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Governance and CEO Turnover: Do Something or Do the Right Thing?

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We study how corporate governance affects firm value through the decision of whether to fire or retain the chief executive officer (CEO). We present a model in which weak governance—which prevents shareholders from controlling the board—protects inferior CEOs from dismissal, while at the same time insulates the board from pressures by biased or uninformed shareholders. Whether stronger governance improves retain/replace decisions depends on which of these effects dominates. We use our theoretical framework to assess the effect of governance on the quality of firing and hiring decisions using data on the CEO dismissals of large U.S. corporations during 1994–2007. Our findings are most consistent with a beneficent effect of weak governance on CEO dismissal decisions, suggesting that insulation from shareholder pressure may allow for better long-term decision making.

Keywords: corporate finance; management; organizational studies; decision making; CEO turnover; governance; entrenchment; entrenched CEOs
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1. Introduction

From Smith (1776) and Berle and Means (1932) to Hermalin and Weisbach (1998), economists have expressed concern about entrenched chief executive officers (CEOs) pursuing personal gain at the expense of shareholders. The prevailing belief is that firms risk value destruction by self-serving CEOs if they are left unchecked by weak boards or weak shareholders.

At the same time, many companies have actively chosen to weaken shareholders' powers with the stated aim of maximizing long-term profits. Recently, Facebook, LinkedIn, and Groupon completed initial public offerings with dual class share structures—with super-voting shares retained by insiders. In Google's case, the company introduced a new class of nonvoting shares, using the justification that "outside pressures [from stockholders] too often tempt companies to sacrifice long term opportunities to meet quarterly market expectations" (Securities and Exchange Commission 2004, p. 27).[1] Google's concern about *too much* shareholder influence seems at odds with the traditional notion that entrenchment—the insulation of CEOs from shareholders—is bad for firms' performance.

In this paper, we incorporate both of these views into a theory of entrenchment that distinguishes between the ability of CEOs to control the board (the "CEO protection" view) and the board's ability to disregard shareholder preferences (the "board protection" view). The literature on entrenchment largely ignores this distinction, assuming that board dependence on the CEO and insulation from shareholders have the same effect—protecting inferior CEOs.

In our model, CEO protection and board protection have differing effects on the firm. Specifically, we examine the quality of the board's decision to retain or fire a CEO. We focus on this decision because it is one of the board's primary functions, a decision that is made solely by the board and that lies at the heart of the debate on the costs of board entrenchment. We formally present and empirically examine a model that establishes distinct predictions for the CEO protection and board protection views of entrenchment and find evidence that limiting shareholder power over boards—that is, *entrenching* boards against shareholders—can improve the quality of firing decisions.

The governance literature already suggests that boards may make flawed firing decisions. Jenter and

[1] This sentiment is not unique to technology firms. Founding families and investors like Warren Buffet have historically turned to dual class structures to limit the influence of short-term investors.

Kanaan (2010, pp. 18–19) conclude that "Corporate boards make systematic mistakes in attributing performance, and credit or blame CEOs for performance caused by factors beyond their control."

We suggest that errors may arise when such decisions are heavily influenced by shareholders. A sense of the short-term pressures exerted by board members comes from a report from the consulting firm Booz, Allen, and Hamilton, which observes:

> In the U.S., investors apparently want CEOs to share the pain of poor returns. Although this reaction is not surprising, it is irrational.... This conclusion [raises] uncomfortable questions about the relationship between boards and management, for it indicates that directors are highly responsive to shareholder pressure about share prices, *even if management is not solely responsible for the performance*. (Lucier et al. 2004)

If shareholders are uninformed, have limited time horizons, or are subject to overreaction or other biases, they may demand CEO dismissal in response to performance changes outside the CEO's control.[2] We argue that these views may influence board decisions to the detriment of firm performance.

Why should board members cater to the tastes of shareholders? In Fama (1980) and Fama and Jensen (1983), the market disciplines boards and encourages oversight by creating incentives for board members to form reputations as experts. But this depends on the market *perceiving* the board member as an expert. Holmstrom (1999) notes that board members wanting to be perceived as doing the right thing is very different from their actually doing the right thing. Brandenburger and Polak (1996) demonstrate how a firm's decision makers can make inappropriate choices when concerned about shareholders' perceptions of their decisions. A primary thesis of our paper is that when board members are less entrenched, they may be more concerned about shareholder perceptions and thus more influenced by noise.

Our model formalizes the above intuition by examining the fire-versus-retain decision facing boards. We consider two scenarios: one in which shareholders know the CEO's quality and another in which shareholders' beliefs about CEO quality are subject to noise.

The first scenario gives rise to the classic notion of entrenchment, in which protecting the CEO and/or protecting the board from shareholders worsens the firing decision. In this case, firms with entrenched CEOs or boards will find it harder to fire the CEO. As a result, such firms are more likely to retain inferior CEOs, firing only those with the worst performance. Board protection and CEO protection play isomorphic roles and both lead to (1) worse performance before the CEO is fired, (2) performance improvement after firing, and (3) worse performance by retained CEOs.

If shareholders' beliefs are susceptible to noise, then entrenchment of the board against shareholders can improve the firing decision, since entrenched boards can retain good but unlucky CEOs (and, for that matter, fire low-quality but lucky ones). In this alternate scenario, board protection will result in (1) better performance before the CEO is fired, (2) performance improvement after firing, and (3) better performance by retained CEOs. Conditional on firing, CEOs fired by less entrenched boards will have had, on average, bad outcomes due to bad luck. Therefore, CEOs fired by more entrenched boards will have had, on average, better performance prior to being fired (Prediction 1). Additionally, since more entrenched boards fire on the basis of quality rather than noise, their firms experience greater improvements in CEO quality after firing (Prediction 2). Finally, entrenched boards retain unlucky but marginally good CEOs, whereas less entrenched boards fire them. And less entrenched boards protect some bad but lucky CEOs, while entrenched boards fire them. Therefore, retained CEOs of entrenched boards will perform better (Prediction 3).

Both scenarios predict that CEO quality will improve when entrenched CEOs are fired. However, they offer opposite predictions on the effect of entrenchment on performance prior to firing and on the performance of retained CEOs.

Using data on CEO firings during 1994–2007, we find evidence that favors the "misguided shareholders" view. Using the Gompers et al. (2003) index of antitakeover provisions as our primary measure of entrenchment, we find that the postdismissal performance of fired CEOs is higher in high-entrenchment firms, as both views predict. However, in high-entrenchment firms, we also observe better predismissal performance of fired CEOs and better performance of retained CEOs. Furthermore, the beneficial effects of entrenchment are strongest when the percentage of independent directors is high or when CEO tenure is low—that is, when the CEO is weak and more vulnerable to shareholder whims. Overall, these results favor the board protection notion of entrenchment; that is, that entrenchment can *improve* the decision to fire or retain the CEO. Our model and our results suggest that the traditional notion of entrenchment—as loosely representing weak

[2] Wolfers (2007) finds similar effect in gubernatorial elections and concludes that voters make systematic attribution errors. Wolfers (2007, p. 1) writes that "voters in oil-producing states tend to re-elect incumbent governors during oil price rises, and vote them out of office when the oil price drops. Similarly, voters in pro-cyclical states are consistently fooled into re-electing incumbents during national booms, only to dump them during national recessions."

shareholders and/or weak boards and unequivocally bad for firms—is imprecise and incomplete.

We note that our objective is not to invalidate the dominant CEO protection view. Indeed, there is a large body of work that establishes that entrenchment is, on average, bad for firms. Gompers et al. (2003), Core et al. (2006), and Bebchuk et al. (2009) show that high entrenchment is associated with lower stock and operating performance, and several papers have shown, using a regression discontinuity framework (Cunat et al. 2012) and exogenous variation in state-level antitakeover laws (Bertrand and Mullainathan 2003), that the relationship between governance and performance is very plausibly causal. We do not seek to overturn the established wisdom, nor to conclude that strong governance harms firms, *in general*.

Instead, we aim to bring attention to (1) the trade-offs arising from firms' governance choices and (2) the interplay among distinct actors within the firm. In general, antitakeover provisions may be harmful, but they may have some benefits. For example, Kadyrzhanova and Rhodes-Kropf (2011) find that firms with more antitakeover statutes are able to obtain higher takeover premia. Entrenching the CEO and/or the board can affect the firm in numerous ways, such that the global, aggregate effect on the firm may differ from effects on specific decisions or specific dimensions of firm value. The existing literature has largely focused on the overall negative effect of entrenchment. However, guided by careful modeling, we can hone in on situations where a positive effect of entrenchment may be detected. Such a model requires consideration of how governance features affect the various decision makers within the firm and their interactions. We therefore chose to model the board's firing decision to introduce a more detailed notion of entrenchment and discuss its consequences.

Our paper contributes to a growing body of research that suggests a positive role for entrenchment. Adams and Ferreira (2007) argue that entrenchment encourages CEOs to share information with and accept advice from the board. In Almazan and Suarez (2003), entrenching the CEO commits the board to retaining her, leading to larger human capital investment by the CEO ex ante. These papers, like ours, view entrenchment as a commitment device that improves the quality of information flow and decision making. However, we are the first to suggest that entrenchment may be ex post optimal rather than simply an ex ante commitment device.

In addition, our paper offers an alternative lens through which to view the conclusions drawn from previous research. There is a large body of work examining forced CEO turnover (for summaries, see Brickley 2003, Hermalin and Weisbach 2003). One stream of research examines the drivers of firing decisions, focusing in particular on the relationship between firm performance and forced turnover (Coughlan and Schmidt 1985, Warner et al. 1988, Huson et al. 2001). In this context, several studies explore the role of governance by examining how the performance sensitivity of turnover varies with proxies for good governance. The maintained assumption is that good governance should increase performance sensitivity. For example, Weisbach (1988) finds that CEO turnover is more sensitive to performance in firms with more outside directors and takes this as evidence of the beneficial effects independent boards. However, because stock performance is noisy—and is often due to factors outside the CEO's control—our model implies that greater sensitivity of turnover to performance is not necessarily desirable.

A separate stream of work on CEO turnover focuses on how firm performance changes after turnover (Hotchkiss 1995, Weisbach 1995, Denis and Denis 1995, Huson et al. 2004). In this literature, a large post-turnover improvement in performance is interpreted as an affirmation of the quality of the firing decision. For example, Huson et al. (2004) find that post-turnover changes in firm profitability are positively related to institutional ownership and percentage of outsiders on the board. They interpret this as evidence that firms with higher institutional ownership and board independence make better firing decisions.[3] We, too, focus on firm performance to examine the quality of the dismissal decision. However, our model shows that we cannot distinguish between the board and CEO protection views of entrenchment by examining the postfiring performance. (The distinguishing predictions lie with examining prefiring performance and the performance of retained CEOs.) Therefore, our model questions the validity of the inference that entrenchment is "bad" from the observation that firms with entrenched CEOs experience greater post-turnover performance improvements.

Our ideas and suggestive empirical findings have broad implications for how to govern a body with potentially uniformed or biased constituents. We hope to further inject into the governance debate the idea

[3] However, we believe that this interpretation is actually difficult to square with the classic view of entrenchment, since the presence of institutional owners and outside directors should make it *easier* to fire the CEO; therefore, the improvement *given* that a CEO has been fired should be less than when a very entrenched firm's CEO is finally fired. However, their findings are consistent with our board protection view of entrenchment: because institutional owners are better informed or less biased, they protect good but unlucky CEOs, firing only bad ones. Therefore, institutional ownership may have the same insulating effect that governance statutes do in protecting CEOs from uninformed shareholders. This is also the view adopted by Aghion et al. (2013), who find that firms with greater institutional ownership are less likely to fire CEOs upon "bad news."

that board independence and board responsiveness to shareholders may have very different implications. Furthermore, while board alignment with shareholder goals is clearly important, board responsiveness to shareholder whims may be counterproductive.

The rest of this paper is structured as follows: Section 2 presents our theoretical framework, emphasizing the difference between the CEO and board protection views of entrenchment. Section 3 describes the data. Section 4 presents the main empirical tests of our theoretical framework. Section 5 explores additional implications of our model. Section 6 concludes.

2. A Model of Entrenchment

2.1. Model Overview

Our model aims to distinguish between the effects of (a) entrenchment that reduces board independence from the CEO (CEO protection) and (b) entrenchment that reduces the board's responsiveness to shareholders (board protection). In this model, board members face one of two types of costs: a cost C if they go against the CEO or a cost S if they go against what shareholders believe to be the right decision.

The larger the cost C, the less independent the board is from the CEO. Board members incur C if they choose to fire the CEO. This cost represents any number of considerations. If directors depend on the CEO for their jobs, then firing the CEO may increase the risk that they too will be removed. Social connections between a director and the CEO may also result in a personal cost of firing the CEO. Or, if a CEO-friendly reputation is an asset for securing invitations to join other boards, firing the CEO may incur a reputational penalty.

The larger the cost S, the greater is the board's responsiveness to shareholders. Board members incur a cost S if they take actions that run contrary to shareholders' desires. This cost could take the form of time and effort spent talking to unhappy shareholders, or a reputational cost of becoming viewed as unresponsive to shareholders. It could also represent the cost of upsetting shareholders, inducing share sales and lowering the share price (similar to Brandenburger and Polak 1996). A lower share price could directly affect board members' compensation, or indirectly affect them via a higher risk of takeover (in which board members might be replaced). In any case, the magnitude of S derives from shareholders' implicit power over the board's directors—either through dismissal or reputational harm. This implicit power induces directors to consider shareholder concerns.

Thus, board responsiveness to shareholders is increasing in S, and board independence from the CEO is decreasing in C. Decreasing S or increasing C will cause a CEO to be more entrenched, in the sense of reducing the probability of dismissal, but as we will show, the two types of entrenchment have different implications for the quality of firing decisions and have distinct empirical predictions.

The model has two periods, with a decision by the board to retain or fire the CEO at the end of the first period. Firms are assumed to begin life at the start of period 1 with a CEO in place. The CEO has unknown quality q drawn from the distribution $F_q(q)$ with mean $\bar{q}$. If the CEO is retained into the second period, his or her quality will persist across both periods. However, the board has the option to fire the CEO and receive a new draw of CEO quality for the second period.

Firm performance in period 1 is a function of CEO quality plus other unknown firm characteristics ϕ, drawn from the distribution $F_\phi(\phi)$ with mean $\bar{\phi}$. The firm-specific characteristics will persist across both periods and will not change with a CEO transition. Performance also depends on a random shock, η, which will be drawn independently and identically distributed in each period from $[-\eta, \eta]$ with mean zero. For simplicity, we reduce the distribution of q to a uniform distribution $[-q', q']$.

A firm's profit depends on the quality of its CEO, firm characteristics, and the random shock, and is represented by $\pi^i(q_t, \phi, \eta_t)$, where the superscript $i \in H, L$ represents a firm's entrenchment level, high or low. The subscript t denotes the first or second period, $t \in \{1, 2\}$; ϕ has no time subscript because firm characteristics are the same across periods. The distributions of q, ϕ, and η are not conditional on i or t, and therefore, ex ante, ignoring any decision to fire, all firms are in expectation identical to each other and across time. For simplicity we will assume that the profit function is such that $\pi^i(q_t, \phi, \eta_t) = q_t + \phi + \eta_t$. This assumption is not critical for our results but simplifies exposition and intuition.[4] We will also assume a zero discount rate, $r = 0$. We will refer to $\hat{q}_t$, $\hat{\phi}$, and $\hat{\eta}_t$ as the realizations of these variables and sometimes add a superscript to denote either high or low entrenchment.

All players (and the econometrician) observe $\pi^i(\hat{q}_t, \hat{\phi}, \hat{\eta}_t)$ at the end of each period. The board observes the components of performance separately.[5]

[4] If π were concave in q, then boards would not fire some CEOs suspected of being below average because the expectation of second-period profit with a random CEO, $E[\pi_2(q, \phi, \eta)]$, is strictly less than the expectation of second-period profit with an average CEO, $E[\pi_2(\bar{q}, \phi, \eta)]$. Therefore, a CEO of slightly less than average quality would also be preferred to a random draw. If π were convex in q, then boards would fire even above-average CEOs. We abstract from this generalization because it is not central to our point.

[5] The assumption of perfect information is not necessary because all results hold if both CEO and firm quality are observed with noise.

The board of directors correctly decomposes performance into $\hat{q}_t$, $\hat{\phi}$, and $\hat{\eta}_t$. Our key assumption is that shareholders may or may not mistakenly attribute the noise, $\hat{\eta}_t$, to the CEO. Thus, instead of interpreting a high or low outcome as possibly due to luck, shareholders may attribute both $\hat{q}_1$ and $\hat{\eta}_1$ to the CEO. Let $\hat{q}_s$ represent the average shareholder's beliefs about CEO quality conditional on period 1 performance. Initially we assume that shareholders correctly attribute only $\hat{q}_1$ to the CEO, so $\hat{q}_s = E[q_s | \hat{q}_1, \hat{\eta}_1] = \hat{q}_1$. Then we consider the implications of shareholders misjudging CEO quality.

Why might investors misjudge CEO quality? One explanation comes from the well-accepted concept of fundamental attribution error (Ross 1977), which posits that when individuals observe an outcome, they are more likely to attribute it to the person or persons involved (dispositional factors) than to the surrounding circumstances (situational factors). Hence, there is a psychological predisposition to blame the person rather than the underlying circumstances that may actually be the source of performance.[6] Alternatively, shareholders may be subject to a bias due to information projection, such as the Fischhoff (1975) hindsight bias that leads them to underestimate the CEO's quality (Madarasz 2012). By projecting information acquired ex post, shareholders may act as if the CEO could have anticipated a shock, rewarding him for good luck and punishing him for bad luck. In contrast, experienced board members can presumably appreciate the difficulty of predicting (ex ante) the events that occurred. As a result of such factors, shareholder beliefs may depend on noise, or $\hat{q}_s = E[q_s \mid \hat{q}_1, \hat{\eta}_1] = \hat{q}_1 + \hat{\eta}_1$.[7] Thus, to the extent that boards respond to shareholders (e.g., due to career concerns as in Brandenburger and Polak 1996), firing decisions may be affected by noise.

2.1.1. Shareholders and Firing. At the end of period 1, shareholders decide whether they believe the CEO should be fired. We will call the shareholders' collective decision d_s, where $d_s = 1$ if the shareholders think the CEO should be fired and $d_s = 0$ if they think the CEO should be retained. Shareholders who want to maximize second-period profits will prefer that the CEO be fired if

$$E[q_2 \mid \text{retained}] = \hat{q}_s < \bar{q} = E[q_2 \mid \text{fired}]. \tag{1}$$

[6] Many papers have documented this type of behavior. See Ross and Nisbett (1991) for an early review and Jenter and Kanaan (2010) or Wolfers (2007) for recent evidence.

[7] This shareholder belief could arise if shareholders were simply unable to separate out the noise. However, we assume below that shareholders use their belief as though it contains no noise. Therefore, a behavioral bias seems most consistent with this assumption.

At the end of period 1, the board makes a decision, d_b, whether to retain the current CEO or to attempt to fire her. Let $d_b \in \{0, 1\}$, with a value of 0 if the board decides to retain the CEO and 1 if it decides to fire her.

We assume that the board benefits from higher second-period firm performance, since board members care about their reputations as effective monitors (Fama 1980, Fama and Jensen 1983). However, they are subject to two costs. First, if the board tries to fire the CEO, they face a cost $C \geq 0$. Second, if the board goes against the shareholders' desires, they face a cost $S \geq 0$. The board pays this additional cost if they take an action that differs from shareholders' beliefs. Thus, C represents how protected the CEO is from the actions of the board, and S represents how protected the board is from the actions of shareholders.

The board makes its decision, $d_b \in \{0, 1\}$, to maximize

$$U_b(d_b) = E\left[\pi_2 \,\middle|\, d_b, \hat{q}_1, \hat{\phi}\right] - S|d_b - d_s| - Cd_b. \tag{2}$$

The board attempts to fire the CEO if the quality of the current CEO, $\hat{q}_1$, is less than the expected quality of the future CEO minus the cost of firing (C), after accounting for the cost of going against shareholders' beliefs (S). Thus, the board attempts to fire the CEO if

$$\begin{aligned} &U_b(\text{retain}) < U_b(\text{fire}), \\ &\hat{q}_1 - Sd_s < \bar{q} - S(1 - d_s) - C. \end{aligned} \tag{3}$$

If $S > 0$, then the board may fire a good CEO simply in response to shareholder preferences. If $C > 0$, then the board is less likely to fire a bad CEO and will do so less often than shareholders would prefer.

2.2. The Standard View of Entrenchment

The goal of the model is to provide empirical predictions and a framework for analyzing the effects of entrenchment. The fundamental question is whether a firm that is more responsive to shareholders makes, on average, better or worse firing decisions. We will first develop a model that reflects the traditional view, in which shareholders are not influenced by noise, and so greater responsiveness to shareholders necessarily improves the firing decision. We then include noise in shareholder preferences and examine the potential benefits of decreasing the board's responsiveness to shareholders. All proofs are relegated to the appendix.

The standard view of entrenchment places little emphasis on differentiating between the factors that increase the cost to the board of firing the CEO and those that decrease the costs of ignoring shareholders. Instead, they are treated as essentially isomorphic. We start with a baseline model that also does not differentiate between entrenchment that increases C versus decreases S. Thus, in our baseline model, firms with

higher entrenchment have higher C and lower S.[8] We present the baseline model to compare it with an alternative, presented in the next section, which incorporates the possibility of biased or poorly informed shareholders. In that case, S and C play distinct roles and produce differing empirical predictions.

Proposition 1. *If shareholders accurately assess CEO quality* ($\hat{q}_s = E[q_s \mid \hat{q}_1, \hat{\eta}_1] = \hat{q}_1$), *then the effects of high entrenchment* (*high C and low S*) *are as follows*:

(a) *The expected improvement in CEO quality after the CEO is fired is greater if entrenchment is high*,

$$E[q_2^H - q_1^H \mid fired] > E[q_2^L - q_1^L \mid fired].$$

(b) *The expected performance in period* 1 *conditional on firing the CEO is worse if the CEO is highly entrenched*,

$$E[\pi_1^H \mid fired] < E[\pi_1^L \mid fired].$$

(c) *The expected performance in period* 2 *conditional on retaining the CEO is worse if the CEO is highly entrenched*,

$$E[\pi_2^H \mid retained] < E[\pi_2^L \mid retained].$$

Throughout the proposition, the H superscript signifies high entrenchment, and L signifies low entrenchment.

Each of these results is the intuitive outcome of the standard entrenchment model. Because it is more costly to fire a highly entrenched CEO, such a CEO must be worse to get fired. Therefore, the improvement in CEO quality that comes from firing a highly entrenched CEO is relatively large (part (a)). Furthermore, because it is more costly to fire a highly entrenched CEO, performance must be worse in the first period to induce firing (part (b)). Finally, because entrenchment will preserve some low-quality CEOs, we expect the performance conditional on not firing the CEO to be worse (part (c)).

2.2.1. Increasing Shareholder Power. It is often suggested that the remedy for entrenchment is to make the board more accountable to shareholders. Bebchuk and Fried (2004), for example, advocate for a greater role for shareholders in the nomination and removal of directors. In the context of our model, this is represented as increasing the cost to the board of going against shareholders (larger S). As long as shareholders accurately assess the CEO's quality, increasing the power of shareholders unambiguously improves the firing decision.

Corollary 1. *If* $\hat{q}_s = \hat{q}_1$, *then for all* $S \geq S'$ *where* $S' < \infty$, *boards will attempt to fire all below-average CEOs*, $E[d_b \mid \hat{q}_1 < \bar{q}] = 1$.

That is, if shareholders are not biased or uninformed, then a board that is sufficiently responsive to shareholder preferences will always do the right thing. Next, we consider how this changes if shareholders excessively attribute firm performance to CEO quality.

2.3. Entrenchment with Misguided Shareholders

In this section, we now assume that shareholders attribute noise to the quality of the CEO ($\hat{q}_s = E[q_s \mid \hat{q}_1, \hat{\eta}_1] = \hat{q}_1 + \hat{\eta}_1$). If shareholders believe a CEO should be removed when poor performance is not her fault, board entrenchment may allow a firm to protect a good but unlucky CEO.

This assumption does not change the effect of increasing C; more interesting is the effect of misguided shareholders on the role of S. To focus on this latter effect, we assume that all firms have the same cost of firing, C, but differ in their responsiveness to shareholders; i.e., each has a different S.[9] Furthermore, if the noise η is very small, then a larger S functions largely as in Corollary 1, and little of interest emerges.[10] Thus, we assume that $\eta > S + C$ to ensure that noise has adverse effects.

Although this model also predicts an improvement in CEO quality after firing an entrenched CEO, we will see that there will be two key predictions that differ from the standard model and that the intuition is entirely distinct.

Proposition 2. *If noise affects the shareholder assessment of CEO quality* ($\hat{q}_s = E[q_s \mid \hat{q}_1, \hat{\eta}_1] = \hat{q}_1 + \hat{\eta}_1$), *then the effects of a higher cost of firing the CEO* (*higher C*) *are as in Proposition* 1. *However, the effects of higher entrenchment in the form of a lower cost to ignoring shareholders* (*lower S*) *are as follows*:

(a) *The expected improvement in CEO quality after the CEO is fired is greater if the board is highly entrenched*,

$$E[q_2^H - q_1^H \mid fired] > E[q_2^L - q_1^L \mid fired]. \tag{4}$$

(b) *The expected performance in period* 1 *conditional on firing the CEO is* better *if the board is highly entrenched*,

$$E[\pi_1^H \mid fired] > E[\pi_1^L \mid fired]. \tag{5}$$

(c) *The expected performance in period* 2 *conditional on retaining the CEO is* better *if the board is highly entrenched*,

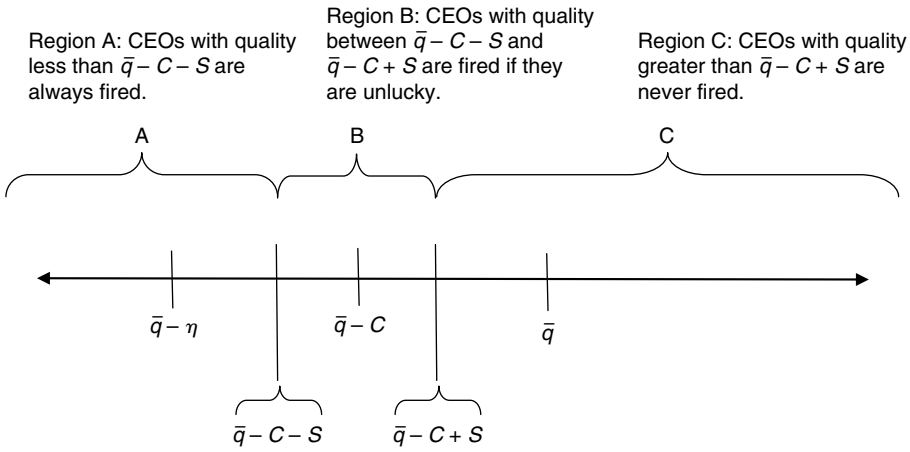
$$E[\pi_2^H \mid retained] > E[\pi_2^L \mid retained]. \tag{6}$$

[8] We will see in Corollary 1 that for entrenchment to result in the retention of low-quality CEOs, S must be low enough. To focus on the interesting case in which entrenchment has this effect, we assume that $S < C$.

[9] We continue to assume, as above, that $S < C$, to focus on the interesting case when both S and C matter.

[10] If the noise is small, then shareholder desires are very close to correct, so responding to them does improve outcomes.

Figure 1 Regions of Possible CEO Quality



The first prediction of the misguided shareholder model is the same as that of the traditional view of CEO entrenchment. However, the intuition behind the results is quite different. CEO quality improves more after an entrenched board fires the CEO because it fires the worst CEOs and protects the marginal ones. In contrast, a less entrenched board listens to the noisy desires of its shareholders and thus protects some bad but lucky CEOs and fires some marginal but unlucky CEOs. Therefore, a board that is not entrenched will often see relatively little improvement in CEO quality after firing (part (a)).

Predictions (b) and (c) will help us to distinguish the relative importance of the two views of entrenchment. In the standard CEO entrenchment model, performance in the first period is lower if the CEO is entrenched but still gets fired, since the CEO must be worse to be dismissed. Thus, if costs of firing are important ex ante, performance of entrenched firms should be significantly lower. However, in a model in which the board is entrenched against misguided shareholders, performance in period 1 conditional on firing the CEO should be higher for the highly entrenched firms. This result stems from the fact that in less entrenched firms the firing decision depends more on shareholders' preferences, which means it depends more on random shocks to firm performance. Thus, conditional on firing, noise is likely to be negative so performance is more likely to be worse for *less* entrenched firms (part (b)).

The prediction of performance in the second period conditional on retaining the CEO (part (c)) is also opposite that of the standard model. In the standard costly firing view, highly entrenched but bad CEOs are not fired, and thus future performance lags. If, instead, entrenchment reflects the ability of the board to ignore shareholder whims, then less entrenched boards cannot ignore shareholders and their decisions will be more influenced by noise. Therefore, more marginal CEOs are fired, and more low-quality CEOs are retained. The retained bad CEOs will bring down the future performance of the retained group relative to that of more entrenched firms where the board ignores noise and therefore only retains relatively good CEOs. Thus, firms with entrenched boards have stronger future performance (part (c)).

The implications of ignoring shareholders are illustrated in Figure 1, which shows the different regions for CEO quality and the outcomes that may occur in each case. If the CEO quality realization, $\hat{q}_1$, is in region A, then the CEO is of very low quality and is fired. If the CEO quality realization is in region C, then CEO quality is high enough to guarantee retention. However, if the CEO quality realization is in region B, then firing will depend on the realization of the noise.[11] CEOs with quality between $\bar{q} - C - S$ and $\bar{q} - C$ would always be fired if shareholders could be ignored. But if the firm is required to pay attention to shareholders, some of these low-quality CEOs will be retained due to lucky outcomes. At the same time, CEOs with quality between $\bar{q} - C$ and $\bar{q} - C + S$ would not be fired if shareholders could be ignored, but misguided shareholders will cause some of these CEOs to be fired. However, although the noise causes the retention of some CEOs and the firing of others, the overall effect is not beneficial, because the CEOs fired as a result of shareholder preferences are of better quality than those retained. This is our main and relatively intuitive point: listening to shareholders may add noise to the firing decision, and this may decrease CEO quality.

Note that in Figure 1, we have assumed η is large enough to have a negative effect. A high level of

[11] It is interesting to note that if $S > C$, then above-average but unlucky CEOs will be fired. Figure 1 assumes $S < C$ and illustrates the model's main intuition.

noise means that shareholder responsiveness results in lower performance. If, instead, η were less than $\bar{q} - C$, then no CEOs with quality less than $\bar{q} - C$ would ever be fired: in this case shareholders would like to fire even the lucky ones. Under this assumption, listening to shareholders would strictly improve the quality of the firing decision. Corollary 1 shows that if shareholders observe CEO quality with little noise, listening to shareholders helps performance. Alternately, if shareholders have a low signal-to-noise ratio they are best ignored.

Finally, it is interesting to consider how the effect of an increase in S depends on C. The following corollary demonstrates that it is more important to ignore shareholders if C is low.

Corollary 2. *The positive effect on second-period performance of ignoring shareholders* (*lower S*) *is larger if the cost of firing the CEO, C, is lower.*

This corollary formalizes the intuition that it is more important to ignore misguided shareholders when the CEO is more vulnerable to being fired due to noise. The firing decision for a weak CEO—for example, a new CEO or one monitored by an independent board—is more easily compromised by listening to misguided shareholders. Therefore, provisions that entrench the board against shareholders are more valuable.

We now turn to the data to see whether the evidence favors the board protection or CEO protection view by examining performance around firing decisions.

3. Data

3.1. Data Sources and Sample Construction

Since our main interest will be exploring the impact of CEO dismissals on firm performance, we begin by constructing a panel of CEO employment by firm. Our sample of CEOs is derived from ExecuComp, which collects compensation data on the top management teams of S&P 1500 firms and records the beginning and end dates of CEO tenure. We merge the CEO service dates with data from Compustat and the Center for Research in Security Prices, and the resulting sample consists of CEO-firm-year-level observations of S&P 1500 firms over the period from 1994 to 2007.

We identify turnover as taking place in the year of the CEO's last service date, or, where this date is missing, in the year of the successor's first service date. A key variable in this paper is *Forced*, an indicator variable that denotes a CEO-firm-year observation in which the CEO was fired. We define a turnover as *Forced* if (1) the turnover is not due to death, as identified in ExecuComp, (2) the turnover occurs at less than 60 years of age, and (3) the CEO is not subsequently reported in ExecuComp as the CEO of another firm. Condition 2 ensures that we are not mistakenly capturing natural turnover due to retirement.[12] Any departures below age 60 are likely to be either forced departures or voluntary moves to other companies; condition 3 diminishes this latter possibility.

Our primary measure of entrenchment is the Gompers et al. (2003) governance index (G-Index), which measures how many of 24 antitakeover provisions a company has in place. These provisions range from bylaws that restrict shareholder voting and permit greenmail payments to whether companies are subject to state-level antitakeover laws. Higher values of the index correspond to weaker governance. This index was tracked by the Investor Responsibility Research Center (IRRC) every two to three years during 1990 to 2006 for the set of S&P 1500 firms. We use lagged values of the G-Index in interim years until updated index values are recorded.[13] Given this practice of using stale values, we treat 2007 as the last year in which the G-Index is reliably recorded and as the final year of CEO turnover we examine; however, we use data from subsequent years to evaluate postturnover performance.

As an auxiliary measure, we use the Bebchuk et al. (2009) entrenchment index (E-Index). Of the 24 provisions of the G-Index, the E-Index is composed of the six that Bebchuk et al. (2009) demonstrate to be most strongly associated with firm performance. Four of these provisions limit shareholder influence: staggered boards, limits to shareholder amendments of bylaws, supermajority requirements for mergers, and supermajority requirements for charter amendments. Two provisions, the poison pill and golden parachute, increase the cost of hostile takeovers.

The G-Index is probably the most widely used measure of entrenchment, having been central to the first works that established the relationship between governance quality and firm value (Gompers et al. 2003, Bebchuk and Cohen 2005, Cremers and Nair 2005, Core et al. 2006). The E-Index has also been

[12] We chose the age of 60 because CEOs are typically under three-year employment contracts, and most CEOs retire at age 65. Therefore, with no renewal of the CEO's employment contract, retirements would typically occur at ages 62 to 65, and would be very unlikely before age 60. Age 60 is also used as a cutoff for determining forced versus natural turnover in Parrino (1997) and Jenter and Kanaan (2010).

[13] ISS Governance Services acquired IRRC in 2005 and offers the data through the data provider RiskMetrics. RiskMetrics changed the data collection methodology starting in 2007, such that the new methodology no longer collects all the variables needed to create the G-Index. Therefore, the index cannot be constructed after 2006.

Table 1 Sample Summary Statistics

	Panel A. Full sample				Panel B. Fired CEOs only			
	N	Mean	Median	Std. dev.	*N*	Mean	Median	Std. dev.
Assets ($M)	30,601	8,775	1,013	44,879	1,304	9,353	1,001	51,747
Market capitalization ($M)	27,317	5,229	964	19,288	1,141	5,829	986	20,528
Book equity to market cap	27,317	0.53	0.45	0.70	1,141	0.54	0.46	1.19
Prior year returns	26,625	0.23	0.12	0.72	1,133	0.05***	(0.02)***	0.63
ROA	30,024	0.08	0.08	0.17	1,295	0.04***	0.07***	0.22
Stock return volatility	26,625	0.12	0.10	0.07	1,133	0.14***	0.12***	0.08
CEO tenure	29,849	6.8	5.0	7.2	1,233	6.2***	5.0	4.9
G-Index	18,680	9.2	9.0	2.7	888	9.1	9.0	2.7
E-Index	17,534	2.4	2.0	1.3	785	2.4	2.0	1.3
% *Independent directors*	15,322	0.65	0.67	0.18	788	0.65	0.67	0.17

Notes. This table reports summary statistics of the sample, based on S&P 1500 firms in 1994 to 2007. Observations are at the firm-CEO-year level. Panel A reports characteristics of the full sample. Panel B reports characteristics of the subsample of observations in which the CEO was fired, where *Forced* = 1. We define a turnover as *Forced* if (1) the turnover is not due to death, as identified in Execucomp, (2) the turnover occurs at less than 60 years of age, and (3) the CEO is not subsequently reported in Execucomp as the CEO of another firm. *Assets* is the book value of assets. *Market capitalization* is the market value of the outstanding equity. *Book equity to market cap* is the book value of equity divided by the market capitalization of equity. *Prior year returns* are cumulative monthly returns from the prior year. *ROA* is the operating income divided by assets. *Stock return volatility* is the standard deviation of monthly returns in the prior year. *CEO tenure* is the number of years the CEO has held the CEO title at the current firm. The *G-Index* is the Gompers et al. (2003) governance index. The *E-Index* is the Bebchuk et al. (2009) entrenchment index.

***The difference in mean or median for characteristics in the full sample versus the fired CEO subsample is significant at 1%.

used in over 150 studies of entrenchment.[14] Both measures are accepted as capturing the traditional notion of entrenchment, in which shareholders are weak and/or CEOs are powerful—but little distinction is made between the two cases.

We view the G- and E-Indices as better proxies for weak shareholders than powerful CEOs. We offer three reasons. First, many provisions of these indices explicitly relate to the ability of shareholders to exercise their power—by making it difficult to call shareholder meetings, reach a threshold majority for approving measures, hold confidential votes, or vote out directors. These provisions generally do not relate to the board's ability to monitor or discipline the CEO. Second, in thinking ahead to our results, this interpretation is consistent with the empirical findings and the model predictions predicated on the *S* interpretation of entrenchment. Third, this interpretation also provides a rationale for the empirical finding, documented in Gillan et al. (2011), that the G-Index is positively correlated with board independence. We will elaborate on these latter two points in §5.2.

We also consider board independence, or the fraction of independent directors on a board, as a measure of entrenchment. RiskMetrics provides these data for S&P 1500 firms after 1996. Director independence is associated with lower compensation (Brick et al. 2006) and greater performance sensitivity of CEO turnover (Weisbach 1988, Huson et al. 2001, 2004). Therefore, some view independent boards as an important characteristic of well-governed firms. However, others view director independence as a form of indifference: neither heavily beholden to the CEO nor effective champions of shareholder interest. Bhagat and Black (1999, p. 922) go further, calling them "lapdogs rather than watchdogs," since even independent directors require the continued support of management to be renominated to the company's slate. Although it is arguable how responsive independent directors are to shareholders, it is clear that dependent directors have less power over the CEO than independent ones. This suggests that director independence is a better measure of *C* than of *S*, and our evidence favors this interpretation. We apply this idea in §5.2, where we explore empirical support for the prediction in Corollary 2 that the benefits of board protection are greater when the CEO is weak.

Our primary measure of firm performance is accounting returns, defined as the change in operating profits divided by total assets (as in Huson et al. 2004). We consider changes in operating returns (ΔROA) in the one- to three-year periods leading up to and following CEO turnover. The ROA measures are industry-year adjusted by subtracting the median ROA values in the corresponding two-digit Standard Industrial Classification (SIC) industry that year.

3.2. Summary Statistics

Table 1 reports summary statistics for the full sample and for the subsample of observations where *Forced* = 1. The rate of fired CEOs in our sample is 4.3%, with 1,304 observations of forced turnover. There are no significant differences in firm size or valuation between the full sample and the set of firm-year observations for fired CEOs. However, firms

[14] These are catalogued on Lucian Bebchuk's website, http://www.law.harvard.edu/faculty/bebchuk/studies.shtml.

Table 2 Entrenchment and the Probability of Forced Turnover

	All CEOs (1)	All CEOs (2)	Tenure ≤ 5 (3)	Tenure > 5 (4)	Tenure ≤ 5 (5)	Tenure > 5 (6)	Tenure ≤ 5 (7)	Tenure > 5 (8)
G-Index	0.986	0.979	0.942***	1.004	0.960*	1.026		
	(0.014)	(0.014)	(0.019)	(0.018)	(0.020)	(0.020)		
E-Index							0.946	1.144***
							(0.040)	(0.048)
CEO tenure		0.987***	1.291***	0.930***	1.316***	0.927***	1.328***	0.929***
		(0.004)	(0.034)	(0.008)	(0.036)	(0.008)	(0.039)	(0.009)
Fixed effects	None	None	None	None	Year, ind	Year, ind	Year, ind	Year, ind
Observations	20,825	20,100	11,208	8,892	10,972	8,793	10,508	8,490

Notes. This table reports the results of logit regressions using the sample of firms in the S&P 1500 in 1994 to 2007. The dependent variable is *Forced*, a binary variable that equals 1 if the CEO was fired. Columns (1) and (2) include the full sample of CEOs. Columns (3)–(8) consider the subset of CEOs who have five or fewer years of tenure or have more than five years of tenure. Coefficients are reported as odds ratios. Standard errors clustered at the firm level are shown in parentheses.

*Significant at 10%; ***significant at 1%.

with forced turnover have had worse stock returns and ROA, and have higher stock return volatility in the year prior to turnover. This is consistent with performance and stability being important drivers of CEO termination decisions. The mean tenure for fired CEOs is 6.2 years, lower than that of the sample average of 6.8; this is consistent with greater vulnerability earlier on the job. However median tenure is five years for both the full sample and the subsample of *Forced* = 1 observations.

Table 1 also reports summary statistics on measures of firm governance, including the G- and E-Indexes, as well as the fraction of directors who are independent.[15] The median values of the G-Index and E-Index are 9 and 2, respectively. On the median firm's board, 67% of the directors are independent. There are no notable differences in these measures between the full sample and the subsample of fired CEOs.

4. Results

We begin by examining the prediction that is common to the two views of entrenchment: that entrenched firms experience greater improvements in performance after forced turnover. We then proceed to examine the two cases where the two views offer differing predictions by assessing whether performance is worse in entrenched firms prior to forced CEO turnover, and whether, when CEOs are *not* fired after poor performance, more entrenched CEOs subsequently perform better.

[15] There are fewer observations for the governance variables for several reasons. First, they are available primarily only for firms in the S&P 1500, whereas ExecuComp also covers 300–500 additional firms per year that were formerly part of the S&P 1500. Second, the coverage in the IRRC database is relatively sparse for the earlier part of the 1990s. Third, director data are only available from RiskMetrics after 1996.

4.1. Effect of Entrenchment on Forced Turnover

We begin by studying the relationship between each of our measures of entrenchment—the G-Index and the E-Index—and forced turnover. This serves as a basic check on whether the entrenchment variables capture differences across firms in the ease with which the board may fire the CEO. Table 2 estimates a logit model of the probability that a CEO j of firm i experiences a forced turnover in year t, using

$$\Pr(Forced_{ijt}) = \Gamma(\beta_0 + \beta_1 Entrenchment_{it} + \beta_2 X_{ijt} + \epsilon_{ijt}), \quad (7)$$

where β_1 estimates the effect of entrenchment on forced turnover, and X is a matrix of control variables. Coefficients are presented as odds ratios. Errors ϵ_{ijt} are assumed to be independent across but not within firms.[16]

Column (1) shows that the G-Index is negatively correlated with forced turnover, though this relationship is not statistically significant (p-value = 0.297). Earlier work (e.g., Brickley 2003) emphasizes the importance of tenure in predicting forced turnover. Therefore, column (2) includes tenure as a control and shows that tenure is negatively and significantly associated with forced turnover. This result is consistent with interpreting tenure as a proxy either for CEO quality—since over time, only high-quality CEOs survive—or for entrenchment, as CEOs gradually find ways to secure their positions. Hermalin and Weisbach (1998) argue, in fact, that higher-quality CEOs will naturally have the opportunity to entrench themselves, which gives rise to the negative relationship between tenure and forced turnover.

[16] An odds ratio greater (less) than one indicates that the covariate increases (decreases) the odds of a positive outcome. Standard errors reference the test of whether the coefficient equals one.

Figure 2 Relationship Between Tenure and Firing

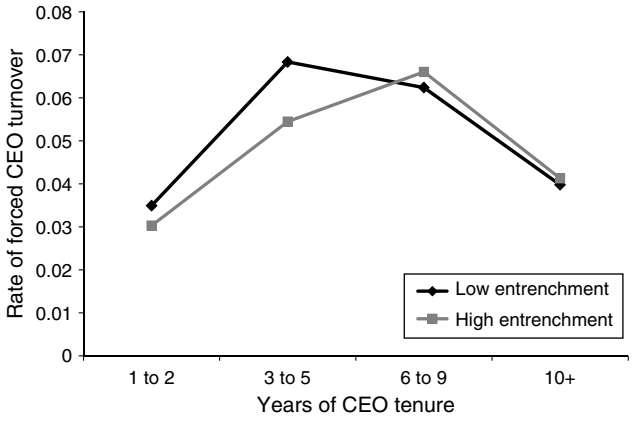
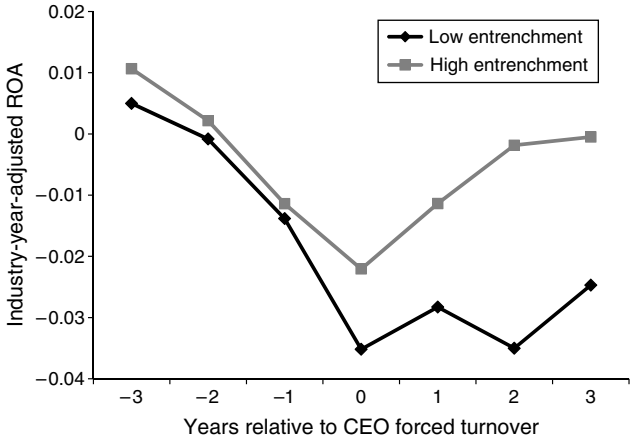


Figure 3 Performance Around Forced Turnover



If tenure is itself a form of entrenchment, then the entrenchment measures captured by the G-Index may be particularly important in alleviating the firing risk of newer CEOs, while less consequential for the firing decisions of long-tenured CEOs. In Figure 2, we examine the relationship between CEO tenure and forced turnover for entrenched versus nonentrenched CEOs. Figure 2 plots the rate of forced CEO turnover across quartile groupings of CEO tenure in firms with above- versus below-median G-Index values. The figure shows that forced turnover is higher for low-tenured CEOs in low-entrenchment firms, suggesting that the entrenchment measures captured by the G-Index provide particularly valuable protection for relatively vulnerable early-tenure CEOs.[17] This protective effect of entrenchment, however, does not persist for CEOs with over five years of tenure.

Columns (3) and (4) of Table 2 present the regression equivalent of Figure 2 by examining the relationship between tenure and forced turnover in separate subsamples of CEOs: those with five or fewer versus more than five years of tenure.[18] Column (3) shows that entrenchment has a significantly negative effect on turnover among low-tenure CEOs; there is no significant effect among the high-tenure CEOs in column (4). Columns (5) and (6) include year and industry effects. The estimates in column (5) indicate that a 10-point increase in the G-Index, a move from a Democracy ($G \leq 5$) to a Dictator ($G \geq 14$) portfolio, is associated with a 40% reduction in the odds of forced turnover for low-tenure CEOs. Columns (7) and (8) use the E-Index as the entrenchment measure and show that entrenchment has a more negative effect on the forced turnover of low-tenure CEOs.

4.2. Performance Postturnover

Propositions 1(a) and 2(a) both predict that the operating response should improve more following the firing of entrenched CEOs. Before turning to regression analyses, we examine the basic patterns in the data presented in Figure 3, which plots the operating performance of firms in the three years surrounding forced turnover, with the sample split at the median value of the G-Index. For both samples, performance rebounds in the years after turnover, but more so for high-entrenchment firms.

The regression equivalent of Figure 3 is presented in Table 3, which examines how the operating performance of a firm that has fired its CEO changes with the level of entrenchment. For firm i that fires its CEO in year t, Table 3 estimates that

$$\Delta ROA_{i[t_1,t_2]} = \beta_0 + \beta_1 Entrenchment_{it} + \beta_2 X_{it} + \epsilon_{it}. \quad (8)$$

The sample is the set of firm-year observations where the CEO was fired. As in Gompers et al. (2003) and Core et al. (2006), we use median regressions to limit the influence of outliers, and we adjust ROA by the median ROA of the corresponding two-digit SIC industry and year.[19] The variables t_1 and t_2 correspond to the interval over which the change in ROA is measured, relative to the year of forced turnover. Control variables in X include lagged ROA and measures of firm size and firm valuation (Core et al. 2006).

[17] The hump-shaped curve of turnover is likely because boards may need several years of data before they can determine CEO quality. Therefore, it is highly unlikely for a CEO to be fired in his first year. The rate of firing may subsequently increase as the board learns about the CEO's ability, then decrease with the CEO's tenure, as CEO quality improves with survival.

[18] Note that the median CEO in the sample has five years of tenure.

[19] These results are robust to the inclusion of year fixed effects, so that time trends in governance or firm profitability do not drive the results. They are not, however, robust to the inclusion of industry ∗ year fixed effects. With a sample restricted to observations where the CEO was fired, industry ∗ year bins are sparsely populated, and the results predictably weaken.

Table 3 Entrenchment and Performance Following Forced Turnover

	ROA[0, 2] (1)	*ROA*[−1, 2] (2)	*ROA*[0, 2] (3)	*ROA*[−1, 2] (4)
G-Index	0.130**	0.112*		
	(0.063)	(0.065)		
E-Index			0.121	0.026
			(0.166)	(0.139)
Log(*MVE*)	0.081	0.038	0.014	0.019
	(0.146)	(0.153)	(0.160)	(0.153)
Log(*BE/MVE*)	−0.461	−0.696	−0.504	−0.370
	(0.395)	(0.485)	(0.429)	(0.484)
ROA[−1]		−54.444***		−43.468***
		(8.511)		(9.570)
ROA[0]	−43.308***		−40.712***	
	(6.505)		(6.159)	
Observations	683	682	608	607

Notes. This table reports the results of median regressions using the sample of firms in the S&P 1500 in 1994 to 2007 where the CEO was fired. Observations are firm-years in which *Forced* = 1. The dependent variable is *change in ROA*, where ROA is adjusted by the median ROA of the corresponding two-digit SIC industry and year. In columns (1) and (3), the dependent variable measures the change in ROA from the year of the CEO's firing to two years after. In columns (2) and (4), the dependent variable measures the change in ROA from the year prior to the CEO's firing to two years after. *ROA*[−1] and *ROA*[0] are the industry-year-adjusted ROA in the year prior to turnover and the year of turnover, respectively. *MVE* is the market value of equity. *BE/MVE* is the book equity to market value of equity. Bootstrapped standard errors are shown in parentheses. All coefficients and standard errors are multiplied by 100.

*Significant at 10%; **significant at 5%; ***significant at 1%.

Columns (1) and (2) of Table 3 use the G-Index as the measure of entrenchment. The dependent variable in column (1) is $\Delta ROA[0, 2]$, or the change in ROA from the year of a CEO's firing to two years after. Column (1) shows that entrenched firms experience a larger increase in postturnover performance, with a point estimate of 0.13. This implies that a one standard deviation increase in the G-Index (2.7) implies an increase of more than 30 basis points in ROA over the two years following CEO dismissal. In column (2), the dependent variable $\Delta ROA[-1, 2]$ is the change in ROA from the year prior to the CEO's firing to two years after. This measure more cleanly compares the firm's performance under the outgoing and incoming CEOs, since performance in the turnover year is attributable to both. Results are similar to those in column (1). Columns (3) and (4) consider the E-Index as an alternate measure of entrenchment; coefficients are positive but insignificant.

These results are consistent with both the traditional view and the misguided shareholder view of entrenchment. Under the former, entrenchment shields low-quality CEOs, so firms enjoy large performance improvements when those CEOs are finally replaced. Under the latter view, entrenched boards fire on the basis of quality rather than noise. Therefore, succeeding CEOs are superior to the outgoing ones, and firm performance improves.

4.3. Preturnover Performance

Next, we examine Propositions 1(b) and 2(b), regarding the relationship between entrenchment and the prefiring performance of dismissed CEOs. Here, the two views of entrenchment make distinct predictions. The traditional view predicts that prefiring performance will be worse for entrenched CEOs because entrenchment protects low-quality CEOs. In contrast, the misguided shareholders view predicts that entrenchment is associated with *better* performance prior to firing, because firing decisions of less entrenched boards depend more on noise. As a result, more entrenched boards may retain good but unlucky CEOs, which less entrenched boards may have fired.

We begin by returning to the plots of ROA in years surrounding forced turnover in Figure 3. In years prior to turnover, high-entrenchment firms actually seem to outperform low-entrenchment firms. This is inconsistent with the traditional view of entrenchment, which posits that low-quality CEOs are protected from dismissal.

We now examine these patterns in a regression framework. Table 4 uses median regression in a specification similar to that of Table 3 to examine the

Table 4 Entrenchment and Performance Prior to Forced Turnover

	ROA[−1, 0] (1)	*ROA*[−2, 0] (2)	*ROA*[−1, 0] (3)	*ROA*[−2, 0] (4)
G-Index	0.105**	0.182***		
	(0.051)	(0.067)		
E-Index			0.216**	0.353**
			(0.105)	(0.158)
Log(*MVE*)	0.133	0.371***	0.198	0.355**
	(0.106)	(0.142)	(0.136)	(0.163)
Log(*BE/MVE*)	−0.836**	−1.851***	−0.592	−1.887***
	(0.353)	(0.366)	(0.470)	(0.425)
ROA[−2]		−43.553***		−37.494***
		(5.567)		(6.090)
ROA[−1]	−23.179***		−18.756***	
	(4.714)		(6.084)	
Observations	776	774	694	692

Notes. This table reports the results of median regressions using the sample of firms in the S&P 1500 in 1994 to 2007 where the CEO was fired. Observations are firm-years in which *Forced* = 1. The dependent variable is *change in ROA*, where ROA is adjusted by the median ROA of the corresponding two-digit SIC industry and year. In columns (1) and (3), the dependent variable measures the change in ROA from the year prior to the CEO's firing to the year of firing. In columns (2) and (4), the dependent variable measures the change in ROA from two years prior to the CEO's firing to the year of firing. *ROA*[−2] and *ROA*[−1] are the industry-year-adjusted ROA in the two prior years and the year prior to turnover, respectively. *MVE* is the market value of equity. *BE/MVE* is the book equity to market value of equity. Bootstrapped standard errors are shown in parentheses. All coefficients and standard errors are multiplied by 100.

**Significant at 5%; ***significant at 1%.

relationship between entrenchment and prefiring performance. Column (1) considers the change in ROA from the year prior to forced turnover to the year of turnover. Column (2) considers a longer window, from two years prior to turnover to the turnover year. Both columns (1) and (2) show that entrenchment, as measured by the G-Index, is positively related to predismissal performance, significant at least at the 5% level. The point estimate in column (1) implies that a one standard deviation increase in the G-Index is associated with an improvement in ROA of 27 basis points. Columns (3) and (4) use the E-Index measure of entrenchment and find effects of comparable magnitude and significance.

The standard model predicts that entrenched CEOs must perform significantly worse to get fired, contrary to our findings in Table 4: higher entrenchment is associated with *better* performance prior to turnover. This result provides evidence in support of the alternative view of entrenchment, where protecting boards from shareholders can improve the firing decision.

4.4. Performance of Retained CEOs

We next examine Propositions 1(c) and 2(c) that focus on the future performance of retained CEOs. The traditional view holds that high-entrenchment firms retain CEOs who are, on average, worse than those of low-entrenchment firms. Therefore, future performance will be worse for entrenched firms. The misguided shareholders view holds that entrenchment helps to shield the board against the noise-induced demands of shareholders, allowing the board to make higher-quality firing decisions. Under this latter view, entrenched boards will retain better CEOs and therefore their firms will have better future performance.

In Table 5, we examine the relationship between entrenchment and future performance for retained CEOs. Column (1) shows a specification similar to that of column (2) in Table 3, examining the relationship between entrenchment, as the G-Index, and future performance, as $\Delta ROA[-1,2]$, using a median regression:

$$\Delta ROA_{i\,[-1,2]} = \beta_0 + \beta_1 Entrenchment_{it} + \beta_2 X_{it} + \epsilon_{it}. \quad (9)$$

The major difference is in the samples. In Table 3 the sample is the set of fired CEOs, whereas in Table 5 the sample is the set of retained CEOs. Furthermore, these observations are such that no turnover has occurred in the prior year and subsequent two years. This restriction ensures that the measured change in ROA is attributable to the current CEO. Column (1) shows no notable relationship between entrenchment and future performance.

Firing a CEO is an extreme and uncommon board decision. Yet the preceding specification essentially estimates the relationship between entrenchment and future performance across firms, on average, which may obscure the existence of an entrenchment effect in the rare cases where board action is needed. We therefore focus on the subset of firm-year observations where the board is more plausibly pressed to make an *active* retention decisions; that is, we attempt to identify CEOs who were actually at risk of being fired, but were nevertheless retained.

To implement this test, we use an approach similar to that of Danzon et al. (2007), in which we use a first stage regression to construct a "propensity of being fired." We use these estimates to focus on the effect of entrenchment on performance when CEOs that had a high firing propensity based on their observable performance were nonetheless retained. If entrenchment protects the board's ability to override misguided shareholders, then entrenchment should be associated with better performance among CEOs who were observably targets for firing but were nonetheless retained.

We estimate this firing propensity, $\widehat{Forced}$, using the logit regression:

$$\begin{aligned}\Pr(Forced_{ijt}) = \Gamma(&\beta_0 + \beta_1 \text{CEO } tenure_{ijt} + \beta_2 ROA_{it-1} \\ &+ \beta_3 Annual\ stock\ return_{it-1} \\ &+ \beta_4 Annual\ return\ volatility_{it-1} + \alpha_t \\ &+ \alpha_y + \epsilon_{ijt}),\end{aligned} \quad (10)$$

where α_t and α_y are year and industry fixed effects, respectively. The controls represent characteristics that shareholders can readily observe, and can therefore use to pressure the board. These include information about the CEO's tenure, prior performance, or return volatility that can help shareholders formulate their opinions of the CEO. We interpret the error term as capturing all the inside information that is not easily documentable—and therefore not easily processed by shareholders—but is used by the board to make its decision.

We include the fitted value from the above equation, $\widehat{Forced}$, as a control in column (2).[20] In column (3), we express $\widehat{Forced}$ as indicator variables corresponding to tercile groupings of $\widehat{Forced}$. It is interesting to note that the propensity to be fired does not by itself seem to

[20] $\widehat{Forced}$ is a generated regressor in Table 5, so we compute standard errors by using a bootstrapping method. We take a bootstrapped sample and run the first-stage regression to generate $\widehat{Forced}$. On this sample, we run the second-stage regression (e.g., corresponding to column (2) in Table 5). We output one set of coefficient estimates. We run this procedure 100 times on 100 bootstrapped samples. This produces a set of 100 coefficient estimates, for which we then compute standard errors. This methodology is applied to all of the specifications in Tables 5–7.

Table 5 Future Performance of Retained CEOs

	(1)	(2)	(3)	(4)	(5)	(6)
G-Index	0.008	0.009	0.007	−0.020		
	(0.010)	(0.012)	(0.011)	(0.021)		
$*\widehat{Forced}$—*Tercile* 2				0.029		
				(0.034)		
$*\widehat{Forced}$—*Tercile* 3				0.072*		
				(0.042)		
E-Index					−0.070***	−0.152***
					(0.022)	(0.033)
$*\widehat{Forced}$—*Tercile* 2						0.126**
						(0.059)
$*\widehat{Forced}$—*Tercile* 3						0.167**
						(0.088)
$\widehat{Forced}$		1.376				
		(2.366)				
$\widehat{Forced}$—*Tercile* 2			0.170*	−0.106	0.152	−0.175
			(0.098)	(0.349)	(0.102)	(0.175)
$\widehat{Forced}$—*Tercile* 3			−0.115	−0.784*	−0.097	−0.517**
			(0.118)	(0.415)	(0.125)	(0.245)
Log(*MVE*)	−0.023	−0.012	−0.013	−0.016	−0.016	−0.019
	(0.024)	(0.026)	(0.027)	(0.027)	(0.029)	(0.030)
Log(*BE/MVE*)	−1.111***	−1.145***	−1.146***	−1.166***	−1.186***	−1.208***
	(0.097)	(0.100)	(0.101)	(0.100)	(0.103)	(0.106)
ROA[−1]	−48.134***	−48.430***	−48.409***	−48.590***	−48.875***	−48.934***
	(1.394)	(1.374)	(1.404)	(1.383)	(1.262)	(1.300)
Observations	13,363	12,869	12,869	12,869	12,098	12,098

Notes. This table reports the results of median regressions using the sample of firms in the S&P 1500 in 1994 to 2007 where the CEO was retained. Observations are firm-years in which *Forced* = 0 in the firm in the preceding year ($t-1$) through the two subsequent years ($t+2$). The dependent variable is *change in ROA* from $t-1$ to $t+2$, where ROA is adjusted by the median ROA of the corresponding two-digit SIC industry and year. $\widehat{Forced}$ is the fitted value from a regression estimating the propensity to be fired. $\widehat{Forced}$ is also presented as indicator variables corresponding to tercile groupings of $\widehat{Forced}$. *ROA*[−1] is the industry-year-adjusted ROA in year $t-1$. *MVE* is the market value of equity. *BE/MVE* is the book equity to market value of equity. Bootstrapped standard errors are shown in parentheses. All coefficients and standard errors are multiplied by 100.

*Significant at 10%; **significant at 5%; ***significant at 1%.

predict future performance. Our main interest, however, is in examining whether retention in the face of poor past performance is more likely to be associated with high future performance in high- versus low-entrenchment firms. This differential effect of retention in the face of high firing propensity is reflected in the interaction of the G-Index with the tercile indicators for $\widehat{Forced}$ in column (4). We estimate that

$$\Delta ROA_{i\,[-1,2]} = \beta_0 + \sum_{k=1}^{3} \beta_{1k}\, Entrenchment_{it} * (\widehat{Forced}\text{—}Tercile\ k)_{it} + \beta_2 X_{it} + \epsilon_{it}. \quad (11)$$

The misguided shareholder view predicts that $\beta_{13} > 0$; that is, entrenchment is associated with higher performance, especially among CEOs whom the board protected despite observable factors that would have supported a firing decision. The costly firing view predicts that $\beta_{13} < 0$, because it reflects entrenched boards retaining CEOs who should have been fired. Column (4) shows that $\beta_{13} > 0$ is positive and significant, consistent with the misguided shareholder view.

In columns (5) and (6), we use the E-Index as our measure of entrenchment. Column (5) shows that, on average, high E-Index is associated with lower future performance. However, column (6) shows that entrenchment, when interacted with tercile indicators of $\widehat{Forced}$, has a large and positive correlation with future performance for CEOs who were the likeliest firing targets. Therefore, the firing (or retention) decisions of entrenched boards appear to be associated with better future performance. This evidence is more consistent with the misguided shareholder view of governance, whereby the entrenchment of

boards against shareholders can lead to higher-quality decisions.

5. Further Analysis

5.1. Alternative Measures of Entrenchment

Our main results favor the view that entrenchment can benefit firms: By lowering the cost S of going against shareholders, entrenched boards can make better firing decisions. We use the G-Index as a proxy for entrenchment, and we find a pattern of evidence that generally supports the board protection view (low S) over the CEO protection (high C) view. Therefore, we now consider whether this interpretation of the G-Index—as offering the board protection from shareholders, rather than weakening it against the CEO—is sensible.

The G-Index is widely understood as a measure that captures the governance quality of a firm. More specifically, though, it is an index of 24 antitakeover provisions. Many of the provisions relate to the exercise of shareholder power: limitations on the ability to call shareholder meetings without prior board approval, confidential shareholder voting, staggered board elections, supermajority requirements for charter amendments or to approve mergers, and so forth. Therefore, it may be reasonable to broadly interpret the G-Index (as well as the related E-Index) as a better measure of S.[21]

This inquiry also naturally leads us to consider whether other common proxies for entrenchment also display S-like characteristics. For instance, having independent directors is often viewed as important for good governance. In Table 6, columns (1) and (2), we consider the fraction of dependent directors as a proxy for entrenchment. If dependent directors provide protection from shareholders (low S), then we would expect to see a positive coefficient on % *Dependent directors* $*$ ($\widehat{Forced}$—*Tercile* 3). The result in column (2) is not significant.

In columns (3) and (4), we consider another common measure of entrenchment, CEO tenure. Tenured CEOs have had the opportunity to amass influence within the firm, and therefore may be viewed as more difficult to oppose or fire. In column (4), we see that the coefficient on *CEO tenure* $*$ ($\widehat{Forced}$—*Tercile* 3) is negative, counter to the board protection view, though it is not significant at conventional levels. Empirically, neither the fraction of dependent directors nor CEO tenure is consistent with the board protection role of S.

[21] Admittedly, the G-Index does include other provisions, such as golden parachutes and the state-level antitakeover laws, that are not as clearly interpretable as limitations on shareholder power over boards.

Table 6 Future Performance of Retained CEOs, Alternative Entrenchment Measures

	(1)	(2)	(3)	(4)
% *Dependent directors*	1.117***	1.045**		
	(0.210)	(0.414)		
$*\widehat{Forced}$—*Tercile* 2		−0.287		
		(0.681)		
$*\widehat{Forced}$—*Tercile* 3		0.634		
		(0.769)		
CEO tenure			0.006	0.008
			(0.004)	(0.005)
$*\widehat{Forced}$—*Tercile* 2				0.008
				(0.013)
$*\widehat{Forced}$—*Tercile* 3				−0.022
				(0.014)
$\widehat{Forced}$—*Tercile* 2	0.2306**	0.343	0.261***	0.227*
	(0.111)	(0.226)	(0.077)	(0.117)
$\widehat{Forced}$—*Tercile* 3	0.032	−0.166	0.031	0.177
	(0.122)	(0.296)	(0.109)	(0.138)
Log(*MVE*)	0.037	0.046	−0.036*	−0.034*
	(0.028)	(0.028)	(0.019)	(0.019)
Log(*BE/MVE*)	−1.075***	−1.089***	−0.977***	−0.974***
	(0.109)	(0.109)	(0.093)	(0.090)
ROA[−1]	−49.361***	−49.461***	−52.282***	−52.130***
	(1.385)	(1.381)	(1.335)	(1.335)
Observations	10,711	10,711	19,019	19,019

Notes. This table reports the results of median regressions using the sample of firms in the S&P 1500 in 1994 to 2007 where the CEO was retained. Observations are firm-years in which *Forced* = 0 in the firm in the preceding year ($t-1$) through the two subsequent years ($t+2$). The dependent variable is *change in ROA* from $t-1$ to $t+2$, where ROA is adjusted by the median ROA of the corresponding two-digit SIC industry and year. % *Dependent directors* is 1 minus the percentage of independent directors. $\widehat{Forced}$ is the fitted value from a regression estimating the propensity to be fired, and is presented as indicator variables corresponding to tercile groupings of $\widehat{Forced}$. *ROA*[−1] is the industry-year-adjusted ROA in year $t-1$. *MVE* is the market value of equity. *BE/MVE* is the book equity to market value of equity. Bootstrapped standard errors are shown in parentheses. All coefficients and standard errors are multiplied by 100.

*Significant at 10%; **significant at 5%; ***significant at 1%.

5.2. Split Sample Results

We now consider how the relative power of the CEO versus shareholders could affect the quality of the board's firing decision. Corollary 2 suggests that entrenching the board against shareholders (low S) should be most important when the board can easily fire the CEO (low C). Therefore, in Table 7, we examine whether the benefits of board entrenchment documented above are more pronounced among weak CEOs.

Here we consider director dependence and CEO tenure as proxies for C. Section 5.1 suggests that neither is a strong S proxy empirically. In addition, a priori, we would argue that director dependence is a better measure of C, rather than S. Because of their employment and reporting status, it is clear that

Table 7 Future Performance of Retained CEOs, Split Samples

	By % *Dependent directors*				By years of *CEO tenure*			
	Below median (1)	Above median (2)	Below median (3)	Above median (4)	Below median (5)	Above median (6)	Below median (7)	Above median (8)
G-Index	−0.056	−0.027			−0.036	0.005		
	(0.034)	(0.040)			(0.028)	(0.027)		
$*\widehat{Forced}$—*Tercile* 2	0.074	0.060			0.028	0.022		
	(0.051)	(0.061)			(0.049)	(0.044)		
$*\widehat{Forced}$—*Tercile* 3	0.114**	0.068			0.135**	−0.020		
	(0.056)	(0.063)			(0.053)	(0.055)		
E-Index			−0.146**	−0.136**			−0.171***	−0.139***
			(0.063)	(0.070)			(0.053)	(0.040)
$*\widehat{Forced}$—*Tercile* 2			0.073	0.201**			0.102	0.162*
			(0.090)	(0.113)			(0.085)	(0.075)
$*\widehat{Forced}$—*Tercile* 3			0.168*	0.144			0.292**	0.084
			(0.115)	(0.125)			(0.104)	(0.127)
$\widehat{Forced}$—*Tercile* 2	−0.464	−0.260	0.067	−0.204	−0.143	−0.035	−0.177	−0.181
	(0.536)	(0.615)	(0.287)	(0.287)	(0.510)	(0.453)	(0.254)	(0.232)
$\widehat{Forced}$—*Tercile* 3	−1.190**	−0.532	−0.451	−0.267	−1.419***	0.063	−0.821**	−0.267
	(0.601)	(0.604)	(0.377)	(0.360)	(0.504)	(0.539)	(0.279)	(0.374)
Log(*MVE*)	0.081*	−0.074*	0.066	−0.096**	0.015	−0.035	−0.008	−0.017
	(0.040)	(0.046)	(0.038)	(0.043)	(0.039)	(0.034)	(0.041)	(0.038)
Log(*BE/MVE*)	−1.209***	−1.130***	−1.206***	−1.304***	−1.176***	−0.981***	−1.264***	−1.130***
	(0.171)	(0.143)	(0.180)	(0.147)	(0.116)	(0.171)	(0.124)	(0.184)
ROA[−1]	−49.376***	−47.766***	−49.213***	−49.856***	−51.649***	−43.947***	−51.947***	−45.578***
	(2.222)	(2.057)	(2.281)	(2.008)	(1.907)	(1.932)	(1.863)	(2.041)
Observations	4,983	4,927	4,710	4,579	7,023	5,846	6,593	5,505

Notes. This table reports the results of median regressions using the sample of firms in the S&P 1500 in 1994 to 2007 where the CEO was retained. Observations are firm-years in which *Forced* = 0 in the firm in the preceding year ($t-1$) through the two subsequent years ($t+2$). The dependent variable is change in ROA from $t-1$ to $t+2$, where ROA is adjusted by the median ROA of the corresponding two-digit SIC industry and year. Columns (1)–(4) split the sample into two groups having below- versus above-median values of % *Dependent directors*. Columns (5)–(8) split the sample into two groups having below- versus above-median values of years of CEO tenure. $\widehat{Forced}$ is the fitted value from a regression estimating the propensity to be fired and is presented as indicator variables corresponding to tercile groupings of $\widehat{Forced}$. *ROA*[−1] is the industry-year-adjusted ROA in year $t-1$. *MVE* is the market value of equity. *BE/MVE* is the book equity to market value of equity. Bootstrapped standard errors are shown in parentheses. All coefficients and standard errors are multiplied by 100.

*Significant at 10%; **significant at 5%; ***significant at 1%.

dependent directors have less power over the CEO than independent ones. However, it is unclear how responsive independent directors are to shareholders. CEO power over the board likely grows with tenure, since directors commonly require the CEO's implicit approval to be renominated to the board. CEO tenure, however, would seem less relevant to either weakening or strengthening the relationship between the board and shareholders.

In columns (1) and (2), we split the sample into below- and above-median groups by % *Dependent directors* as a measure of *C*. The benefits of board entrenchment (low *S*, as measured by a high G-Index) are concentrated in column (1), where directors are less dependent on the CEO (low *C*). Specifically, the coefficient on *G-Index*$*$($\widehat{Forced}$—*Tercile* 3) is nearly 70% larger in column (1) than in column (2). Columns (3) and (4), which use the E-Index as the measure of *S*, do not reveal any substantial differences between low- and high-director dependence groups.

Columns (5) to (8) use CEO tenure as a measure of *C* and suggest that the benefit of entrenching boards (low *S*) is concentrated among low tenured CEOs (low *C*) in columns (5) and (7). These results are consistent using either the G-Index or E-Index as the proxy for *S*. Overall, our results lean toward the view that board entrenchment (low *S*) is most important in circumstances in which the CEO is otherwise vulnerable to firing (low *C*), as in the case of an early-tenure CEO or a board with many independent directors.

These results also provide a framework for understanding the finding of Gillan et al. (2011) that independent directors and the G-Index are positively correlated across firms. Our results would suggest that high-director-independence firms (low *C*) tend to have high values of the G-Index (low *S*) because

this set of conditions is beneficial for board decision making.

Although the lack of a clear demarcation between proxies for S versus C limits our ability to precisely test our model's predictions, we have endeavored in this section to examine whether plausible proxies for the S versus C types of entrenchment interact in ways that are consistent with our model. The collective evidence leans in favor of a multidimensional notion of "entrenchment" that highlights the potential for board protection and CEO protection to have distinct roles in firm governance.

5.3. Alternative OLS Specification

In our main results, we follow Gompers et al. (2003) and Core et al. (2006) in adopting a median regression specification where the dependent variable ΔROA is industry-year adjusted. An alternative to industry-adjusting the dependent variable is to include industry $*$ year fixed effects. However, median regressions are not ideal for specifications involving large numbers of fixed effects, because they require estimation of all nuisance parameters. This becomes computationally prohibitive for Tables 5–7, which have over 1,000 industry $*$ year effects.

Therefore, in unreported results, we run Tables 5–7 using OLS regressions with industry $*$ year fixed effects instead of industry-year adjusting the dependent variable. We winsorize ROA at the 1st and 99th percentiles. All results are robust, and are available upon request.

6. Conclusion

In this paper, we analyze the role of entrenchment on performance surrounding CEO dismissals. We emphasize that entrenchment has potential costs and benefits, and the choice of entrenchment involves a tradeoff. We illustrate this through a model that spells out the tradeoff between a traditional "costly firing" view of entrenchment and an "ignoring misguided shareholders" view based on the premise of performance misattribution. While our results lean in favor of the view that entrenched boards benefit from ignoring misguided shareholders, we emphasize that our intention is not to prove or disprove any particular view. Rather, we hope to shift the emphasis of the debate on entrenchment to considering the potential tradeoffs involved, and to focus the discussion more closely on the actual decisions associated with a firm's governing bodies, such as CEO dismissal or the decision to merge.

It is important to emphasize that our findings do not mean that corporate governance provisions are "good" or "bad" for the firm in general, as they may affect many aspects of firm performance. We show that if the board is less responsive to shareholders, then it seems to make better firing decisions. In a similar vein, Kadyrzhanova and Rhodes-Kropf (2011) show that firms with more antitakeover statutes are able to obtain higher takeover premia. However, these same provisions may cause the firm to be less well-run in other ways. For example, Bertrand and Mullainathan (2001) conclude that CEOs in firms that are less well governed are able to skim and get paid for good luck. Thus, it seems likely that governance statutes have tradeoffs—they may improve decisions such as CEO turnover and alter payments in mergers and acquisitions but they may also allow cream-skimming by the CEO.

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Appendix

Proof of Proposition 1.

(a) Note that

$$E[q_2 - q_1 \mid \text{fired}] = \bar{q} - E[q_1 \mid \text{fired}] = \bar{q} - E[q_1 \mid q_1 < \bar{q} + S - C]. \quad (12)$$

Since $S^H - C^H < S^L - C^L$,

$$E[q_1 \mid q_1 < \bar{q} + S^H - C^H] < E[q_1 \mid q_1 < \bar{q} + S^L - C^L]. \quad (13)$$

Therefore, $E[q_2^H - q_1^H \mid \text{fired}] > E[q_2^L - q_1^L \mid \text{fired}]$, and the expected improvement in CEO quality is greater after firing an entrenched CEO.

(b) This is a direct consequence of Equation (13).

(c) To show $E[\pi_2^H \mid \text{retained}] < E[\pi_2^L \mid \text{retained}]$, note that

$$E[\pi_2^H \mid \text{retained}] = E[q_1 \mid q_1 \geq \bar{q} + S^H - C^H] + \hat{\phi} \quad (14)$$

and

$$E[\pi_2^L \mid \text{retained}] = E[q_1 \mid q_1 \geq \bar{q} + S^L - C^L] + \hat{\phi} \quad (15)$$

if $S^L - C^L < 0$, or

$$E[\pi_2^L \mid \text{retained}] = E[q_1 \mid q_1 \geq \bar{q}] + \hat{\phi} \quad (16)$$

if $S^L - C^L \geq 0$. Either way, $E[\pi_2^H \mid \text{retained}] < E[\pi_2^L \mid \text{retained}]$ because $S^H - C^H < S^L - C^L$. □

Proof of Corollary 1. The probability that the board decides to fire the CEO is conditional on both true CEO quality and the noise the shareholders attribute to the CEO:

$$\text{Prob}[d_b = 1 \mid \hat{q}_1, \hat{q}_s] = \begin{cases} 1 & \text{if } \hat{q}_1 < \bar{q} + S - C \text{ and } \hat{q}_s < \bar{q}, \\ 1 & \text{if } \hat{q}_1 < \bar{q} - S - C \text{ and } \hat{q}_s \geq \bar{q}, \\ 0 & \text{if } \hat{q}_1 \geq \bar{q} + S - C \text{ and } \hat{q}_s < \bar{q}, \\ 0 & \text{if } \hat{q}_1 \geq \bar{q} - S - C \text{ and } \hat{q}_s \geq \bar{q}. \end{cases} \quad (17)$$

The dual inequalities correspond to the decision of the board and the beliefs of the shareholders. If the shareholders believe the CEO should be fired, $\hat{q}_s < \bar{q}$, then it becomes harder for the board to retain the CEO. As $S \to \infty$, the probability that the board attempts to fire, Equation (17), becomes

$$\text{Prob}[d_b = 1 \mid \hat{q}_1, \hat{q}_s] = \begin{cases} 1 & \text{if } \hat{q}_1 < \infty \text{ and } \hat{q}_s < \bar{q}, \\ 1 & \text{if } \hat{q}_1 < -\infty \text{ and } \hat{q}_s \geq \bar{q}, \\ 0 & \text{if } \hat{q}_1 \geq \infty \text{ and } \hat{q}_s < \bar{q}, \\ 0 & \text{if } \hat{q}_1 \geq -\infty \text{ and } \hat{q}_s \geq \bar{q}. \end{cases} \quad (18)$$

Therefore, if $\hat{q}_s = \hat{q}_1$, then $E[d_b \mid \hat{q}_1 < \bar{q}] = 1$, and all below-average CEOs will be fired. □

Proof of Proposition 2. The proof of the first statement in the proposition is identical to the proof of Proposition 1 and is omitted. When higher entrenchment means smaller S, we have the following.

The CEO is fired if (1) $\hat{q}_1 < \bar{q} + S - C$ and $\hat{q}_1 + \hat{\eta}_1 < \bar{q}$ or if (2) $\hat{q}_1 < \bar{q} - S - C$ and $\hat{q}_1 + \hat{\eta}_1 \geq \bar{q}$; otherwise, he is retained. We have assumed that $\eta > S + C$. This results in three regions. When $\hat{q}_1 < -S - C$, the CEO is fired whether or not she is lucky. And when $-S - C \leq \hat{q}_1 \leq S - C$, the CEO is fired if unlucky and retained if lucky. And when $S - C < \hat{q}_1$, then the CEO is retained.

(a) To prove that $E[q_2^H - q_1^H \mid \text{fired}] > E[q_2^L - q_1^L \mid \text{fired}]$, note that

$$E[q_2 - q_1 \mid \text{fired}] = \bar{q} - E[q_1 \mid \text{fired}]. \quad (19)$$

Therefore, we need to show that $E[q_1^H \mid \text{fired}] < E[q_1^L \mid \text{fired}]$. We know that $E[q_1 \mid \text{fired}]$ can be expressed as

$$\begin{aligned} &E[q_1 \mid q_1 < \bar{q} - S - C]\,\text{Prob}(q_1 < \bar{q} - S - C \mid \text{fired}) \\ &\quad + E[q_1 \mid \bar{q} - S - C < q_1 < \bar{q} + S - C] \\ &\quad \cdot \text{Prob}(\bar{q} + S - C < q_1 < \bar{q} - S - C \mid \text{fired})/2. \end{aligned} \quad (20)$$

Given that F_q is uniform $[-q, q]$ and $\bar{q} = 0$, these can be written as

$$\frac{-q - S - C}{2}\frac{q - S - C}{q - C} - C\frac{S}{q - C}. \quad (21)$$

The derivative with respect to S is

$$\frac{S}{q - C} > 0, \quad (22)$$

which is clearly greater than zero since $q > C$ and $S > 0$.

(b) Note that

$$E[\pi_1 \mid \text{fired}] = E[q_1 \mid \text{fired}] + E[\eta_1 \mid \text{fired}] + E[\phi \mid \text{fired}]. \quad (23)$$

Part (a) shows that $E[q_1^H \mid \text{fired}] \leq E[q_1^L \mid \text{fired}]$. We also know that $E[\phi \mid \text{fired}] = \bar{\phi}$, because the firm fixed component does not affect the firing decision. So, $(\partial / / \partial S)E[\phi \mid \text{fired}] = 0$. Therefore, to prove part (b) it is necessary to show that $E[q_1^H + \eta_1^H \mid \text{fired}] > E[q_1^L + \eta_1^L \mid \text{fired}]$.

If $\hat{q}_1 < -S - C$, the CEO is fired whether or not she is lucky. However, when $-S - C \leq \hat{q}_1 \leq S - C$, the CEO is fired only if the realized noise is $-\eta$. Therefore,

$$E[\eta_1 \mid \text{fired}] = -\eta\frac{S}{q - C}. \quad (24)$$

Therefore,

$$E[q_1 + \eta_1 \mid \text{fired}] = \frac{-q - S - C}{2}\frac{q - S - C}{q - C} - C\frac{S}{q - C} - \eta\frac{S}{q - C}, \quad (25)$$

and the derivative with respect to S is

$$\frac{S - \eta}{q - C} < 0, \quad (26)$$

which is clearly less than zero since $S < \eta$ and $q > C$.

(c) To show $E[\pi_2^H \mid \text{retained}] > E[\pi_2^L \mid \text{retained}]$, note that

$$\begin{aligned} E[\pi_2 \mid \text{retained}] &= E[q_1 \mid \text{retained}] + E[\eta_2 \mid \text{retained}] \\ &\quad + E[\phi \mid \text{retained}]. \end{aligned} \quad (27)$$

The expectation of the noise and firm effect are, respectively, $E[\eta_2 \mid \text{retained}] = 0$ and $E[\phi \mid \text{retained}] = \bar{\phi}$. The CEO is retained if $-S - C \leq \hat{q}_1 \leq S - C$ and the CEO is lucky, and when $S - C < \hat{q}_1$:

$$E[\pi_2 \mid \text{retained}] = \frac{q + S - C}{2}\frac{q - S + C}{q + C} - C\frac{S}{q + C} \quad (28)$$

And the derivative with respect to S is

$$\frac{-S}{q + C} < 0, \quad (29)$$

which is clearly negative since $S > 0$. □

Proof of Corollary 2. The derivative with respect to C of the derivative of $E[\pi_2 \mid \text{retained}]$ with respect to S is

$$\frac{S}{(q + C)^2} > 0. \quad (30)$$

Thus, there is a larger negative effect of increasing S on second-period performance for firms with lower C. □

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