for non-executive directors.[20] Finally, we find that excess votes withheld, ISS recommendations, and meeting attendance do not have a moderating effect on the sensitivity of turnover to performance for corporate directors. We omit these last results from Table 8 for brevity.

In untabulated tests, we also consider the effects of other governance measures that may be related to the turnover-performance sensitivity of directors. Specifically, for a subsample of S&P 1500 firms we include in our specifications the G-index and E-index of shareholder rights.

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[20] We replicate our specifications utilizing alternative measures of institutional ownership: total percentage of institutional ownership; number of blockholders with 5% interest or more; number of motivated monitors (Fich, Harford and Tran, 2015); and change in the number of 5% blockholders or motivated monitors. None of these measures have any significant influence on the likelihood of turnover or turnover-performance sensitivity.

We also include an indicator for a classified board, and a variable equal to one in years where a director's term has expired. Neither the G- nor E-index have an independent effect on turnover or on the turnover-performance sensitivity. As expected, classified board (term expiring) has a negative (positive) effect on turnover, but neither have a significant effect on the turnover-performance sensitivity.

6. The Consequences of Director Turnover for the Firm

Turnover tied to firm performance represents a material economic incentive for the average director. The positive incentive effect for the firm may, however, be at least partially attenuated by the costs of replacing the skill and experience of directors that exit. Given a relatively thin labor market for qualified directors, the appointment of less qualified directors represents a potential cost of director turnover. This cost is likely exacerbated when turnover and replacement coincides with relatively poor performance.

6.1 Local supply effects on director turnover

Knyazeva, Knyazeva, and Masulis (2013) show that a firm's ability to recruit non-executive directors is positively correlated with the local supply of prospective directors, suggesting in turn, that the depth of the director pool in the local market is likely to be an important determinant of director turnover. Following Knyazeva et al., we define the supply of directors in the local labor market by the log of the number of other firms headquartered within a 60-mile radius of a sample firm. In untabulated regressions otherwise similar to those in Table 2, we find that the supply of directors in the local labor market is positively correlated with director turnover. For example, directors of firms headquartered in markets in the top quartile of labor supply are 0.7 percentage points more likely to experience turnover in a given firm-year. When we interact labor supply with an indicator variable equal to one when a firm's lagged industry-adjusted stock return

is in the lowest quartile, the coefficient on the interaction term is insignificant. Thus the depth of the local director market does not moderate the turnover-performance sensitivity for directors.

6.2 Firm performance and the quality of replacement directors

In Table 9, we summarize differences between the directors that leave a board and those appointed to the board after they turn over. Given that each director departure does not always match to one replacement, we quantify differences among departing and replacement directors by pairing each departing director with each replacement over one, two and three year horizons.[21] Differences for each pair are averaged over each firm-year with at least one director exit. Panel A summarizes all turnover-replacement pairs for 12,752 director turnovers and 13,113 replacements over a one-year horizon after turnover. Panels B and C detail all turnover-replacement pairs over a two and three-year horizon following turnover, respectively.

Column 1 in each panel of Table 9 reports average differences in director characteristics for all turnover-replacement pairs. Overall, replacement directors are almost six years younger and exhibit higher proxies for reputation and experience in terms of additional directorships and current CEO experience than the directors they replace. Replacement directors are also less likely to have compensation and nominating committee experience, and are more likely to be female.

We examine whether turnover may have unintended consequences for firms replacing directors after poor performance. The literature indicates that holding a directorship in a poorly performing firm might be a relatively unattractive option for qualified replacements. Fich and Shivdasani (2007) note that outside directors of firms subject to lawsuits for financial fraud experience a decline in the number of board seats held, while Srinivasan (2005) finds that

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[21] We examine short and long-term horizons to account for search and matching frictions in the director labor market.

reputation declines for directors after earnings restatements. Gilson (1990) shows that outside directors on boards of firms in financial distress hold fewer additional board seats.

To consider the moderating influence of firm performance on the quality of replacement directors, columns 2 and 3 separate turnover-replacement pairs into firms-years in the lowest (column 2) and highest quartile (column 3) of lagged industry-adjusted stock returns. Replacement directors at firms with low performance are generally of no better quality than those that turn over (Panel A). Firms in the highest quartile, however, are able to attract higher quality replacements compared to directors that turn over as defined by additional directorships, CEO experience, and audit committee experience. These results suggest that poorly performing firms with director turnover are subsequently handicapped in the director labor market. While this result may seem counterintuitive, it is consistent with our findings that the turnover-performance sensitivity for directors is not attenuated by the depth of the pool of prospective directors in the local labor market.

7. Conclusion

In this paper, we examine performance-based turnover on corporate boards. Our results suggest that directors are more likely to leave boards following both poor accounting and stock price performance. The turnover-performance sensitivity to stock returns manifests in the idiosyncratic component of returns, but not in the component of returns common to the firm's industry peers. This suggests that director replacement is a byproduct of observing actions attributable to a firm's board, and not to performance beyond their control. The consequences of the threat of turnover extends to the broader labor market for directors as individuals who leave a firm in the context of poor performance are less likely to obtain other directorships in the future. Our findings are robust to alternative explanations for the turnover-performance sensitivity including voluntary director exit for reputation concerns and coincident CEO turnover.

The sensitivity of director turnover to firm performance increases substantially over our sample period, particularly during the first half of our sample (2000-2005). This result is highlighted by the increase in turnover-performance sensitivity in the presence of an active institutional blockholder or hedge fund. Director turnover also became increasingly sensitive to idiosyncratic stock returns while becoming less sensitive to industry-induced returns over time, consistent with relative performance evaluation. These results are consistent with the notion that the director labor market became considerably more dynamic over the decade of the 2000s and increasingly tied to relative firm performance. This evidence complements recent evidence that the sensitivity of CEO turnover to firm performance also increased over the same period.

We also find that governance characteristics affect the rate of turnover and influence the director turnover-performance sensitivity. Most notably, directors are more likely to turn over and exhibit a higher turnover-performance sensitivity at firms with an active institutional blockholder. This suggests that one of the main channels by which the observed turnover-performance sensitivity may work is outside pressure from investors. Overall, a firm's governance structure moderates or strengthens the relation between director turnover and prior firm performance.

To investigate the impact of director turnover on a firm, we consider supply effects in the local labor market as well as the quality of directors appointed to a board after turnover. The supply of prospective directors in the firm's local market increases the likelihood of director turnover, however, this supply effect does not moderate the turnover-performance sensitivity for directors. Consistent with this result, we find that poorly performing firms are unable to attract higher quality replacements precisely when additional expertise would be most valuable. After poor firm performance and turnover, newly appointed directors are no more qualified, in terms of additional directorships and executive experience, than the directors they replace. Thus, while the

threat of turnover for poor performance may have positive incentive effects, the replacement of these directors does not yield a substantial improvement in the quality of the overall board.

Overall, our results are consistent with Fama (1980) and Fama and Jensen (1983) who contend that outside directors have incentives to be effective monitors in order to signal their value in the director labor market. Our results provide broad support for the notion that individual directors, and boards overall, are disciplined for poor performance and experience post-turnover reputational consequences in the director labor market. The threat of replacement, particularly in the context of poor firm performance, presents an economically significant incentive for directors.

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Appendix A: Variable Definitions

	Variable Definition
Panel A: Firm Performance Measures	
Industry-adjusted stock return	Annual stock return adjusted by median Fama-French 48 industry return of all CRSP firms
Industry-adjusted ROA	Operating income scaled by total book value of assets adjusted by median Fama-French 48 industry ROA of all Compustat firms
Industry-induced stock return	The fitted value from a cross-sectional regression of annual stock return on median Fama-French 48 industry return of all CRSP firms
Idiosyncratic stock return	The residual from a cross-sectional regression of annual stock return on median Fama-French 48 industry return of all CRSP firms
Low stock return	Indicator equal to one if industry-adjusted stock return falls in the lowest quartile of industry-adjusted stock return in a given sample year
Low ROA	Indicator equal to one if industry-adjusted ROA falls in the lowest quartile of industry-adjusted ROA in a given sample year
Low industry-induced stock return	Indicator equal to one if industry-induced stock return falls in the lowest quartile in a given sample year
Low idiosyncratic stock return	Indicator equal to one if idiosyncratic stock return falls in the lowest quartile in a given sample year
Panel B: Director Characteristics	
Age	Director age in years
Tenure	Director tenure in years
Number of other seats	Total number of other public directorships held by director
Hold additional seats	Indicator equal to one if director holds additional directorships at outside public firms, zero otherwise
Current CEO elsewhere	Indicator equal to one if director is currently a CEO of an outside public firm, zero otherwise
Attendance < 75%	Indicator equal to one if director attends less than 75% of board meetings in a given sample year, zero otherwise
Audit committee	Indicator equal to one if director sits on the audit committee, zero otherwise
Compensation committee	Indicator equal to one if director sits on the compensation committee, zero otherwise
Nominating committee	Indicator equal to one if director sits on the nominating committee, zero otherwise
Gain new seat - prior year	Indicator equal to one if director gains an additional directorship at an outside public firm in the prior year, zero otherwise
Female	Indicator equal to one if director is female, zero otherwise
Co-option	Indicator equal to one if director tenure is less than current CEO tenure, zero otherwise
Age (65-71)	Indicator equal to one if director age is greater than or equal to 65 and less than or equal to 71, zero otherwise
Age (72+)	Indicator equal to one if director age is greater than or equal to 72, zero otherwise

Appendix A (continued): Variable Definitions

	Variable Definition
Panel B: Director Characteristics (continued)	
Audit committee experience	Indicator equal to one if director currently sits or previously sat on audit committee of a public firm, zero otherwise
Compensation committee experience	Indicator equal to one if director currently sits or previously sat on compensation committee of a public firm, zero otherwise
Nominating committee experience	Indicator equal to one if director currently sits or previously sat on nominating committee of a public firm, zero otherwise
Panel C: Firm Governance Measures	
Busy	Percentage of outside directors holding three or more directorships
Co-option	Percentage of outside directors with tenure less than the current CEO
CEO chair	Indicator equal to one if CEO also holds position of chair of the board, zero otherwise
Former CEO is chair	Indicator equal to one if chair of the board was previously CEO, zero otherwise
Active blockholder	Indicator equal to one if firm has an outside shareholder who files a 13D disclosing a 5% stake with intentions to affect the firm or management, zero otherwise
Active appearance	Indicator equal to one if active block exists as of fiscal year-end prior to when turnover is identified but did not exist in year prior to this, zero otherwise
Hedge fund blockholder	Indicator equal to one if firm has a hedge fund shareholder with at least a 5% stake in the firm's equity, zero otherwise
Board size	Total number of directors on the board
Outsiders	Percentage of outside directors on the board
Panel D: Firm Characteristics	
CEO turnover	Indicator equal to one if CEO turnover occurs during the current fiscal year, zero otherwise
Firm age	Firm age in years
Firm size	The natural log of total book value of assets
Return volatility	Annualized standard deviation of monthly stock returns in prior fiscal year

Figure 1: Time series of director turnover-performance sensitivity

The figure reports the time series variation in director turnover-performance sensitivity with respect to idiosyncratic stock returns over the sample period (2000 - 2011). For each two-year window over the sample period, regressions are estimated similar to those of Model 6 in Table 2. The marginal effects from the coefficients on idiosyncratic stock return are plotted for each two-year rolling window.
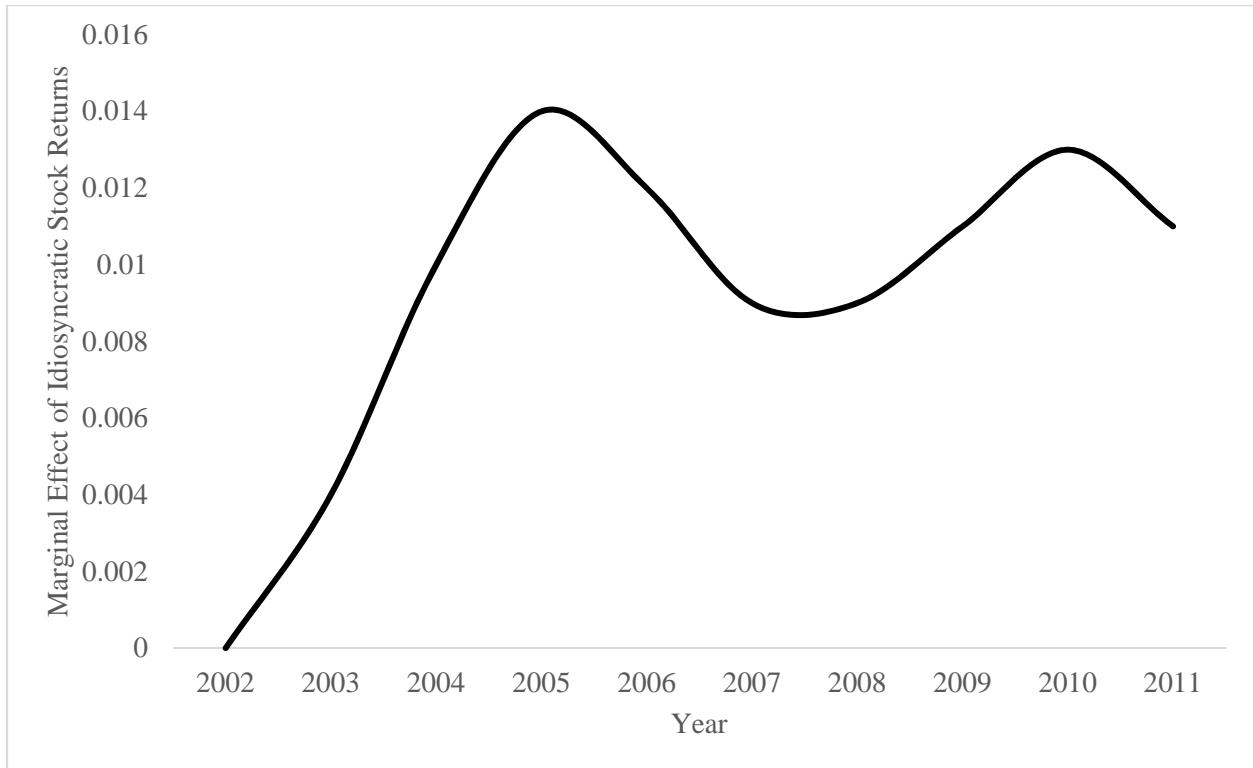
Figure 2: Active blockholder and hedge fund blockholder ownership over time

The figure reports the time series variation in the proportion of firm-years with the presence of an active blockholder or a hedge fund blockholder over the sample period (2000 - 2011). An active blockholder is an outside investor who files a 13D disclosing a 5% stake with intentions to affect the firm or management. A hedge fund blockholder is a hedge fund investor who holds at least a 5% stake of the firms' equity.
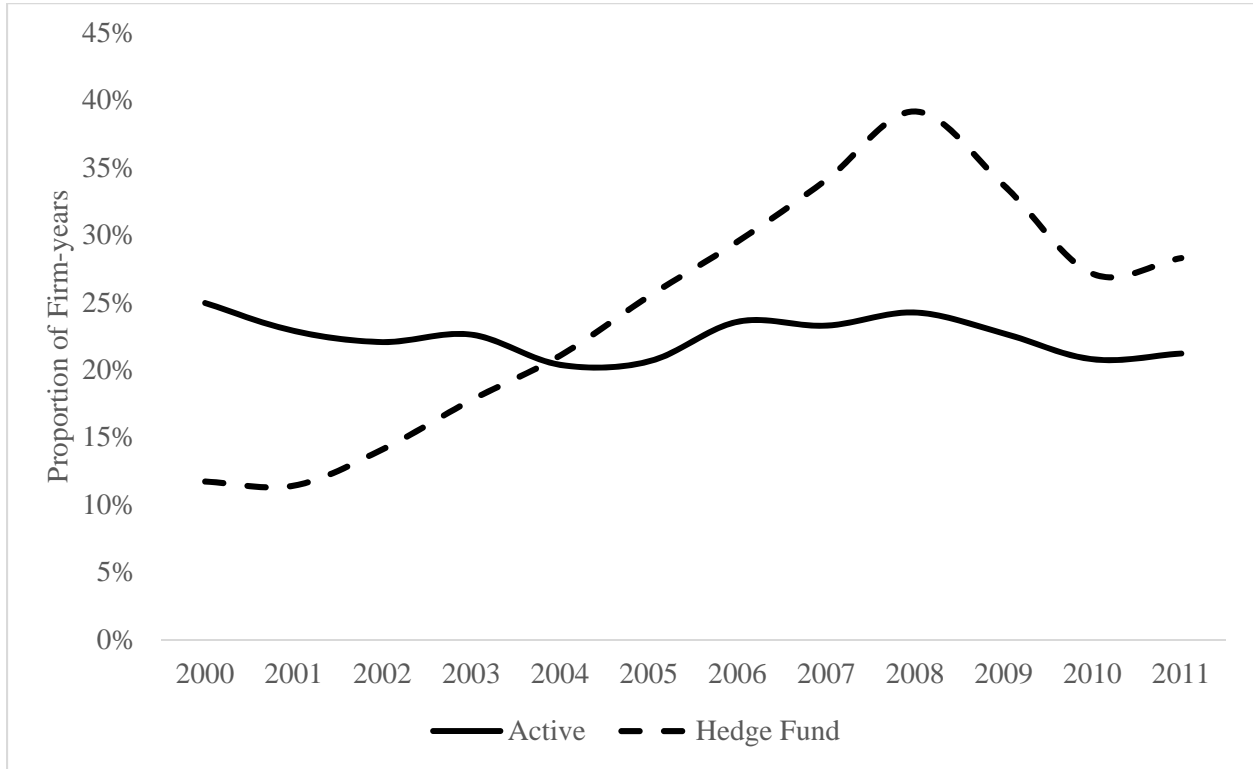
Figure 3: Time series of director turnover-performance sensitivity at firms with blockholders

The figure reports the time series variation in director turnover-performance sensitivity with respect to idiosyncratic stock returns at firms with the presence of an active blockholder or a hedge fund blockholder over the sample period (2000 - 2011). For each two-year window over the sample period, we estimate regressions similar to those of Table 8. The marginal effects from the coefficients on the interaction term between idiosyncratic stock return and the presence of an active blockholder/hedge fund blockholder are plotted for each two-year rolling window. An active blockholder is an outside investor who files a 13D disclosing a 5% stake with intentions to affect the firm or management. A hedge fund blockholder is a hedge fund investor who holds at least a 5% stake of the firms' equity.
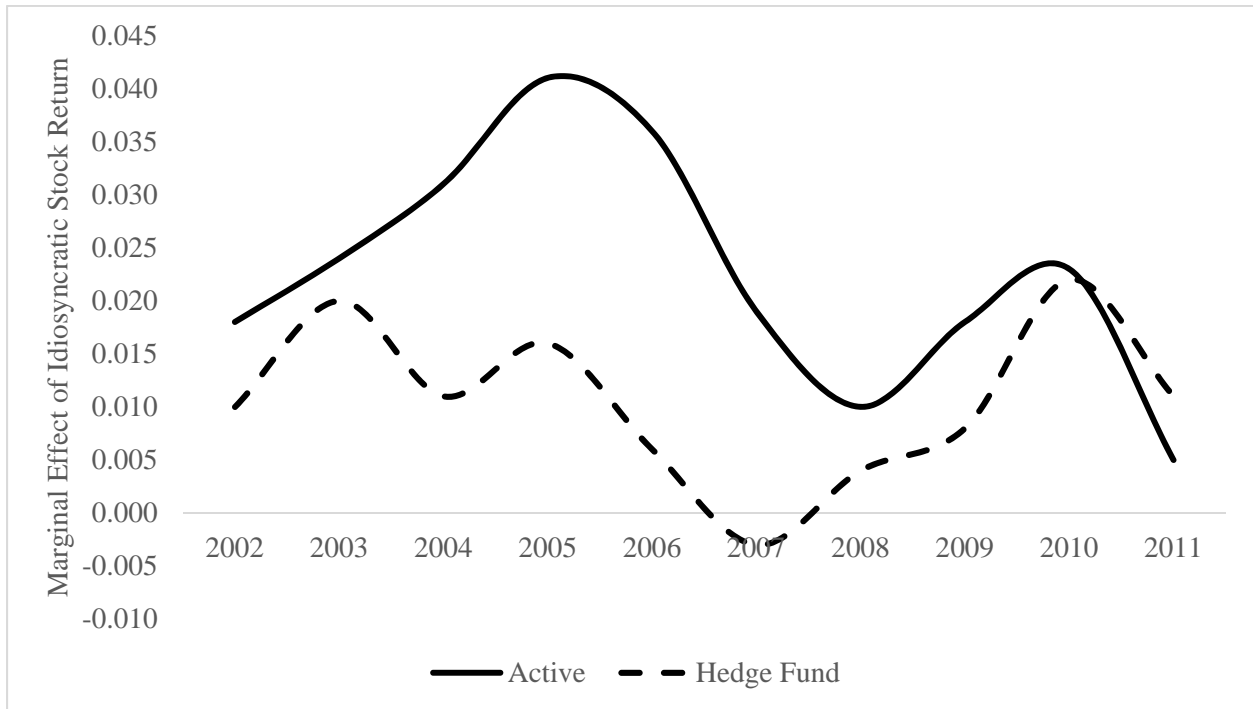
Table 1: Summary of firm characteristics

The table summarizes firm characteristics for 39,975 firm-years between 2000 and 2011. Panel A summarizes one-year lagged firm performance measures from CRSP and Compustat. Industry-adjusted stock return (ROA) is the annual buy-and-hold return (ROA) adjusted by the median Fama-French 48 industry return (ROA) based on all firms in CRSP (Compustat). ROA is operating income scaled by the total book value of assets. Industry-induced (idiosyncratic) stock return is the fitted (residual) value from a cross-sectional regression of annual buy-and-hold returns on the median Fama-French 48 industry return based on all firms in CRSP. Panel B reports board, director and governance characteristics as of the fiscal year-end prior to when turnover is identified from BoardEx and Thomson Reuters. Age is director age in years. Tenure is director tenure in years. Hold additional seats is an indicator equal to one if the director holds an additional directorship at an outside public firm, zero otherwise. Gain new seats - prior year is an indicator equal to one if the director gains an additional directorship at an outside public firm in the past year, zero otherwise. Current CEO elsewhere is an indicator equal to one if the director is currently a CEO of an outside public firm, zero otherwise. Female is an indicator equal to one if the director is female, zero otherwise. Busy is an indicator equal to one if the director holds three or more public directorships, zero otherwise. Co-opted is an indicator equal to one if the director's tenure is less than the current CEO's tenure, zero otherwise. CEO chair is an indicator equal to one if the CEO also holds the position of chair of the board, zero otherwise. Former CEO is chair is an indicator equal to one if the chair of the board was previously the firm's CEO, zero otherwise. Active blockholder is an indicator variable equal to one if a firm-year has an outside shareholder who files a 13D disclosing a 5% stake with intentions to affect the firm or its management, zero otherwise. Board size is the total number of directors on the board. Outsiders is the percentage of outside directors on the board. Panel C reports firm characteristics as of the fiscal year-end prior to when turnover is identified from Compustat, BoardEx, and CRSP. CEO turnover is an indicator variable equal to one if a CEO turnover occurs during the current fiscal year, zero otherwise. Firm age is the age of the firm in years. Firm size is the log transformed total book value of assets. Return volatility is the annualized standard deviation of monthly stock returns. Panel D sorts the sample into firm-years experiencing director turnover(s) (14,220 firm-years) and firm-years with no director turnover (25,755 firm-years) to compare firm performance. ***, **, * denote statistically significant differences at the 1%, 5%, and 10%, levels respectively.

	Mean	Median	Std Dev
Panel A: Firm Performance Measures			
Industry-adjusted stock return	11.40%	1.21%	0.59
Industry-adjusted ROA	0.82%	0.93%	0.18
Industry-induced stock return	15.13%	13.38%	0.28
Idiosyncratic stock return	0.00%	-8.62%	0.62
Panel B: Board, Director and Governance Characteristics			
Age	60.49	61.00	9.26
Tenure	7.34	6.77	4.13
Hold additional seats	37.14%	0.00%	0.48
Gain new seat - prior year	3.81%	0.00%	0.19
Current CEO elsewhere	20.59%	0.00%	0.40
Female	10.31%	0.00%	0.30
Busy	17.63%	0.00%	0.38
Co-opted	33.81%	0.00%	0.47
CEO chair	50.02%	100.00%	0.50
Former CEO is chair	15.45%	0.00%	0.36
Active blockholder	22.38%	0.00%	0.42
Board size	8.65	8.00	2.73
Outsiders	71.63%	75.00%	0.15
Panel C: Firm Characteristics			
CEO turnover	10.07%	0.00%	0.30
Firm age	19.32	14.00	14.90
Firm size	6.51	6.51	2.10
Return volatility	0.47	0.39	0.34

	Turnover Firm-Years (1)	Non-Turnover Firm-Years (2)	Difference (1) – (2)
Panel D: Firm Performance Measures			
Industry-adjusted stock return	10.68%	11.80%	-1.12%**
Industry-adjusted ROA	0.68%	0.89%	-0.21%
Industry-induced stock return	16.18%	14.54%	1.64%***
Idiosyncratic stock return	-1.26%	0.69%	-1.95%***

Table 2: Logit regressions modeling individual director turnover

The table reports logistic regressions modeling the likelihood that a director turns over in a given firm-year. The sample consists of 281,062 director-firm-year observations between 2000 and 2011. In each model, the dependent variable is an indicator equal to one if the director turns over and zero otherwise. Models 1-3 include continuous measures of lagged performance: industry-adjusted stock return (Model 1), industry-adjusted ROA (Model 2), industry-induced and idiosyncratic stock returns (Model 3). Industry-adjusted stock return (ROA) is the annual buy-and-hold return (ROA) adjusted by the median Fama-French 48 industry return (ROA) based on all firms in CRSP (Compustat). ROA is operating income scaled by the total book value of assets. Industry-induced (idiosyncratic) stock return is the fitted (residual) value from a cross-sectional regression of annual buy-and-hold returns on the median Fama-French 48 industry return. Models 4-6 include measures of lagged performance based on sample quartiles for a given sample year: low stock return (Model 4), low ROA (Model 5), low industry-induced and low idiosyncratic stock return (Model 6). Low stock return (ROA) is an indicator equal to one if the lagged industry-adjusted stock return (ROA) falls in the lowest quartile of performance for the sample year, zero otherwise. Low industry-induced (idiosyncratic) stock return is an indicator equal to one if industry-induced (idiosyncratic) stock return falls in the lowest quartile of performance for the sample year, zero otherwise. All stock and accounting performance measures are winsorized at the 1st and 99th percentiles. All other independent variables are measured as of the fiscal year-end prior to when turnover is identified. Age (65-71) is an indicator equal to one if the director is between the ages of 65 and 71, zero otherwise. Age (72+) is an indicator equal to one if the director is 72 years or older, zero otherwise. Hold additional seats is an indicator equal to one if the director holds additional directorships at outside public firms, zero otherwise. Gain new seat - prior year is an indicator equal to one if the director gained an additional directorship at an outside public firm in the past year, zero otherwise. Current CEO elsewhere is an indicator equal to one if the director is currently a CEO at an outside public firm, zero otherwise. Audit, Compensation, and Nominating committee are indicators equal to one if the director sits on the respective committee, zero otherwise. Female is an indicator equal to one if the director is female, zero otherwise. Tenure is director tenure in years. Co-option is an indicator equal to one if the director's tenure is less than the current CEO's tenure, zero otherwise. CEO turnover is an indicator equal to one if CEO turnover occurs during the current fiscal year, zero otherwise. Firm age is the age of the firm in years, firm size is the log transformed total book value of assets, return volatility is the annualized standard deviation of monthly stock returns, and board size is the total number of directors on the board and outsiders is the percentage of outside directors on the board. Year fixed effects are also included. Marginal effects are reported and computed at the mean values of the independent variables. Marginal effects are the change in the probability of director turnover for a one standard deviation change in a continuous variable or a shift from zero to one for an indicator variable. *p*-values based on standard errors clustered by firm and by year are in parentheses.

Table 2 (continued)

	Firm Performance, Continuous			Firm Performance, Low		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Intercept	-1.961	-1.969	-1.977	-2.033	-2.105	-2.036
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Industry-adjusted stock return	-0.005			0.010		
	(0.008)			(0.000)		
Industry-adjusted ROA		-0.025			0.015	
		(0.000)			(0.000)	
Industry-induced stock return			-0.003			0.003
			(0.753)			(0.282)
Idiosyncratic stock return			-0.005			0.009
			(0.003)			(0.000)
Age (65-71)	0.014	0.014	0.014	0.014	0.014	0.014
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Age (72+)	0.056	0.056	0.056	0.056	0.055	0.056
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Hold additional seats	-0.004	-0.004	-0.004	-0.005	-0.005	-0.005
	(0.012)	(0.014)	(0.011)	(0.009)	(0.007)	(0.007)
Gain new seat - prior year	0.006	0.006	0.006	0.006	0.006	0.006
	(0.027)	(0.024)	(0.028)	(0.025)	(0.025)	(0.029)
Current CEO elsewhere	0.001	0.001	0.001	0.001	0.001	0.001
	(0.686)	(0.748)	(0.684)	(0.703)	(0.745)	(0.697)
Audit committee	-0.033	-0.033	-0.033	-0.032	-0.032	-0.032
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Compensation committee	-0.022	-0.022	-0.022	-0.022	-0.022	-0.022
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Nominating committee	-0.019	-0.019	-0.019	-0.019	-0.019	-0.019
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Female	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002
	(0.076)	(0.076)	(0.071)	(0.087)	(0.083)	(0.081)
Tenure	-0.000	0.000	-0.000	0.000	0.000	0.000
	(0.967)	(0.814)	(0.957)	(0.937)	(0.672)	(0.950)
Co-option	-0.019	-0.019	-0.019	-0.019	-0.019	-0.019
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
CEO turnover	0.036	0.036	0.036	0.035	0.035	0.035
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Firm age	0.000	0.000	0.000	0.000	0.000	0.000
	(0.749)	(0.792)	(0.706)	(0.668)	(0.915)	(0.615)
Firm size	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001
	(0.030)	(0.211)	(0.029)	(0.057)	(0.275)	(0.047)
Return volatility	0.023	0.019	0.023	0.020	0.018	0.020
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Board Size	0.001	0.001	0.001	0.001	0.001	0.001
	(0.002)	(0.007)	(0.002)	(0.002)	(0.004)	(0.001)
Outsiders	-0.047	-0.047	-0.047	-0.046	-0.045	-0.046
	(0.026)	(0.024)	(0.025)	(0.027)	(0.030)	(0.026)
Year FE, Director, Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	281,062	281,062	281,062	281,062	281,062	281,062
Pseudo r^2	0.044	0.045	0.044	0.045	0.045	0.045

Table 3: Tobit regressions modeling percentage of board turnover

The table reports Tobit regressions modeling the percentage of outside directors on a board that turn over in a given firm-year. The sample consists of 39,975 firm-year observations between 2000 and 2011. In each model, the dependent variable is the number of outside directors that turn over scaled by the total number of outside directors on the board in a given firm-year. Models 1-3 include continuous measures of lagged performance: industry-adjusted stock return (Model 1), industry-adjusted ROA (Model 2), industry-induced and idiosyncratic stock returns (Model 3). Industry-adjusted stock return (ROA) is the annual buy-and-hold return (ROA) adjusted by the median Fama-French 48 industry return (ROA) based on all firms in CRSP (Compustat). ROA is operating income scaled by total book value of assets. Industry-induced (idiosyncratic) stock return is the fitted (residual) value from a cross-sectional regression of annual buy-and-hold returns on the median Fama-French 48 industry return. Models 4-6 include measures of lagged performance based on sample quartiles for a given sample year: low stock return (Model 4), low ROA (Model 5), low industry-induced and low idiosyncratic stock returns (Model 6). Low stock return (ROA) is an indicator equal to one if lagged industry-adjusted stock return (ROA) falls in the lowest quartile of performance for the sample year, zero otherwise. Low industry-induced (idiosyncratic) stock return is an indicator equal to one if industry-induced (idiosyncratic) stock return falls in the lowest quartile of performance for the sample year, zero otherwise. All stock and accounting performance measures are winsorized at the 1st and 99th percentiles. All other independent variables are measured as of the fiscal year-end prior to when turnover is identified. CEO turnover is an indicator equal to one if CEO turnover occurs during the current fiscal year, zero otherwise. Firm age is the age of the firm in years. Firm size is the log transformed total book value of assets. Return volatility is the annualized standard deviation of monthly stock returns. Board size is the total number of directors on the board. Outsiders is the percentage of outside directors on the board. All variable definitions are included in Appendix A. Year fixed effects are also included. p-values based on standard errors clustered by firm and by year are in parentheses.

	Firm Performance, Continuous			Firm Performance, Low		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Intercept	-0.235	-0.235	-0.236	-0.245	-0.254	-0.244
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Industry-adjusted stock return	-0.009			0.024		
	(0.052)			(0.000)		
Industry-adjusted ROA		-0.053			0.038	
		(0.000)			(0.000)	
Industry-induced stock return			-0.011			0.007
			(0.722)			(0.350)
Idiosyncratic stock return			-0.008			0.019
			(0.021)			(0.000)
CEO turnover	0.097	0.098	0.097	0.096	0.096	0.097
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Firm age	0.000	0.000	0.000	0.000	0.000	0.000
	(0.004)	(0.003)	(0.003)	(0.001)	(0.006)	(0.001)
Firm size	-0.007	-0.005	-0.007	-0.006	-0.005	-0.006
	(0.000)	(0.003)	(0.000)	(0.001)	(0.005)	(0.000)
Return volatility	0.058	0.050	0.058	0.052	0.045	0.051
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Board size	0.024	0.023	0.024	0.024	0.023	0.024
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Outsiders	-0.111	-0.111	-0.111	-0.110	-0.109	-0.110
	(0.073)	(0.071)	(0.071)	(0.074)	(0.077)	(0.073)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	39,975	39,975	39,975	39,975	39,975	39,975
Pseudo r^2	0.063	0.064	0.063	0.064	0.066	0.064

Table 4: Regressions modeling changes and gain in future board seats

The table reports OLS regressions modeling the change in number of board seats in the following three years and logistic regressions modeling the likelihood that a director obtains a new directorship in the following three years. The sample consists of 176,958 director-year observations between 2000 and 2008. In Models 1-3, the dependent variable is the change in number of outside directorships held from year 0 to year 3. In Models 4-6, the dependent variable is an indicator equal to one if the director gains a new directorship in the following three years and zero otherwise. Models 2 (3) and 5 (6) include only directors in the lowest (highest) quartile of prior industry-adjusted stock return for that sample year. Turnover is an indicator equal to one if the director experiences turnover in year 0, zero otherwise. All other independent variables are measured as of the fiscal year-end prior to when turnover is identified. Age (65-71) is an indicator equal to one if the director is between the ages of 65 and 71, zero otherwise. Age (72+) is an indicator equal to one if the director is 72 years or older, zero otherwise. Tenure is director tenure in years. Hold additional seats is an indicator equal to one if the director holds additional directorships at an outside public firm, zero otherwise. Current CEO elsewhere is an indicator equal to one if the director is currently a CEO at an outside public firm, zero otherwise. Audit, Compensation, and Nominating committees are indicators equal to one if the director sits on the respective committee, zero otherwise. Gain new seat - prior year is an indicator equal to one if the director gained an additional directorship at outside public firms in the past year, zero otherwise. Female is an indicator equal to one if the director is female, zero otherwise. All regressions include firm-year fixed effects. p-values based on standard errors clustered by firm are in parentheses.

	Delta Seats (0,+3)			Gain New Seat (0,+3)		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
	All	Low	High	All	Low	High
Intercept	0.128	0.122	0.130			
	(0.000)	(0.000)	(0.000)			
Turnover	-0.022	-0.033	-0.018	-0.088	-0.149	-0.020
	(0.000)	(0.010)	(0.166)	(0.014)	(0.034)	(0.787)
Age (65-71)	-0.157	-0.151	-0.154	-0.828	-0.711	-0.726
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Age (72+)	-0.114	-0.117	-0.116	-1.334	-1.412	-1.221
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Tenure	-0.003	-0.003	-0.003	-0.070	-0.072	-0.076
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Hold additional seats	-0.307	-0.318	-0.298	0.747	0.756	0.738
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Current CEO elsewhere	0.069	0.082	0.056	0.221	0.240	0.201
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Audit committee	0.029	0.038	0.032	0.200	0.221	0.234
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Compensation committee	0.002	-0.002	0.001	0.116	0.070	0.101
	(0.543)	(0.799)	(0.875)	(0.000)	(0.057)	(0.007)
Nominating committee	-0.012	-0.011	-0.021	0.046	0.030	0.021
	(0.001)	(0.176)	(0.009)	(0.029)	(0.483)	(0.626)
Gain new seats – prior year	-0.084	-0.097	-0.120	0.393	0.476	0.368
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Female	-0.009	0.002	0.005	0.210	0.277	0.228
	(0.097)	(0.838)	(0.679)	(0.000)	(0.000)	(0.000)
Firm-Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	176,958	40,559	41,015	92,867	21,455	20,971
Pseudo r^2	0.064	0.065	0.062	0.110	0.111	0.108

Table 5: Regressions modeling pre- and post-SOX turnover-performance sensitivity for directors

The table examines the difference in turnover-performance sensitivity between pre- and post-SOX time periods using linear probability models estimating the likelihood of director turnover for 281,062 director-firm-year observations between 2000 and 2011. In all models, the dependent variable is an indicator equal to one if the director turns over and zero otherwise. Interactions between a post-SOX indicator variable and lagged performance measures are included to capture the difference in turnover-performance sensitivities between the two time periods. Low stock return (ROA) is an indicator equal to one if lagged industry-adjusted stock return (ROA) falls in the lowest quartile of performance for the sample year, zero otherwise. Low industry-induced (idiosyncratic) stock return is an indicator equal to one if lagged industry-induced (idiosyncratic) stock return falls in the lowest quartile of performance for the sample year, zero otherwise. Post-SOX is an indicator equal to one if the director-firm-year occurs in 2003 or after, zero otherwise. All other independent variables are measured as of the fiscal year-end prior to when turnover is identified. Director controls not shown include age (65-71), age (72+), hold additional seats, gain new seat - prior year, current CEO elsewhere, audit committee, compensation committee, nominating committee, female, co-option, and tenure. Firm controls not shown include CEO turnover, firm age, firm size, return volatility, board size and outsiders. All variable definitions are included in Appendix A. p-values based on standard errors clustered by firm and by year are in parentheses.

| | Director-Level | | |
	Model 1	Model 2	Model 3
Intercept	0.132	0.126	0.131
	(0.000)	(0.000)	(0.000)
Low stock return	0.009		
	(0.009)		
Low stock return * Post-SOX	0.003		
	(0.382)		
Low ROA		0.015	
		(0.001)	
Low ROA * Post-SOX		0.003	
		(0.579)	
Low industry-induced stock return			0.009
			(0.000)
Low industry-induced stock return * Post-SOX			-0.007
			(0.054)
Low idiosyncratic stock return			0.003
			(0.252)
Low idiosyncratic stock return * Post-SOX			0.008
			(0.005)
Post-SOX	0.003	0.004	0.003
	(0.623)	(0.519)	(0.591)
Director/Firm Controls	Yes	Yes	Yes
Observations	281,062	281,062	281,062
Adjusted r^2	0.024	0.025	0.024

Table 6: Regressions modeling director turnover with governance

The table reports regressions modeling the likelihood of director turnover with a focus on the impact of governance. Models 1-3 present logistic models estimating the likelihood of director turnover for 109,331 director-firm-year observations between 2000 and 2011. In Models 1-3 the dependent variable is an indicator equal to one if the director turns over and zero otherwise. Models 4-6 present Tobit regressions modeling the percentage of directors on a board that turn over in a given firm-year for a sample of 14,560 firm-year observations between 2000 and 2011. In Models 4-6 the dependent variable is the percentage of directors on the board that turn over. Low stock return (ROA) is an indicator equal to one if lagged industry-adjusted stock return (ROA) falls in the lowest quartile of performance for the sample year, zero otherwise. Low industry-induced (idiosyncratic) stock return is an indicator equal to one if industry-induced (idiosyncratic) stock return falls in the lowest quartile of performance for the sample year, zero otherwise. All other independent variables are measured as of the fiscal year-end prior to when turnover is identified. Co-option is an indicator equal to one if the director's tenure is less than the current CEO's tenure (Models 1-3) or the percentage of directors with tenure less than the current CEO's (Models 4-6). Busy is the percentage of outside directors holding three or more public directorships. CEO chair (Former) is an indicator equal to one if the CEO (former CEO) also holds the position of chair of the board, zero otherwise. Active blockholder is an indicator equal to one if a firm-year has an outside shareholder who files a 13D disclosing a 5% stake with intentions to affect the firm or its management, zero otherwise. In Models 1-3, director controls not shown include age (65-71), age (72+), hold additional seats, gain new seat - prior year, current CEO elsewhere, audit committee, compensation committee, nominating committee, female, and tenure. In all models, firm controls not shown include CEO turnover, firm age, firm size, return volatility, board size and outsiders. All variable definitions are included in Appendix A. Year fixed effects are also included. Coefficients for Model 1-3 are marginal effects computed at the mean values of the independent variables. Marginal effects are the change in the probability of director turnover for a one standard deviation change in a continuous variable or a shift from zero to one for an indicator variable. p-values based on standard errors clustered by firm and by year are in parentheses.

	Director-Level			Firm-Level		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model6
Intercept	-2.033	-2.009	-2.019	-0.171	-0.168	-0.170
	(0.000)	(0.000)	(0.000)	(0.002)	(0.002)	(0.002)
Low stock return	0.007			0.017		
	(0.000)			(0.002)		
Low ROA		0.016			0.042	
		(0.000)			(0.000)	
Low industry-induced stock return			-0.000			0.004
			(0.959)			(0.612)
Low idiosyncratic stock return			0.005			0.012
			(0.020)			(0.100)
Co-option	-0.023	-0.023	-0.023	-0.039	-0.038	-0.039
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Busy	0.018	0.017	0.018	0.019	0.017	0.019
	(0.018)	(0.021)	(0.017)	(0.379)	(0.418)	(0.375)
CEO chair	-0.004	-0.003	-0.004	-0.017	-0.015	-0.017
	(0.208)	(0.283)	(0.207)	(0.015)	(0.022)	(0.014)
Former CEO is chair	-0.006	-0.006	-0.006	-0.019	-0.017	-0.019
	(0.017)	(0.024)	(0.016)	(0.012)	(0.018)	(0.012)
Active blockholder	0.012	0.011	0.012	0.029	0.028	0.030
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Year FE, Director, Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	109,331	109,331	109,331	14,560	14,560	14,560
Pseudo r^2	0.059	0.059	0.059	0.106	0.110	0.106

Table 7: Logit regressions modeling individual director turnover with director voting

The table reports logistic regressions modeling the likelihood that a director turns over in a given firm-year. Models 1-3 include 52,228 director-firm-year observations with available information on director voting between 2003 and 2011. Models 4-6 restrict the sample to 28,796 director-firm-year observations with available information on director voting and director attendance between 2003 and 2011. The regression specifications include measures of lagged performance based on sample quartiles for a given sample year: low stock return (Models 1 and 4), low ROA (Models 2 and 5), low industry-induced and low idiosyncratic stock returns (Models 3 and 6). Low stock return (ROA) is an indicator equal to one if lagged industry-adjusted stock return (ROA) falls in the lowest quartile of performance for the sample year, zero otherwise. Low industry-induced (idiosyncratic) stock return is an indicator equal to one if industry-induced (idiosyncratic) stock return falls in the lowest quartile of performance for the sample year, zero otherwise. Excess withheld is an indicator equal to one if the director receives less 'for' votes than the average director on the board, zero otherwise. ISS against is an indicator equal to one if ISS (Institutional Shareholder Services) recommends a vote against the director, zero otherwise. Attendance < 75% is an indicator equal to one if the director attends less than 75% of board meetings in a given sample year. All other independent variables are measured as of the fiscal year-end prior to when turnover is identified. Director controls not shown include age (65-71), age (72+), hold additional seats, gain new seat - prior year, current CEO elsewhere, audit committee, compensation committee, nominating committee, female, co-option, and tenure. Firm controls not shown include CEO turnover, firm age, firm size, return volatility, board size and outsiders. All variable definitions are included in Appendix A. Year fixed effects are also included. Marginal effects are reported and computed at the mean values of the independent variables. Marginal effects are the change in the probability of director turnover for a one standard deviation change in a continuous variable or a shift from zero to one for an indicator variable. p-values based on standard errors clustered by firm and by year are in parentheses.

	Director Level					
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Intercept	-3.339	-3.359	-3.327	-6.073	-6.113	-6.050
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Excess withheld	0.012	0.012	0.012	0.013	0.013	0.013
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ISS against	-0.001	-0.001	-0.000	-0.009	-0.009	-0.009
	(0.877)	(0.866)	(0.921)	(0.225)	(0.194)	(0.217)
Low stock return	0.013			0.010		
	(0.000)			(0.081)		
Low ROA		0.014			0.014	
		(0.000)			(0.004)	
Low industry-induced stock return			0.004			0.002
			(0.513)			(0.749)
Low idiosyncratic stock return			0.019			0.013
			(0.000)			(0.012)
Attendance < 75%				0.026	0.026	0.025
				(0.006)	(0.005)	(0.007)
Year FE, Director, Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	52,228	52,228	52,228	28,796	28,796	28,796
Pseudo r^2	0.0413	0.0411	0.0423	0.0624	0.0626	0.0629

Table 8: OLS regressions modeling director turnover with governance interaction

The table reports linear probability regressions modeling the likelihood that a director turns over in a given firm-year. In each model, the dependent variable is an indicator equal to one if the director turns over and zero otherwise. The sample in the first four models consists of 109,331 director-firm-year observations between 2000 and 2011. The sample in the last two models consists of a propensity score matched sample. Firms with the presence (appearance) of an active blockholder are matched to up to three control firms based a propensity score matching model described in Section 4.4. The measure of performance in all models is based on sample quartiles in a given sample year. Low stock return is an indicator equal to one if the lagged industry-adjusted stock return falls in the lowest quartile of performance for the sample year and zero otherwise. All models include an interaction between low stock return and the measure of governance indicated in the column header. All other independent variables are measured as of the fiscal year-end prior to when turnover is identified. Co-opted is an indicator equal to one if the director's tenure is less than the current CEO's tenure, zero otherwise. Busy is the percentage of outside directors holding three or more public directorships. CEO chair (Former) is an indicator equal to one if the CEO (former CEO) also holds the position of chair of the board, zero otherwise. Active blockholder is an indicator variable equal to one if a firm-year has an outside shareholder who files a 13D disclosing the 5% stake with intentions to affect the firms or its management, zero otherwise. Active appearance is an indicator variable equal to one if an active block exists as of the fiscal year-end prior to when turnover is identified but did not exist in the year prior to this, zero otherwise. Director/firm controls not shown include tenure, co-option, CEO turnover, firm age, firm size, return volatility, board size and outsiders. All variable definitions are included in Appendix A. Marginal effects are reported and computed at the mean values of the independent variables. Marginal effects are the change in the probability of director turnover for a one standard deviation change in a continuous variable or a shift from zero to one for an indicator variable. p-values based on standard errors clustered by firm and by year are in parentheses.

			Governance measure			
	Co-opted	Busy	CEO chair	Former CEO is chair	Active blockholder	Active appearance
Intercept	0.113	0.101	0.095	0.096	0.113	0.089
	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.001)
Low stock return	0.007	0.014	0.012	0.010	0.006	0.002
	(0.004)	(0.000)	(0.000)	(0.000)	(0.020)	(0.687)
Low stock return * Governance	0.006	-0.020	-0.003	-0.004	0.016	0.028
	(0.163)	(0.042)	(0.328)	(0.513)	(0.017)	(0.015)
Governance	-0.024	0.027	-0.004	-0.002	0.010	0.008
	(0.000)	(0.005)	(0.235)	(0.644)	(0.000)	(0.091)
Age (65-71)	0.015	0.016	0.016	0.016	0.016	0.018
	(0.006)	(0.004)	(0.003)	(0.004)	(0.006)	(0.001)
Age (72+)	0.113	0.113	0.113	0.113	0.108	0.115
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Hold additional seats	-0.008	-0.009	-0.007	-0.007	-0.008	-0.008
	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.024)
Gain new seat – prior year	0.006	0.004	0.005	0.005	0.007	0.003
	(0.058)	(0.187)	(0.115)	(0.112)	(0.038)	(0.651)
Current CEO elsewhere	-0.000	-0.000	-0.000	-0.000	-0.004	-0.001
	(0.898)	(0.860)	(0.906)	(0.889)	(0.191)	(0.874)
Audit committee	-0.037	-0.036	-0.036	-0.036	-0.040	-0.036
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Compensation committee	-0.028	-0.028	-0.028	-0.028	-0.027	-0.025
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Nominating committee	-0.024	-0.023	-0.023	-0.023	-0.024	-0.022
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Female	-0.002	-0.003	-0.002	-0.002	-0.006	-0.001
	(0.310)	(0.265)	(0.359)	(0.347)	(0.002)	(0.842)
Year FE, Director, Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	109,331	109,331	109,331	109,331	66,872	33,996
Adjusted r^2	0.035	0.034	0.034	0.034	0.033	0.034

Table 9: Characteristics of replacement directors following turnover

The table summarizes differences between turnover directors and directors appointed to the same firm in the following year(s). Each turnover director is paired with each replacement director over the given time horizon. The difference in director characteristics for each pair is then averaged over the turnover firm-year. Column 1 reports average differences in director characteristics for all turnover-replacement pairs. Column 2 reports average differences in director characteristics for turnover-replacement pairs in the lowest quartile of lagged industry-adjusted stock return in each sample year and Column 3 reports average differences in director characteristics for turnover-replacement pairs in the highest quartile of lagged industry-adjusted stock return in each sample year. All director characteristics are measured as of the fiscal year-end prior to when turnover is identified. Panel A summarizes all pairs for 12,752 turnover directors and 13,113 replacement directors over a 1 year horizon following turnover. Panel B summarizes all pairs for 15,369 turnover directors and 20,827 replacement directors over a 2 year horizon following turnover. Panel C summarizes all pairs for 16,252 turnover directors and 26,608 replacement directors over a 3 year horizon following turnover. Age is director age in years. Number of other seats is the total number of public directorships held by the director. Hold additional seats is an indicator equal to one if the director holds at least one additional public directorship, zero otherwise. Current CEO elsewhere is an indicator equal to one if the director is currently a CEO at an outside public firm, zero otherwise. Audit, Compensation, or Nominating committee experience is an indicator equal to one if the director has current or previous outside respective committee experience, zero otherwise. Female is an indicator equal to one if the director is female, zero otherwise. ***, **, * denote statistical significance from zero at the 1%, 5%, and 10%, levels respectively.

	All Turnovers (1)	Low Stock Return (2)	High Stock Return (3)
Panel A: Replacement-Turnover Pairs, 1-year Horizon			
Age difference	-5.98***	-4.85***	-5.20***
Number of other seats difference	0.01	-0.03	0.05*
Hold additional seats difference	0.03***	0.01	0.05***
Current CEO elsewhere difference	0.03***	-0.01	0.02*
Audit com. experience difference	0.01	0.02	0.04***
Comp com. experience difference	-0.02***	-0.02	0.00
Nom com. experience difference	-0.02***	-0.01	0.00
Female difference	0.05***	0.04***	0.06***
Panel B: Replacement-Turnover Pairs, 2-year Horizon			
Age difference	-5.98***	-4.80***	-5.10***
Number of other seats difference	0.01	-0.01	0.05**
Hold additional seats difference	0.04***	0.02*	0.06***
Current CEO elsewhere difference	0.02***	-0.01	0.02
Audit com. experience difference	0.01**	0.02**	0.05***
Comp com. experience difference	-0.02***	-0.01	0.00
Nom com. experience difference	-0.01***	-0.01	0.00
Female difference	0.06***	0.04***	0.06***
Panel C: Replacement-Turnover Pairs, 3-year Horizon			
Age difference	-5.91***	-4.74***	-5.14***
Number of other seats difference	0.02*	0.00	0.06***
Hold additional seats difference	0.04***	0.02**	0.06***
Current CEO elsewhere difference	0.02***	-0.01	0.01
Audit com. experience difference	0.02***	0.03***	0.06***
Comp com. experience difference	-0.01*	-0.01	0.01
Nom com. experience difference	0.00	0.00	0.01
Female difference	0.06***	0.04***	0.06***