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JEL classification: G30, G38, J10, J16.

Keywords: Corporate governance, director tenure, board tenure, board composition, board diversity, CEO turnover, restatement.

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Director Tenure Diversity and Board Monitoring Effectiveness

ABSTRACT

This study examines the impact of director tenure diversity on board effectiveness. We find that tenure-diverse boards exhibit significantly higher CEO performance-turnover sensitivity and that firms with tenure-diverse audit committees are less likely to experience accounting restatements. Furthermore, we document that tenure-diverse compensation committees also award less excess compensation and are less likely to overcompensate. Even though tenure-diverse boards seem to exhibit superior monitoring performance, there is limited evidence that their firms exhibit superior financial performance. The findings suggest that recent calls for board renewal, to the extent that it would increase tenure diversity rather than just decrease average board tenure, may help enhance board monitoring.

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1. Introduction

Recent international proposals to impose term limits on independent directors have reignited the debate around the ideal length of director tenure. The motivation for such proposals is to ensure that “the purpose behind the independent director rule is not lost.”¹

While some firms limit director terms, their limits tend to be long.² Some practitioners and regulators have even questioned whether optimal board tenure exists. For the most part, however, firms and regulators acknowledge the benefits of long tenure, including knowledge continuity and boardroom collegiality. Even so, governance experts have recently raised concerns about the potential *costs* of longer director tenure. These costs may include a loss of independence and the lack of agility and adaptability.³

The idea that tenure length may be associated with board effectiveness is not new. An issue explored in governance studies is whether board tenure length, among the many director attributes studied, affects a board’s ability to monitor management. Some researchers hypothesize that longer tenure should result in better monitoring, since tenure length decreases directors’ susceptibility to management influence (e.g., Beasley 1996) and increases their firm-specific knowledge (Bacon and Brown 1973). In contrast, other scholars expect longer tenure to lead to greater commitment to the status quo (Janis 1982; Staw and Ross 1980; Stevens et al. 1978)

¹ <http://business.inquirer.net/36337/new-sec-rules-on-independent-directors>. For example, in the Philippines, independent directors’ term limits were established as of 2012 to combat potentially impaired independence.

² Continuing the conversation: Board renewal (PwC Center for Board Governance, Fall 2011).

³ Canavan, Judy, Blair Jones, and Mary Jo Potter, 2004, Board tenure: How long is too long? *Directors & Boards*, January 1.

and board entrenchment, resulting in weaker monitoring (e.g., Anderson et al. 2004).

Empirical studies provide mixed evidence.⁴

One way to examine the pros and cons of board tenure is to explore the optimal *average* board tenure—aiming to identify a timespan that minimizes agency conflict while maximizing firm-specific knowledge—and to encourage firms to adhere to it. A downside of that approach is that such a target is necessarily stringent and therefore may be impractical to implement or maintain. A second way to tackle the issue of the optimal tenure length is to consider the *diversity* in the length of directors' tenure, rather than the average.⁵ Using this technique, research has shown that both the characteristics (traits) and the variety (diversity) of team members' cognitive resources are important in understanding team performance (Hoffman 1959; Hoffman and Maier 1961; Triandis et al. 1965). The importance of studying variation among board members has been further emphasized by Morck et al. (1988). As research points out, simply examining the average of a board characteristic does not capture the diversity of information sources and perspectives (Wiersema and Bantel 1992). Boards with diverse director tenure lengths may recognize the benefits of having both senior and junior directors, leading to knowledge continuity as well as independence. While empirical findings are mixed with regard to the effect of board *demographic* diversity, the underlying theory that predicts that diverse director characteristics impact board efficacy applies in this setting as well. Tenure diversity has

⁴ Anderson et al. (2004) document a positive association between board tenure length and financing costs, implying weaker management monitoring and greater entrenchment. Beasley (1996) finds that tenure length decreases the likelihood of fraud, implying stronger management monitoring.

⁵ To implement a policy that stipulates an optimal mean tenure would require boards to focus on meeting a particular target annually, which would mean that they would have to replace the board member whose departure would bring the board closest to the optimum. Tenure length diversity, by contrast, only stipulates that there ought to be a mix of directors in terms of their tenure lengths. This means the board retains the flexibility to determine whether and when to replace a board member.

an unique aspect relative to diversity in general: other dimensions of diversity rely on the assumption that directors with different demographic and background characteristics will have divergent opinions, an assumption questioned by prior research (Harrison et al. 1998, 2002). Tenure diversity does not require this assumption.

While tenure-diverse board members may vary in how they think, even without such a difference, tenure diversity offers benefits. As directors join the board at different times, this decreases the probability of group cohesiveness, which can lead to groupthink (Janis 1982). In addition, O'Reilly et al. (1989) find that team tenure diversity decreases a team's social integration and mutual attraction and, Wiersema and Bantel (1992) hypothesize that heterogeneous team tenure leads to new and different perspectives and prevents the "cohort phenomenon." Although socially integrated teams may be desirable in other settings, on corporate boards, they may be prone to groupthink and complacency and thus may ineffectively monitor firm management.

Despite the theoretical arguments that demographic diversity should result in diverse opinions and better governance, the empirical evidence to date is mixed. The assumption that a particular type of observed demographic diversity captures cognitive differences may be a contributing factor to the generally inconclusive evidence for the benefit of such diversity in the board setting. Some studies find limited benefits from this type of diversity (Adams and Ferreira 2009; Carter et al. 2003; Gul et al. 2011), while others fail to find such benefits (Ahern and Dittmar 2011; Gray and Nowland 2015; Knyazeva et al. 2009).

A potential explanation for the mixed prior results is that differences in opinions even if captured by the variation in demographic characteristics, may be accompanied by costs. There is evidence that decisions made by diverse groups may not result in better outcomes as diversity increases internal conflict and divisiveness (Simons and Peterson 2000) and obstructs

coordination and communications (van den Steen 2010). This results in animosity, dissatisfaction, and the failure to reach agreement (Wall and Nolan 1986). With respect to organizational tenure, heterogeneous groups tend to have difficulty communicating, relative to homogeneous teams (McCain et al. 1983). Yet, even if some dissent is desirable and more likely to occur in more diverse groups, it is not clear that differences within cohorts lead to long-term disagreements. New directors may begin to conform to the group norms, and a board may revert to its original level of cohesiveness.⁶ Consequently, director tenure diversity may have no effect or obtain effects opposite to those advocated by the regulators. Ultimately, it is an empirical question whether greater tenure diversity enhances board effectiveness.

Our empirical findings support the hypothesis that tenure-diverse boards better monitor the CEO. Specifically, tenure-diverse boards appear to be (1) more sensitive to performance when replacing the CEO, (2) less frequently associated with accounting restatements, (3) more likely to replace the CEO if a restatement occurs, and (4) less likely to overcompensate the CEO. We find no evidence, however, that tenure diversity is associated with better future market performance and very little evidence it is associated with better future accounting performance. Our results are consistent with prior studies that find that increased monitoring may interfere with the board's advisory role (Adams and Ferreira 2007). Since we focus on the role of tenure diversity in the context of tasks for which boards are directly responsible (e.g., CEO replacement), endogeneity poses a less severe concern, relative to settings where board effectiveness is inferred indirectly, such as through firm performance (Hermalin and Weisbach 2003). Nonetheless, our research design addresses the issue of correlated omitted variable bias,

⁶ Some experimental studies observe that group development happens fairly quickly, with cohesiveness developing as early as 10 weeks to six months into a group's formation (Tuckman 2001).

which increases confidence when drawing causal inferences: we employ a firm- fixed effect specification in the CEO turnover-performance analysis.

We lag tenure diversity and the control variables relative to the outcome variable to reduce simultaneity or reverse-causality concerns. To further mitigate endogeneity concerns, we implement an instrumental variable approach. Even so, we are unable to rule out that endogeneity affects our results and thus leave it up to the readers to decide whether to draw causal inferences from the findings.

Our study contributes to research on board composition in the following three ways. First, it extends the literature showing that board tenure influences governance effectiveness. Prior studies are mixed regarding the impact of board tenure on governance; our study provides a different perspective on board tenure and its importance in relation to board effectiveness.

Second, this work may contribute to the regulatory discussions around the importance of board member term limits. By shifting the focus to the mix of director tenure lengths, this study provides evidence that tenure diversity matters for effective governance. Furthermore, our evidence suggests that board renewal initiatives may not be baseless; we find support for the notion that, in some instances, limiting director terms may result in better governance if doing so alters the mix of tenure lengths.

Third, our study suggests that director tenure diversity, which can be achieved through board renewal initiatives, may organically introduce perspective diversity. By introducing dimensions of director diversity other than those primarily targeted by regulators, we extend the current literature on board composition and diversity, most of which focuses exclusively on gender or expertise. While other dimensions of diversity may be beneficial, they rely on the assumption that demographically different directors will hold differing perspectives. Tenure diversity, by contrast, can lead to better group dynamics even without this assumption. Our study controls for

these other forms of board diversity to show that tenure diversity has an incremental effect above and beyond the effects found through other forms of diversity.

The remainder of the study is organized as follows. Section 2 discusses the relevant literature and the motivation for the study and develops the hypotheses. Section 3 describes the sample along with the source of the data. Sections 4 to 7 present the results of our analyses. Section 8 concludes.

2. Diversity and board performance

We examine the role of director tenure diversity in the context of the major board task—CEO replacement. There are two major mechanisms through which diversity is broadly believed to boost group performance: perspective diversity (Wiersema and Bantel 1992; van Knippenberg et al. 2004) and better access to information and resources (Hambrick and Mason 1984). Perspective diversity is believed to generate better discussions and deliberations (Jehn et al. 1999) and create a culture of communication and questioning (van Knippenberg et al. 2004). As a result, diverse groups achieve better outcomes than homogeneous groups. Perspective diversity also increases independence: heterogeneous directors are likely to ask questions that would not arise within a homogeneous group. Diverse boards are considered the “ultimate outsiders” (Carter et al. 2003).

The second mechanism, better access to information and resources, improves the board’s ability to carry out its duties. The amount and nature of information that directors possess have great impacts on board effectiveness (Bebchuk and Weisbach 2010). Boards are the primary link between the firm and its external sources of dependency (Hillman et al. 2007). By bringing a group of diverse individuals together, boards gain access to broader sets of information, knowledge, skills, and talent (Pfeffer 1973; Pfeffer and Salancik 1978; Zald 1969). These benefits stem from directors’ human capital and relationship capital (Hillman and Dalziel 2003).

Board diversity is often discussed in the context of the demographic characteristics of the board members. Prior studies have mainly examined gender diversity and, to a lesser extent, expertise or experience diversity. The findings are mixed. While Carter et al. (2003) find an association between gender diversity and firm value, Adams and Ferreira (2009) show that gender diversity improves only the monitoring role of the board and only in weakly governed firms. Ahern and Dittmar (2011), by contrast, find that the value of firms that are forced to adopt increased gender diversity declines. Gul et al. (2011) show that board gender diversity improves the informativeness of stock prices. While results regarding the impact of gender diversity on governance are mixed, the benefits of expertise diversity seem even less convincing. Gray and Nowland (2015) find that broad expertise diversity, in general, does not impact firm value but that diversity along a limited subset of expert skills does. Knyazeva et al. (2009) find that director industry expertise diversity leads to lower firm value.

While empirical findings on the benefits of board diversity, defined broadly, are inconclusive, the theoretical underpinnings that suggest potential benefits of diversity apply to tenure diversity as well. In addition, tenure determines individuals' cohort membership and defines experiences, perspectives, and values (O'Reilly et al. 1989; Pfeffer 1983). Research shows that tenure-homogenous teams create more socially cohesive groups (O'Reilly et al. 1989), a trait that can be more desirable in settings other than governance (Kosnik 1990). From a governance perspective, boards that are too cohesive and friendly tend to lack the ability to effectively monitor due to complacency and groupthink (Herman 1981). Conversely, tenure-diverse boards should possess the desire and ability to undertake changes; this prevents complacency, which often leads to board failures (Kosnik 1990). Less cohesiveness likewise minimizes the probability of groupthink, even if the team members otherwise have homogenous opinions. This characteristic sets tenure diversity apart from other dimensions of diversity: it

does not rely on the assumption that board members diversity along an observable characteristic makes them think differently, an assumption that some studies have disputed (Harrison et al. 1998, 2002).

Additionally, tenure diversity may derive benefits from another source. Firms with tenure-diverse boards may benefit from having the best of both worlds—directors with longer tenures may better understand firm-specific issues and avoid capture by the CEO, while those with shorter tenures may not be entrenched and thus bring fresh perspective to board discussions.

Despite the possible benefits of tenure diversity and of diversity more broadly, heterogeneous groups face several well-known obstacles to effective functioning. These include lack of cohesiveness (Jackson et al. 1991); inability to reach satisfactory agreement, leading to excessive conflict and animosity (Simons and Peterson 2000); coordination issues (van den Steen 2010); and diversion of time toward persuasion and conflict (Baranchuk and Dybvig 2009). The same factors that can make a board more effective can also be its downfall. Consequently, diversity is often deemed a double-edged sword (Milliken and Martins 1996).

There are other factors that may make tenure diversity ineffective at improving monitoring. For instance, the theory of the cohort effect assumes that the benefit of including individuals from different cohorts lasts for a long time. It is not clear, however, that this is true. Studies on group development (e.g., Tuckman 1965; 2001; Tuckman and Jensen 1977) have found that group dynamics change with the length of time the individuals are in the group. In the initial stages, groups experience orientation and dissent, but in the latter stages of group development, cohesion arises, regardless of individual differences. Some studies have observed the appearance of cohesion as early as 10 weeks to six months after individuals form a group. To the extent that cohesion arises rapidly in governance settings as well, it is not clear that rotating board members in and out will produce lasting benefits.

Finally, while it is generally believed that cohesion can lead to groupthink, it is not clear that differences in opinion in tenure-diverse groups are likely to be expressed in a noncohesive, less friendly environment. The group development theory (Tuckman 1965) posits that the free and open exchange of differing opinions is most likely to occur at the later stages of group development, after members identify with each other. If that is the case, tenure-diverse boards may cultivate different opinions, but it is not clear that these differences would be revealed during board discussions if the environment is sufficiently contentious.

Consistent with the lack of clear expectations for the effect of diversity in board settings, prior studies, which primarily focus on the diversity of boards by considering visible demographic characteristics, have found mixed results. To our knowledge, there have been no studies examining the effect of tenure diversity on boards' ability to monitor management effectively.

3. Data

Sample selection

A 13-year sample, from 2000 to 2012, is selected from the universe of ExecuComp firms. From this sample, we eliminate firms not covered by BoardEx and firms without the required financial information in Compustat or stock price information in CRSP. The final sample used in the CEO turnover-performance sensitivity tests consists of 13,903 firm-year observations and 1,966 unique firms. For the test examining CEO turnover after a restatement, the subsample of firms with a restatement announcement is used, reducing the sample to 870 firm-year observations. For the test examining post-CEO replacement performance, the sample is reduced to the set of observations during which the CEO is replaced and for which future performance data is available, resulting in a sample of 867 firm years. Finally, for the test examining the likelihood of restatement as a

function of tenure diversity, the sample is reduced to include only observations starting in 2002, as that is the first full year of Audit Analytics coverage, resulting in a final sample of 11,170 firm-year observations (5,097 in the conditional logit model, conditional on a firm having at least one restatement announcement during the sample period).

For each director in the sample, we collect tenure information as well as other demographic information from BoardEx, financial information from Compustat, and the required compensation data from ExecuComp. Information about the CEOs (age, tenure, gender, turnover, and role duality) is obtained from ExecuComp and supplemented by data available in RiskMetrics. All restatement-related data is from Audit Analytics. To calculate board expertise and board nationality diversity control measures, we supplement BoardEx with data hand-collected from the internet.

Tenure diversity variables

We construct the tenure diversity measure in two different ways. First, since tenure is a continuous variable, tenure diversity is measured as a coefficient of variation, CV_{tenure} . The coefficient of variation is defined as:

$$CV_{it} = \sigma_{it} / \mu_{it}.$$

Although it is standard to use the coefficient of variation in organizational behavior literature when calculating the diversity of a dimension captured by a continuous variable, it has a drawback in that it can be affected by large values. Therefore we construct an additional tenure diversity variable, HHI_{tenure} . To calculate HHI_{tenure} , we convert the continuous tenure variable into a discrete variable ranging from one to 10 (10 categories of tenure, with 1 being the shortest and 10 the longest), based on which decile each director's tenure falls into. Then we use the ten deciles to create the tenure diversity measure for each firm-year where

$$HHI_tenure = 1 - \sum_{x=1}^{10} (\text{Total Directors in Category}_x / \text{Total Directors})^2$$

Descriptive statistics

Table 1 presents the descriptive statistics of the sample. Panel A shows the financial characteristics of the sample firms. The selected firms are large; mean and median market capitalizations for a sample firm are \$7.6 billion and \$7.5 billion, respectively, reflecting ExecuComp's focus on large firms. The median firm in the sample is a growth firm, with a book-to-market ratio of 0.46, and profitable, with a return on assets (*ROA*) of 5.1%. There is a large variation in leverage, with 0.05 and 0.34 at the 25th and 75th percentiles, respectively. Similarly, for the annual stock returns, -16% and 26% are the 25th and 75th percentiles respectively.

Since both the CEO and incumbent members of the board have a say in nominating incoming directors, the structure of the board and characteristics of the CEO may affect board diversity. For this reason, we control for CEO characteristics in all tests. Panel B of Table 1 presents descriptive statistics of such variables. Only 2.7% of the firms in the sample have a female CEO. The CEO also serves as the chairman of the board for more than half of the sample firms. Most board members (83%) are independent⁷, and the median board has eight directors ($\exp^{(2.079)}$). On average, 38% of the compensation awarded to the five highest earners is allocated to the CEO.

Table 2 provides additional information about differences in firm characteristics between firms with highly tenure-homogenous boards and those with highly tenure-heterogeneous ones. Homogeneous (heterogeneous) boards are those below (at or above) the median of the tenure diversity measure. Firms with diverse boards are significantly larger and more complex, as measured by the number of geographic and business segments. Compared to firms with homogeneous boards, those with diverse boards are more likely to have an older CEO with a

⁷ This figure excludes CEO/board chairman. Including the CEO, the percentage of independent directors over our sample period is 83.5%.

shorter firm tenure. The accounting performance of such firms is marginally higher relative to firms with homogeneous boards, but the stock performance is significantly weaker. Finally, tenure-diverse boards are larger and relatively more independent, have lower institutional ownership, and are somewhat more diverse along other dimensions as well.

Table 3 presents Pearson's correlation matrix of the variables used throughout the study. The values in bold represent correlations that are significant at the 5% level or better. The two measures of tenure diversity have a correlation figure of 0.54 (p-value of 0.000), indicating that they represent a similar construct.

4. Tenure diversity and performance-related CEO turnover

One of a board's most important tasks is selecting and replacing the CEO (Hermalin 2005). Research has shown that boards considered better monitors are more likely to replace the CEO following poor stock performance (Weisbach 1988; Yermack 1996). Weisbach (1988) also shows that turnover-performance sensitivity is heightened for boards with more independent directors. Turnover-performance sensitivity has been previously explored as a function of other board characteristics, such as gender (Adams and Ferreira 2009), monitoring intensity (Faleye et al. 2011), busy directors (Fich and Shivdasani 2006), and the presence of founders on the board (Li and Srinivasan 2011), among others.

If diverse boards engage in better dialogue and tougher discussions, as asserted by the literature, their ability to monitor the CEO is likely to be better. Since perspective diversity is believed to increase the true independence of the board, tenure-diverse boards should be more willing to replace the CEO when firm performance is poor. However, prior findings indicate that diversity can have a counter-effect by leading to disagreement and a lack of coordination. To the extent that a board is unsure whether to replace its CEO, perspective diversity might lead to

indecisiveness and disagreement about the best course of action. This, in turn, might lead to a decreased board sensitivity to firm performance and slower reactions to performance signals. Since both benefits and costs of director tenure diversity may exist, it is not clear whether tenure diversity will result in more or less turnover-performance sensitivity. To examine the effect of tenure diversity on CEO turnover-performance sensitivity, we estimate the following model:

$$\begin{aligned}
 CEO_Turnover_{it+1} = & \beta_0 + \beta_1 StockReturns_{it} + \beta_2 Tenure_Diversity_{it} + \beta_3 StockReturns_{it} * \\
 & TenureDiversity_{it} + \beta_{4-7} OtherDiversity_{it} + \beta_{8-11} GovernanceControls_{it} + \\
 & \beta_{12-15} FirmControls_{it} + \beta_{16-21} CEOControls_{it} + \beta_{22-40} StockReturns * \\
 & Controls + IndustryDummies_i + YearDummies_{it} + \varepsilon
 \end{aligned} \tag{1}$$

We define CEO turnover (*CEO_Turnover*) as a dummy variable equal to 1 if the CEO leaves the post involuntarily in year $t+1$. We follow the standard procedure developed by Parrino (1997) to identify involuntary departures.⁸ Our measure of stock performance (*StockReturns*) is each firm's annual return in t minus the CRSP value-weighted index during the same period, compounded monthly.⁹ Tenure diversity measures are defined previously in section 3. Consistent with prior research, we control for firm performance and CEO characteristics that may affect the likelihood of CEO turnover, such as CEO age (*CEOAge*), gender (*CEOGender*), tenure (*CEOTenure*), CEO power proxied by CEO pay slice (*CEOPaySlice*) (Bebchuk et al. 2011), and

⁸ Since some prior studies modify the Parrino (1997) approach and use 65, instead of 60, as the cut-off age prior to which CEO departure is deemed involuntary, we check the robustness of our findings by using the alternative cut-off. The results are similar, and all of the heterogeneity variables are significant at the originally reported probability levels.

⁹ To examine the possibility that turnover-performance sensitivity is affected by the choice of market index used to adjust the firm's raw returns, we recalculate market-adjusted returns using the equally weighted index and median industry (two-digit sic) returns. The results using the two alternative measures of market-adjusted returns are qualitatively the same, and heterogeneity variables are still significant at originally reported levels. Using equally weighted or median industry returns instead of a value-weighted index to adjust raw returns does not affect our results. Also, using an accounting-based performance measure (ROA) yields substantively similar results.

the duality of the CEO/chairman role (*CEODuality*). Additionally, we control for firm characteristics and important governance characteristics, such as board independence (*BoardIndependence*), board size (*BoardSize*), and percentage of shares held by institutional investors (*InstitutionalOwnership*), which have been shown to affect the likelihood of CEO turnover. Since we wish to examine whether tenure diversity offers an incremental monitoring benefit over other sources of diversity, we control for other dimensions of diversity such as gender (*Gender_Diversity*), age (*Age_Diversity*), functional experience (*Expertise_Diversity*), and nationality (*Nationality_Diversity*). Furthermore, since tenure diversity may be a proxy for tenure length, which is a related but distinct construct, we include mean board tenure length (*Tenure_Length*) as a control variable as well. Following the approach in Li and Srinivasan (2011), we interact all control variables in the CEO turnover-performance analysis with the firm's stock performance. This approach eliminates any portion of the CEO turnover-performance sensitivity attributable to other governance or firm characteristics included in the model other than board tenure diversity.

Table 4 Panel A shows a multivariate analysis of CEO performance-based turnover as a function of director tenure diversity and other variables hypothesized to affect turnover-performance sensitivity. The variable of primary interest is the interaction term of tenure diversity and stock returns. Boards considered to be better monitors are expected to have a significantly negative coefficient β_3 . For each of the two tenure diversity measures, the first specification shows the logistic model estimates, the second model presents results from the linear probability model with firm fixed effects, and the third model specification shows the firm fixed effect conditional logit model. Finally, we include an instrumental variable specification in our final model (3).

The results show that boards with higher tenure diversity are more performance sensitive and consequently increase the likelihood of replacing the CEO as the stock price declines. The β_3 coefficient estimate for the first tenure diversity measure, CV_Tenure_{BD}, is negative and statistically significant at the 5% level (p -value of 0.029). For the second tenure diversity measure, HHI_Tenure_{BD}, the β_3 coefficient is negative and statistically significant at the 10% level (p -value of 0.066).¹⁰

Among the endogeneity concerns associated with attributing CEO turnover-performance sensitivity to director diversity, omitted variable bias is the most relevant. We seek to mitigate this concern by controlling for factors previously shown to affect turnover-performance sensitivity, namely, factors that could be correlated with board diversity. To further address the issue of omitted time-invariant variables, we also use a firm fixed-effects specification. To the extent that the correlated omitted variable is time invariant, a firm fixed-effect specification should mitigate the concerns related to this type of endogeneity. To reduce the possibility that simultaneity and reverse causality impact our test results, board composition is observed at the beginning of the year, CEO turnover is observed during the entire year, and stock performance is measured over the prior year. Still, we cannot eliminate endogeneity concerns, and we leave it up to the reader to interpret the findings as either documenting an association between tenure diversity and our outcome variables of interest or implying a causal relationship between the two.

Accounting for the possibility of an omitted time-invariant variable by estimating a firm fixed effects linear probability model leads to a similar conclusion. The results from firm fixed-effects regressions show that firms with tenure-diverse boards (p -values of 0.001 and 0.001, respectively)

¹⁰ The subscript BD is added to the tenure diversity variable names (CV_Tenure and HHI_Tenure) to denote when the variables are calculated for the full board, while the subscripts AC and CC are added when the measures are calculated for the subset of directors who form the audit committee or the compensation committee of the board, respectively.

exhibit an increase in the likelihood of replacing the CEO, compared to less tenure-diverse boards, as the firms' market-adjusted performance for the prior year decreases. In an untabulated analysis, we estimate the conditional logistic model with firm fixed effects and find similar results; the level of board tenure diversity is associated with an increased likelihood of turnover-performance sensitivity, even if we condition on firms experiencing CEO turnover within the sample period (p-values of 0.041 and 0.022).

Finally, as the firm fixed-effects specification cannot address all sources of endogeneity, we implement an instrumental variable approach to estimating CEO turnover-performance sensitivity. Finding good instruments in this setting poses a challenge. Zald (1969) argues that the location of a firm determines its board composition due to the available director supply, Knyazeva et al. (2013) shows that board composition is largely determined by local director supply. We thus use local demographics—proxied by the zip code of a firm's headquarters—as an instrument for its board composition. Using this instrument is also consistent with the resource dependency view of the board: the board serves to connect the firm with the resources it needs to operate effectively (Pfeffer 1973; Pfeffer and Salancik 1978). To the extent that the board needs to understand the local environment, a firm's choice of directors should represent the locality in which it operates. Becker et al. (2011), for example, use local demographics (wealth density) as an instrument when examining the impact of large shareholders on corporate performance.

We use two variables to instrument for board tenure diversity: local cost of living and the amount of water area (as opposed to land area) where the firm is headquartered. The logic for using the two instruments is as follows. Cost of living (measured as average house price scaled by average income) negatively impacts the availability of local professional talent (Board of Trade 2015). As previously documented (Zald 1969), board composition is largely determined by the

local labor supply. If a firm is located in a more expensive area, there will be fewer professionals to draw upon for director roles and thus the ability to find qualified board members will be impacted.¹¹ We would expect that, in locations with a higher cost of living, tenure diversity would be lower as well. Our second instrument, the amount of local area composed of water, proxies for accessibility. Historically, cities located around bodies of water have had better accessibility for commerce and otherwise (Population Reference Bureau 2003). Areas with more developed commerce will not only have a greater pool of local talent for directorships, but they will also be more attractive to out-of-state directors due to easier access to board meetings. We expect that firms in localities surrounded by water (high water area) will have higher tenure diversity due to the greater ease of finding board members.

The instruments appear to pass the statistical tests of relevance as presented in Table 4 Panel B. In the first stage regression, both of these instruments are highly significant in the direction predicted. Cost of living (where high figures indicate less affordable areas) is negative and a significant predictor of tenure diversity (coefficient of -0.004, p-value of 0.004 for CV_Tenure_{BD} and coefficient of -0.004 and p-value of 0.001 for HHI_Tenure_{BD}), while local water area is a positive and significant predictor of tenure diversity (coefficient of 0.010, p-value of 0.002 for CV_Tenure_{BD} and coefficient of 0.005 and p-value of 0.011 for HHI_Tenure_{BD}). Eigenvalues of 15.02 for CV_Tenure_{BD} and 29.53 for HHI_Tenure_{BD} exceed the rule of thumb (10) and the 5% threshold (11.04, in this case), rejecting the hypothesis that the two instruments are jointly weak and suggesting that the two instruments are jointly relevant.

¹¹ Bureau of Labor Statistics data appear to confirm this argument. Some of the areas with the highest CEO quotient (concentration of professionals with CEO titles relative to other jobs) are in relatively low cost of living metropolitan areas. Since directors are generally drawn from the pool of executives, lower cost of living areas, which are associated with a higher CEO quotient, may provide a sufficiently large pool of director candidates, allowing local firms to renew board talent if needed.

We do not believe that the two instruments directly impact our outcome variable, CEO turnover. While director availability is determined by the local labor market supply, the CEO labor market is broader and not limited to local talent. Furthermore, approximately 80% of incoming CEOs are insiders who were at the firm in a different senior role prior to the CEO appointment (Parrino 1997). Since we have two instruments for one variable that needs instrumenting, we can perform Sargan and Basman tests to check for instrument validity. Based on the tests, we have no reason to believe that the instruments selected fail the exogeneity criteria. Neither test can reject instrument exogeneity for either tenure diversity variable, CV_Tenure_{BD} (p-values of 0.174 and 0.177 for Sargan and Basman, respectively) or HHI_Tenure_{BD} (p-values of 0.569 and 0.573). This test gives us confidence that our instruments are valid. However, the test of instrumented variables (our original tenure diversity variable) shows that we cannot reject the null hypothesis that the instrumented variable is exogenous for the HHI_Tenure_{BD} measure (Durbin Chi-Squared 4.554, p-value 0.103 and Wu Hausman F-stat of 2.253 with p-value of 0.105). If tenure diversity is truly exogenous, then the OLS/logit estimates are more efficient than the instrumental variable estimates, and those should be used.

Using the two-stage instrumental variable approach, we re-estimate our main analyses. Tenure diversity, previously found to be associated with greater CEO turnover-performance sensitivity, continues to exhibit a similar association (p-values of 0.044 and 0.087, respectively). The results in aggregate suggest that our analyses may be robust to the main types of endogeneity that could threaten the findings in this setting.

One of the concerns of the analysis is whether tenure diversity only proxies for tenure length or whether it captures boards where tenure length is neither long enough for boards to become entrenched nor short enough for them to be captured. To show whether tenure diversity has an

incremental effect above and beyond average tenure length, we control for tenure length in all of our specifications. This does not change the inferences regarding the impact of tenure diversity on monitoring, as measured by turnover-performance sensitivity. Tenure-diverse boards are significantly more turnover-performance sensitive relative than less tenure-diverse boards. In contrast, tenure length itself does not exhibit any association with turnover-performance sensitivity. The results seem to point to the importance of periodic board renewal to ensure the tenure diversity mix but do not seem to indicate that imposing terms limits, which would decrease average tenure but may not affect tenure diversity itself, would necessarily be effective in improving board monitoring.

Tenure diversity and the quality of CEO replacement decision

Though studies have established that CEO turnover-performance sensitivity is a good test of board effectiveness, another explanation for the result could be that diverse boards are “trigger-happy.” To ensure our result is not merely capturing this attitude, we examine post-CEO replacement firm performance, as measured by the increase in market value. Table 5 shows the estimation of the likelihood of an increase in market value following CEO replacement. The tenure-diverse boards, which are more performance sensitive when replacing the CEO, are also more likely to experience an increase in market value in the year after the new CEO arrives. The dependent variable is *MV_Increase*, which takes the value 1 if the firm has an increase in market value following CEO replacement. The coefficients on the two tenure diversity measures are statistically significant (p-values of 0.007 and 0.091 for *CV_Tenure_{BD}* and *HHI_Tenure_{BD}*, respectively). The results seem to imply that tenure-diverse boards make better CEO turnover decisions, rendering the “trigger-happy” explanation less plausible.

5. Audit committee tenure diversity and the likelihood of restatements

CEO disciplining is only one aspect of board monitoring. Although governance studies have largely focused on dismissal because it represents an outcome solely within the discretion of the board, other firm outcomes can, at least partially, be attributed to a board's effectiveness. For example, boards are also tasked with reviewing financial reporting integrity (audit committee task), reviewing and establishing CEO compensation (compensation committee task), and providing general strategic guidance to management.

One of the main responsibilities of the audit committee is reviewing financial statements. The goal of this review is to lend integrity to financial reporting and prevent restatements. Restatements hurt firm valuation (Palmrose et al. 2004) and harm directors' reputations, as evidenced by a reduction in the number of other directorships held by directors serving on boards of firms that restate their financial reports (Srinivasan 2005). In line with this argument, many of the Sarbanes-Oxley directives, which aimed to ensure greater financial reporting integrity, focused on improving board competency and independence.

Studies have found links between board characteristics and financial reporting outcomes. Dechow et al. (1996), Beasley (1996), and Farber (2005) all demonstrate an association between the percentage of insiders on the board and financial reporting quality using a sample of firms subject to SEC enforcement actions. Similarly, Klein (2002) shows that audit committee independence is inversely related to the level of earnings management.

If tenure-diverse audit committees are better at monitoring management, we would expect them to be more likely to catch financial reporting errors or fraud prior to the release of financial statements. Consequently, we would expect firms with tenure-diverse boards or, more precisely, more tenure-diverse audit committees, to experience fewer accounting restatements as a result of the board's diligence.

To examine whether tenure-diverse audit committees are better at monitoring management with regard to financial reporting choices, we examine whether audit committees' tenure diversity affects the likelihood of a major restatement occurring in the next three years, an approach previously used by Daines et al. (2010). Specifically, we estimate the following regression model:

$$\begin{aligned}
 Restatement_{it} = & \beta_0 + \beta_1 Tenure_Diversity_{it} + \beta_{2-5} Other_Diversity_{it} \\
 & + \beta_{6-9} GovernanceControls_{it} + \beta_{10-14} CEOControls_{it} + \beta_{15-23} FirmControls_{it} \\
 & + YearDummies_{it} + IndustryDummies_{it} + \varepsilon
 \end{aligned} \tag{2}$$

The dependent variable, $Restatement_{it}$, is a dummy variable equal to 1 if the firm announces an income decreasing restatement in years $t+1$, $t+2$, or $t+3$ and 0 otherwise. A negative coefficient on β_1 would indicate that firms with tenure-diverse boards are less likely to experience a negative (income/equity decreasing) accounting restatement. To the extent that restatements indicate the audit committee's ineffectiveness, we would conclude that audit committees with a lower likelihood of a restatement are better at their duties.

Findings provide some evidence that this is true. The results in the logit model in Table 6 show that firms with tenure-diverse audit committees are less likely to have restatements, as measured using CV_Tenure_{AC} (coefficient -0.205, p-value 0.088). The results of the logit model using HHI_Tenure_{AC} are not statistically significant (coefficient -0.108, p-value of 0.591). After including firm fixed effects in models (2) and (5) in Table 6, however, audit committees with higher tenure diversity are significantly less likely (p -values of 0.091 and 0.009 respectively) to experience an accounting restatement in the following three years when we measure tenure diversity as CV_Tenure_{AC} and HHI_Tenure_{AC} , respectively. Using a linear probability specification with firm fixed effects, rather than a conditional logit with firm fixed effects, in

models (3) and (6) yields similar results (p-values of 0.088 and 0.009, respectively). The findings are generally consistent with the prediction that tenure-diverse boards are better at monitoring management due to their increased independence.

Tenure diversity and post-restatement CEO replacement decision

Restatements can signal one of the two things: 1) poor underlying accounting quality, i.e., weak monitoring, or 2) stronger ex-post detection of prior issues, i.e., strong monitoring (Dyck et al. 2010). While a lack of restatements has more commonly been interpreted in the literature as indicating tighter monitoring, we further investigate this interpretation by examining board actions post-restatement. Although CEO dismissal is often seen as a result of a CEO's performance, there are instances where a CEO is replaced for other reasons, such as to restore investor confidence following a reputation-damaging event. Chakravarthy et al. (2014) find that replacing the executive team is one of the methods companies use most frequently to attempt to repair reputation following a restatement. Replacing management is a way for the board to communicate to its investors that it takes financial reporting integrity seriously and that it will not tolerate damage to firm value. To the extent that tenure-diverse boards show less tolerance for actions that harm the firm, we would expect them to be more inclined to replace the CEO, conditional on experiencing a restatement. To examine whether our conjecture holds, we estimate the following model:

$$\begin{aligned}
 &CEO_Turnover_{it} \\
 &= \beta_0 + \beta_1 Tenure_Diversity_{it} + \beta_2 Restatement_Magnitude_{it} \\
 &+ \beta_{3-6} Other_Diversity_{it} + \beta_{7-10} GovernanceControls_{it} + \beta_{11-15} CEOControls_{it} \\
 &+ \beta_{16-19} FirmControls_{it} + YearDummies_{it} + IndustryDummies_{it} + \varepsilon \quad (3)
 \end{aligned}$$

The dependent variable, *CEO_Turnover_{it}*, is a dummy variable that equals 1 if the CEO was replaced within six months of the restatement announcement in models (1) and (2) of Table 7 or within 12 months of the restatement announcement in models (3) and (4) of the same table and 0 otherwise. To account for the potential difference in the severity of the restatements across tenure-diverse and nontenure-diverse boards, we control for restatement magnitude. The control variable *Restatement_Magnitude* is a continuous variable measured as the dollar amount restated scaled by total assets. We control for other dimensions of diversity as well as for other firm, governance and CEO characteristics, as shown in Table 7. The sample in this regression model is significantly smaller, 870 observations, as it is limited to the subsample of restating firms within the original sample.

The results in Table 7 indicate that tenure diversity increases the likelihood that a CEO will be fired in the six months (p-values 0.074 and 0.011, depending on the tenure diversity measure used) or in the 12 months (p-values of 0.011 and <0.000) following a restatement. This finding suggests that tenure-diverse boards are not only less likely to experience a restatement but, should such a restatement occur, they are also more prompt in replacing a CEO who damaged the firm's reputation, presumably in a bid to restore investor confidence and improve performance.¹² Taken together, the results in Tables 6 and 7 point to the interpretation that tenure-diverse audit committees and boards are stricter monitors of financial reporting.

6. Compensation committee tenure diversity and CEO compensation

¹² Although we have no reason to believe that better boards would be more magnitude-sensitive when replacing the CEO following a restatement, we examine the possibility in an untabulated analysis given studies that document the importance of magnitude in assessing severity of a problem (e.g. Palmrose, Richardson, and Scholz 2004). We interact tenure diversity with magnitude and find that, while the coefficient on tenure diversity is still significantly positive (the main effect), the interaction term is not statistically significant. The findings indicate that tenure diverse board are not more magnitude sensitive when replacing the CEO; instead, tenure-diverse boards are more likely to replace the CEO following a restatement, irrespective of the restatement magnitude.

Another context in which boards' monitoring ability is often examined is that of CEO compensation. Boards considered to be better monitors are found to award less excess compensation to their CEOs. Adams and Ferreira (2009) examine the compensation practices of gender-diverse boards but find no evidence that these boards award less overall compensation to the CEO. Their findings are attributed to the infrequent appointment of women to compensation committees and the complexity of CEO contracts.

We use CEO compensation as another setting to examine the role of director tenure diversity. If tenure-diverse boards better understand appropriate CEO compensation and if they are more independent and less collusive, the CEOs of their firms should be less overcompensated. However, if perspective diversity makes the committee indecisive regarding the appropriate level of compensation, we would not expect the diverse board to be any better at setting an appropriate level of compensation than a homogeneous board.

We examine the role of tenure diversity on total excess compensation and the likelihood of awarding any excess compensation to the CEO. To derive excess compensation, we first estimate normal compensation using the following model:

$$\ln(CEOTotalComp)_{it} = \beta_0 + \beta_{1-8}FirmControls_{it} + \beta_{9-12}CEOControls_{it} + YearDummies_{it} + IndustryDummies_i + LocationDummies_i + \epsilon \quad (4a)$$

We regress the natural log of total compensation ($\ln(CEOTotalComp)$) on the factors believed to be the determinants of CEO compensation, as documented by Core et al. (1999), among others, such as firm and CEO characteristics, firm performance, performance volatility, two-digit SIC industry code, firm location, and year fixed effects.¹³ Using coefficient estimates from the

¹³ More precisely, we include the following variables in the first stage: *Firm Size*, *Sales Growth*, *ROA*, *ROA Volatility*, *Stock Returns*, *Stock Return Volatility*, *Business and Geographic Segments*, *CEO Age*, *CEO Gender*, *CEO Tenure*, and *CEO Duality*. All the variables are defined in the Appendix. We also include *CEO Power*, which we measure by

estimated model, we calculate excess compensation as the difference between the actual and the predicted total compensation. Using excess compensation as the dependent variable (continuous variable *Excess_Comp* and indicator variable *Excess_Comp_Dummy* for any excess compensation), we estimate the following model:

$$\begin{aligned}
 Excess_Comp_{it} = & \beta_0 + \beta_1 Tenure_Diversity_{it} + \beta_2 BoardSize_{it} + \beta_3 BoardIndep_{it} + \\
 & \beta_{4-7} Other_Diversity_{it} + \beta_8 InsiderOwner_{it} + YearDummies_{it} + \\
 & IndustryDummies_{it} + \varepsilon
 \end{aligned}
 \tag{4b}$$

The results in Table 8 indicate that tenure-diverse compensation committees award less excess compensation and are less likely to award any excess compensation. The coefficients on tenure diversity are negative in the first two models examining the level of excess compensation and statistically significant at the 1% level (*p*-values of 0.001 and 0.001). Similarly, tenure diversity is negatively associated with the likelihood of awarding any excess compensation (*p*-values of 0.042 and 0.015, respectively). The compensation analysis indicates that tenure-diverse compensation committees are stricter monitors that award less excess compensation and are less likely to overcompensate their CEOs.

7. Tenure diversity and firm performance

In addition to being tasked with assessing and disciplining CEOs, boards also provide strategic advice. In that sense, the advisory role of a board is a way to monitor the CEO's performance ex-ante, instead of—or in addition to—assessing performance ex-post and taking appropriate action, which may include CEO replacement. Though Schwartz-Ziv and Weisbach (2012) find that boards mostly act in the monitoring role and devote much less time to the advisory role, they indicate that

the length of the CEO's official title. In addition, we include year indicators, two-digit industry indicators and headquarter location (metropolitan area) indicators, as all of these factors are believed to impact CEO compensation.

approximately one-third of all issues discussed at board meetings are of an advisory nature. If tenure-diverse boards are better at monitoring, they should be better at monitoring in both the pre-replacement and the post-replacement periods. As such, one would expect that firms with tenure-diverse boards have better financial performance.

Studies, however, find that a board's monitoring and advisory roles are not always compatible. Adams and Ferreira (2009), for example, find that gender-diverse boards, which perform better at ex-post monitoring, do not have better firm performance than boards without female directors. In fact, after controlling for endogeneity, such firms' performance is worse. They attribute their findings to the cost of excess monitoring. An alternative explanation could be that the benefits of diversity may not be as relevant in this setting. In their advisory capacity, boards perform tasks that are usually more routine and less stressful. Under such conditions, dysfunctional group behavior, which is the primary concern of regulators focused on governance reform, is less likely, and independence plays a less important role. Additionally, by fostering disagreement, excess diversity can be counterproductive when tasks are routine (Jehn et al. 1999). To test whether tenure diversity impacts the board's effectiveness in ensuring better firm performance, we estimate the following model:

$$\begin{aligned}
 & FirmPerformance_{it+1} \\
 & = \beta_0 + \beta_1 Tenure_Diversity_{it} + \beta_{2-5} Other_Diversity_{it} \\
 & + \beta_{6-8} GovernanceControls_{it} + \beta_{9-13} CEOControls_{it} + \beta_{14-17} FirmControls_{it} \\
 & + YearDummies_{it} + FFEs + \varepsilon
 \end{aligned} \tag{5}$$

We define firm performance in two ways. In Table 9, we first examine firm performance in the context of future stock performance ($Returns_{t+1}$), measured as year t+1 annual stock returns, value-weighted index adjusted, and compounded monthly. Subsequently, we estimate the same

model using return on assets (ROA_{t+1}) as the measure of firm performance. In the model, ROA is measured in period $t+1$ as income before extraordinary items scaled by total assets.

Table 9 presents the results of the analysis. Tenure diversity appears not to be associated with higher future performance, in terms of stock returns. However, there is some limited evidence that it is associated with higher future ROA (p-values of 0.089 and 0.013 for the two measures of tenure diversity) using the instrumental variable approach. The regression models including firm fixed effects, standard OLS, or Arellano-Bond method,¹⁴ however, produce no evidence of an association between tenure diversity and future superior performance. This result is consistent with the Adams and Ferreira study (2009), which shows that better monitoring, ex-post, does not indicate a board that is better at guiding the CEO from a strategic/advisory perspective.

8. Conclusion

The results of this study are consistent with the assertion that diversity affects board effectiveness. Specifically, this study provides support for the argument that tenure-diverse boards may more diligently monitor management on account of their increased independence. Unlike boards where most directors have long tenures, tenure-diverse boards have at least some directors who have not been present long enough to become entrenched. Unlike boards where most directors have short tenures, tenure-diverse boards have at least some directors who have been in their positions long enough not to be “captured” by the CEO and who have more firm-specific governance experience. More importantly, because the directors on a tenure-diverse board do not join the board simultaneously, they are less likely to exhibit a cohort mentality and to become too friendly

¹⁴ Arellano-Bond is a standard dynamic panel data particularly useful in instances where N is large and the number of time periods is small. Given the possibility of the dynamic relationship between tenure diversity and firm performance, use of a dynamic estimator model seems appropriate as it allows for feedback from the lagged value of performance to the current value of tenure diversity, thereby addressing the issue of potential reverse causality.

cohesive—in other words, to become a “groupthink board.” Excessive cohesiveness is the most important pre-condition for groupthink, resulting in an insufficiently skeptical board (Janis 1982). Unlike other dimensions of tenure diversity, which rely on the assumption that directors with different characteristics will have different opinions, tenure diversity does not have to rely on such an assumption, even though tenure-diverse boards may hold a broader set of views; for tenure diversity to stem groupthink, it must only lead to less cohesiveness.

The findings regarding tenure diversity, which can be a byproduct of a periodic board renewal, may be but are not necessarily consistent with more recent assertions regarding the benefits of introducing new directors through mandatory retirement and term limits.¹⁵ Although mandatory term limits will decrease average director tenure, they may or may not increase tenure diversity for all boards. Boards that tend to have a very long average tenure would increase tenure diversity by implementing tenure limits. Overall, the benefits of tenure diversity are derived from monitoring and disciplining underperforming CEOs. Though there is only limited evidence that tenure diversity increases firm performance, it may shield investors from unfavorable and reputation-damaging events. The findings of this study indicate that such diversity may provide a more organic way to enhance director independence and, in turn, improve governance.

¹⁵ See, for instance, a publication from PricewaterhouseCoopers titled “Continuing the Conversation: Board Renewal,” Fall 2011.

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Appendix

| Dependent Variables | Definition (Data Source if not Compustat) |
|--|--|
| <i>CEO_Turnover</i> | Indicator variable equal to 1 if the CEO changes involuntarily in year $t+1$, 0 otherwise. Turnover is classified as voluntary versus involuntary based on Parrino (1997). In the turnover after restatement test, the indicator variable is equal to 1 if the turnover occurs within six months of the restatement announcement or within 12 months of the restatement announcement, depending on the model (ExecuComp & AuditAnalytics). |
| <i>CEO Compensation</i> | Total compensation earned by the CEO in year t , as reported in ExecuComp , variable <i>tdc1</i> . |
| <i>Excess_Comp</i> | The total amount of excess compensation awarded to a firm's CEO, where excess compensation is calculated as actual compensation - predicted compensation. The prediction model for predicted compensation is described in the compensation table (ExecuComp). |
| <i>Excess_Comp_Dummy</i> | Indicator variable equal to 1 if a firm awards any excess compensation, i.e., if the excess compensation as defined above is greater than zero, 0 otherwise (ExecuComp). |
| <i>MV_Increase</i> | Indicator variable equal to 1 if a firm experiences an increase in market value, 0 otherwise. |
| <i>Restatement</i> | Following Daines et al. (2010), an indicator variable equal to 1 if a firm announces a negative (income/equity decreasing) restatement in any of the years $t+1$, $t+2$, or $t+3$, and 0 otherwise (AuditAnalytics). |
| <i>ROA_{t+1}</i> | Ratio of income before extraordinary items to total assets at the end of year $t+1$. |
| <i>Stock Returns_{t+1}</i> | Annual market-adjusted (value-weighted) returns for year $t+1$, compounded monthly. |
| Main Variables | Definition (Data source if not Compustat) |
| <i>Tenure Diversity_{BD, CC, AC}</i> | Tenure diversity is defined in two ways, using coefficient of variation (CV_Tenure) and the Herfindahl Hirschman Index (HHI_Tenure). The two definitions are further explained below. The calculation is done either at the board level (denoted by subscript BD), audit committee level (denoted by subscript AC), or compensation committee level (denoted by subscript CC). |
| <i>CV_Tenure</i> | Calculated as $CV_{it} = \sigma_{it} / \mu_{it}$, where mean and standard deviation are based on the tenures of each director on board (or compensation committee or audit committee) of the firm. First, tenure length of each director is sorted into one of 10 categories based on deciles. Then the following calculation is performed: |
| <i>HHI_Tenure</i> | $HHI_{tenure} = 1 - \sum_{x=1}^{10} \left(\frac{\text{Total Directors in Category}_x}{\text{Total Directors}} \right)^2$ |
| Control Variables | Definition (Data Source if not Compustat) |
| <i>BD Age Diversity</i> | Coefficient of variation (standard deviation/mean) of board members' ages on board i at time t (BoardEx). |
| <i>BD Expertise Diversity</i> | Calculated using the following formula, after classifying each director into one of 16 functional expertise categories: $BD \text{ Expertise Diversity} = 1 -$ |

| | |
|---------------------------------|---|
| | $\sum_{x=1}^{16} (\text{Total Directors in Category}_x / \text{Total Directors})^2$ (BoardEx + hand-collection). |
| <i>BD Gender Diversity</i> | Indicator variable equal to 1 if board i has at least one female director in year t , 0 otherwise (BoardEx). |
| <i>BD Nationality Diversity</i> | Indicator variable equal to 1 if board i has at least one director who is not American in year t , 0 otherwise (BoardEx + hand-collection). |
| <i>Board Independence</i> | Percentage of the board directors considered unaffiliated in year t (BoardEx). |
| <i>Board Size</i> | Natural log of the number of directors on the board at the end of period t (BoardEx). |
| <i>Book to Market</i> | Ratio of book value (total assets - total liabilities) to market value of equity in year t . |
| <i>Business Segments</i> | Number of reporting business segments measured in year t . |
| <i>CEO Age</i> | Age of the CEO at the end of the period t (ExecuComp). |
| <i>CEO Duality</i> | Indicator variable equal to 1 if the CEO is also the company's chairman, 0 otherwise (ExecuComp). |
| <i>CEO Gender</i> | Indicator variable equal to 1 if the CEO is female, 0 otherwise (ExecuComp). |
| <i>CEO's Pay Slice</i> | % of total compensation paid to the top five earners claimed by the CEO (ExecuComp). |
| <i>CEO Tenure</i> | Number of years, measured at the end of year t , that the CEO has been at the position (ExecuComp). |
| <i>Firm Size</i> | Natural log of total assets in year t . |
| <i>Geographic Segments</i> | Number of reporting geographic segments measured in year t . |
| <i>Institutional Ownership</i> | % of float shares held by institutional investors in year t (Thomson Financial). |
| <i>Leverage</i> | Sum of long- and short-term debt divided by average total assets in year t . |
| <i>Log(Sales)</i> | Natural log of total revenue in year t . |
| <i>Market Value</i> | Market value of equity at the end of the period t . |
| <i>Restatement_Magnitude</i> | Total \$ amount restated (AuditAnalytics) divided by total assets in year t . |
| <i>Return Skewness</i> | Calculated as $\frac{1}{N} * \sum_{n=1}^N [(R_d - \mu) / \sigma]^3$, following Bali et al. (2011). |
| <i>ROA</i> | Net income excluding extraordinary items divided by average total assets in period t . |
| <i>ROA Volatility</i> | Standard deviation of annual ROA over the three-year period preceding year t . |
| <i>Sales Growth</i> | % increase in sales from year $t-1$ to year t . |
| <i>Stock Returns</i> | Annual market-adjusted (CRSP value-weighted) returns for year $t-1$, compounded monthly (CRSP). |
| <i>Stock Volatility</i> | Standard deviation of monthly stock returns over three years prior to t (CRSP). |
| <i>Tenure Length</i> | Average tenure length for all directors on the board of firm i in year t . For the tests related to audit committee or compensation committee decisions, the variable is calculated at the audit committee level (denoted by subscript AC) or compensation committee level (denoted by subscript CC), respectively. |

TABLE 1

Sample summary statistics

The sample consists of an unbalanced panel of 1,966 unique firms over the five years from 2000 to 2012, for a total of 13,903 firm-years. To be included in the sample, each firm had to be in BoardEx and Execucomp and meet the minimum data requirements. All Compustat variables are winsorized at the 1st and 99th percentile.

Panel A - Firm Characteristics

| Variable | n | Mean | Median | 25th percentile | 75th percentile |
|---------------------------|-------|----------|----------|-----------------|-----------------|
| Firm Size | 13903 | 7.674 | 7.529 | 6.504 | 8.713 |
| Log(Sales) | 13903 | 7.412 | 7.345 | 6.355 | 8.436 |
| Book to Market | 13903 | 0.533 | 0.455 | 0.276 | 0.689 |
| Return on Assets (ROA) | 13903 | 0.048 | 0.051 | 0.018 | 0.092 |
| Leverage | 13903 | 0.222 | 0.202 | 0.054 | 0.340 |
| ROA Volatility | 13903 | 0.041 | 0.020 | 0.009 | 0.047 |
| Stock Volatility | 13903 | 0.118 | 0.101 | 0.071 | 0.144 |
| Market Value | 13903 | 7.642 | 7.511 | 6.562 | 8.621 |
| Stock Returns | 13903 | 0.122 | 0.033 | -0.156 | 0.261 |
| CEO Turnover | 13903 | 0.065 | 0.000 | 0.000 | 0.000 |
| CEO Compensation (1,000s) | 13903 | 5689.839 | 3430.456 | 1674.738 | 6728.068 |
| Restatement | 13903 | 0.068 | 0.000 | 0.000 | 0.000 |

Panel B - Board & CEO Characteristics

| | n | Mean | Median | 25th percentile | 75th percentile |
|------------------------------|-------|--------|--------|-----------------|-----------------|
| Tenure Diversity: CV_Tenure | 13903 | 0.674 | 0.668 | 0.502 | 0.840 |
| Tenure Diversity: HHI Tenure | 13903 | 0.692 | 0.735 | 0.640 | 0.792 |
| Board Gender Diversity | 13903 | 0.645 | 1.000 | 0.000 | 1.000 |
| Board Age Diversity | 13903 | 0.122 | 0.117 | 0.091 | 0.148 |
| Board Expertise Diversity | 13903 | 0.716 | 0.722 | 0.690 | 0.750 |
| Board Nationality Diversity | 13903 | 0.216 | 0.000 | 0.000 | 0.000 |
| CEO Age | 13903 | 55.268 | 55.000 | 50.000 | 60.000 |
| CEO Gender | 13903 | 0.027 | 0.000 | 0.000 | 0.000 |
| CEO Tenure | 13903 | 7.679 | 5.586 | 2.751 | 10.005 |
| CEO's Pay Slice | 13903 | 0.380 | 0.381 | 0.306 | 0.451 |
| CEO Duality | 13903 | 0.556 | 1.000 | 0.000 | 1.000 |
| Institutional Ownership | 13903 | 0.716 | 0.772 | 0.611 | 0.888 |
| Board Size | 13903 | 2.015 | 2.079 | 1.792 | 2.197 |
| Board Independence | 13903 | 0.831 | 0.857 | 0.786 | 0.889 |

TABLE 2

Summary statistics: low versus high tenure diversity boards

This table shows differences in firm and governance characteristics between firms with low board tenure diversity and firms with high board tenure diversity. The low board tenure diversity firms are those that are below median on the tenure diversity measure, and the high board tenure diversity firms are the firms above the median of the sample. All variables are defined in the appendix. Significance is denoted by ***, **, and * for the 1%, 5%, and 10% levels, respectively.

| Variable | Board Tenure Diversity: CV_Tenure | | | Board Tenure Diversity: HHI Tenure | | |
|-----------------------------------|--------------------------------------|----------------|--------------------|---------------------------------------|----------------|--------------------|
| | Low N=6952 | High N=6951 | Diff (Low-High) | Low N=6952 | High N=6951 | Diff (Low-High) |
| Firm Characteristics | | | | | | |
| Firm Size | 7.603 | 7.744 | -0.140*** | 7.296 | 8.056 | -0.760*** |
| Log(Sales) | 7.294 | 7.530 | -0.236*** | 7.002 | 7.827 | -0.825*** |
| Book to Market | 0.533 | 0.533 | 0.000 | 0.546 | 0.519 | 0.027*** |
| Leverage | 0.229 | 0.216 | 0.014*** | 0.208 | 0.237 | -0.029*** |
| Business Segments | 2.644 | 3.030 | -0.386*** | 2.559 | 3.118 | -0.559*** |
| Geographic Segments | 2.867 | 3.131 | -0.264*** | 2.835 | 3.165 | -0.330*** |
| Firm Age | 32.105 | 43.983 | -10.878*** | 28.515 | 46.975 | -18.460*** |
| Firm Performance | | | | | | |
| ROA | 0.047 | 0.050 | -0.002 | 0.047 | 0.050 | -0.003** |
| ROA Volatility | 0.042 | 0.040 | 0.003*** | 0.047 | 0.035 | 0.013*** |
| Stock Volatility | 0.122 | 0.115 | 0.006*** | 0.129 | 0.108 | 0.021*** |
| Market Value | 7.575 | 7.709 | -0.134*** | 7.329 | 7.958 | -0.629*** |
| Stock Returns | 0.130 | 0.114 | 0.016 | 0.154 | 0.090 | 0.064*** |
| CEO Characteristics | | | | | | |
| CEO Age | 55.087 | 55.449 | -0.362*** | 55.192 | 55.345 | -0.153 |
| CEO Gender | 0.025 | 0.028 | -0.004 | 0.026 | 0.027 | -0.000 |
| CEO Tenure | 7.773 | 7.585 | 0.188 | 8.261 | 7.090 | 1.171*** |
| CEO's Pay Slice | 0.380 | 0.381 | -0.001 | 0.373 | 0.387 | -0.014*** |
| CEO Duality | 0.561 | 0.551 | 0.010 | 0.515 | 0.597 | -0.082*** |
| Governance Characteristics | | | | | | |
| Board Gender Diversity | 0.618 | 0.672 | -0.055*** | 0.519 | 0.772 | -0.252*** |
| Board Age Diversity | 0.119 | 0.125 | -0.007*** | 0.125 | 0.119 | 0.005*** |
| Board Experience Diversity | 0.716 | 0.716 | 0.001 | 0.712 | 0.720 | -0.007*** |
| Board Nationality Diversity | 0.208 | 0.225 | -0.017** | 0.158 | 0.275 | -0.117*** |
| Institutional Ownership | 0.731 | 0.702 | 0.029*** | 0.720 | 0.714 | 0.006 |
| Board Size | 1.976 | 2.053 | -0.078*** | 1.901 | 2.129 | -0.228*** |
| Board Independence | 0.828 | 0.834 | -0.006*** | 0.813 | 0.849 | -0.036*** |

TABLE 3
Correlation table

This table presents Pearson's correlation of variables. Bolded values indicate correlation significance at the 5% level or better. All variables are defined in the appendix.

| | Firm Characteristics | | | | | | | | | | | | | Board Characteristics | | | | | | | | | |
|------------------------------|----------------------|--------------|----------------|--------------|--------------|----------------|------------------|--------------|----------------|--------------|--------------|--------------|-----------------|-----------------------|-------------------|--------------|--------------------|------------------|---------------|----------------------|-----------------------|-----------------------------|-----------------------|
| | Firm Size | Log(Sales) | Book to Market | ROA | Leverage | ROA Volatility | Stock Volatility | Market Value | Annual Returns | CEO Age | CEO Gender | CEO Tenure | CEO's Pay Slice | CEO Duality | Insider Ownership | Board Size | Board Independence | Gender Diversity | Age Diversity | Experience Diversity | Nationality Diversity | Tenure Diversity: CV_Tenure | Tenure Diversity: HHI |
| Firm Size | 1.00 | 0.88 | 0.06 | 0.03 | 0.27 | -0.27 | -0.29 | 0.85 | -0.08 | 0.10 | -0.03 | -0.09 | 0.05 | 0.19 | -0.03 | 0.56 | 0.20 | 0.37 | -0.16 | 0.12 | 0.26 | 0.05 | 0.14 |
| Log(Sales) | 0.88 | 1.00 | -0.03 | 0.14 | 0.16 | -0.27 | -0.28 | 0.79 | -0.06 | 0.11 | -0.02 | -0.09 | 0.07 | 0.20 | -0.01 | 0.55 | 0.19 | 0.41 | -0.16 | 0.10 | 0.24 | 0.08 | 0.18 |
| Book to Market | 0.06 | -0.03 | 1.00 | -0.36 | 0.00 | 0.01 | 0.05 | -0.33 | -0.19 | 0.06 | 0.01 | 0.00 | -0.06 | -0.02 | -0.04 | 0.01 | 0.02 | -0.02 | 0.00 | -0.01 | -0.05 | 0.01 | -0.01 |
| ROA | 0.03 | 0.14 | -0.36 | 1.00 | -0.20 | -0.32 | -0.21 | 0.29 | 0.11 | 0.02 | -0.02 | 0.05 | 0.06 | 0.03 | 0.15 | 0.00 | -0.07 | 0.03 | -0.03 | -0.05 | 0.01 | 0.00 | 0.01 |
| Leverage | 0.27 | 0.16 | 0.00 | -0.20 | 1.00 | -0.07 | -0.04 | 0.07 | -0.02 | 0.04 | 0.01 | -0.05 | 0.06 | 0.07 | -0.01 | 0.18 | 0.09 | 0.11 | -0.03 | 0.03 | 0.01 | -0.02 | 0.03 |
| ROA Volatility | -0.27 | -0.27 | 0.01 | -0.32 | -0.07 | 1.00 | 0.41 | -0.24 | 0.09 | -0.08 | 0.03 | -0.03 | -0.05 | -0.10 | -0.09 | -0.18 | -0.02 | -0.13 | 0.07 | 0.03 | -0.01 | -0.02 | -0.09 |
| Stock Volatility | -0.29 | -0.28 | 0.05 | -0.21 | -0.04 | 0.41 | 1.00 | -0.30 | 0.18 | -0.07 | 0.02 | 0.00 | -0.05 | -0.06 | -0.09 | -0.24 | -0.09 | -0.19 | 0.07 | 0.00 | -0.06 | -0.05 | -0.10 |
| Market Value | 0.85 | 0.79 | -0.33 | 0.29 | 0.07 | -0.24 | -0.30 | 1.00 | 0.02 | 0.05 | -0.04 | -0.06 | 0.06 | 0.16 | 0.01 | 0.46 | 0.13 | 0.32 | -0.15 | 0.12 | 0.28 | 0.04 | 0.13 |
| Annual Returns | -0.08 | -0.06 | -0.19 | 0.11 | -0.02 | 0.09 | 0.18 | 0.02 | 1.00 | -0.01 | -0.02 | -0.01 | 0.04 | -0.01 | -0.01 | -0.06 | -0.04 | -0.05 | 0.02 | -0.02 | -0.03 | -0.02 | -0.05 |
| CEO Age | 0.10 | 0.11 | 0.06 | 0.02 | 0.04 | -0.08 | -0.07 | 0.05 | -0.01 | 1.00 | -0.06 | 0.41 | 0.02 | 0.28 | -0.03 | 0.06 | -0.05 | 0.00 | -0.09 | -0.08 | 0.01 | 0.03 | 0.00 |
| CEO Gender | -0.03 | -0.02 | 0.01 | -0.02 | 0.01 | 0.03 | 0.02 | -0.04 | -0.02 | -0.06 | 1.00 | -0.06 | 0.00 | -0.03 | 0.01 | -0.01 | 0.04 | 0.03 | -0.03 | 0.06 | 0.00 | 0.01 | 0.02 |
| CEO Tenure | -0.09 | -0.09 | 0.00 | 0.05 | -0.05 | -0.03 | 0.00 | -0.06 | -0.01 | 0.41 | -0.06 | 1.00 | 0.00 | 0.26 | 0.01 | -0.20 | -0.24 | -0.16 | 0.03 | -0.11 | -0.08 | -0.01 | -0.04 |
| CEO's Pay Slice | 0.05 | 0.07 | -0.06 | 0.06 | 0.06 | -0.05 | -0.05 | 0.06 | 0.04 | 0.02 | 0.00 | 0.00 | 1.00 | 0.09 | 0.07 | 0.09 | 0.18 | 0.05 | -0.03 | 0.02 | 0.04 | 0.01 | 0.06 |
| CEO Duality | 0.19 | 0.20 | -0.02 | 0.03 | 0.07 | -0.10 | -0.06 | 0.16 | -0.01 | 0.28 | -0.03 | 0.26 | 0.09 | 1.00 | -0.01 | 0.10 | 0.05 | 0.11 | -0.07 | -0.02 | 0.04 | -0.01 | 0.05 |
| Institutional Ownership | -0.03 | -0.01 | -0.04 | 0.15 | -0.01 | -0.09 | -0.09 | 0.01 | -0.01 | -0.03 | 0.01 | 0.01 | 0.07 | -0.01 | 1.00 | -0.07 | 0.05 | 0.01 | -0.03 | 0.03 | -0.04 | -0.05 | 0.03 |
| Board Size | 0.56 | 0.55 | 0.01 | 0.00 | 0.18 | -0.18 | -0.24 | 0.46 | -0.06 | 0.06 | -0.01 | -0.20 | 0.09 | 0.10 | -0.07 | 1.00 | 0.61 | 0.48 | -0.10 | 0.14 | 0.25 | 0.15 | 0.29 |
| Board Independence | 0.20 | 0.19 | 0.02 | -0.07 | 0.09 | -0.02 | -0.09 | 0.13 | -0.04 | -0.05 | 0.04 | -0.24 | 0.18 | 0.05 | 0.05 | 0.61 | 1.00 | 0.27 | -0.09 | 0.12 | 0.14 | 0.05 | 0.16 |
| Gender Diversity | 0.37 | 0.41 | -0.02 | 0.03 | 0.11 | -0.13 | -0.19 | 0.32 | -0.05 | 0.00 | 0.03 | -0.16 | 0.05 | 0.11 | 0.01 | 0.48 | 0.27 | 1.00 | -0.09 | 0.12 | 0.14 | 0.07 | 0.21 |
| Age Diversity | -0.16 | -0.16 | 0.00 | -0.03 | -0.03 | 0.07 | 0.07 | -0.15 | 0.02 | -0.09 | -0.03 | 0.03 | -0.03 | -0.07 | -0.03 | -0.10 | -0.09 | -0.09 | 1.00 | 0.00 | -0.06 | 0.08 | -0.04 |
| Experience Diversity | 0.12 | 0.10 | -0.01 | -0.05 | 0.03 | 0.03 | 0.00 | 0.12 | -0.02 | -0.08 | 0.06 | -0.11 | 0.02 | -0.02 | 0.03 | 0.14 | 0.12 | 0.12 | 0.00 | 1.00 | 0.11 | 0.02 | 0.09 |
| Nationality Diversity | 0.26 | 0.24 | -0.05 | 0.01 | 0.01 | -0.01 | -0.06 | 0.28 | -0.03 | 0.01 | 0.00 | -0.08 | 0.04 | 0.04 | -0.04 | 0.25 | 0.14 | 0.14 | -0.06 | 0.11 | 1.00 | 0.03 | 0.10 |
| Tenure Diversity: CV_Tenure | 0.05 | 0.08 | 0.01 | 0.00 | -0.02 | -0.02 | -0.05 | 0.04 | -0.02 | 0.03 | 0.01 | -0.01 | 0.01 | -0.01 | -0.05 | 0.15 | 0.05 | 0.07 | 0.08 | 0.02 | 0.03 | 1.00 | 0.54 |
| Tenure Diversity: HHI_Tenure | 0.14 | 0.18 | -0.01 | 0.01 | 0.03 | -0.09 | -0.10 | 0.13 | -0.05 | 0.00 | 0.02 | -0.04 | 0.06 | 0.05 | 0.03 | 0.29 | 0.16 | 0.21 | -0.04 | 0.09 | 0.10 | 0.54 | 1.00 |

TABLE 4

CEO turnover-performance sensitivity and tenure diversity

Panel A of this table shows a logistic, linear probability model with firm fixed effects and instrumental variable 2SLS regressions models. In the first three models, CV_Tenure is used to measure tenure diversity, while the last three models, HHI_Tenure is used to measure tenure diversity. Panel B of this table presents the first stage regression with two instruments used to estimate predicted tenure diversity. Controls and fixed effects from the second stage are included in the first stage but not presented in the table. The results of various diagnostic tests to validate instrument relevance and exogeneity are included at the bottom of Panel B. All variables are defined in the appendix. Robust standard errors are clustered at the firm level. Numbers in parentheses are two-sided p-values. Significance is denoted by ***, **, and * for the 1%, 5%, and 10% levels, respectively.

| | Dependent Variable: CEO Turnover | | | | | |
|--|----------------------------------|----------------------|----------------------|------------------------------|----------------------|----------------------|
| | Tenure Diversity: CV_Tenure | | | Tenure Diversity: HHI_Tenure | | |
| | Logit | LPM FFE | IV | Logit | LPM FFE | IV |
| Returns | -0.674*** [0.000] | -0.022*** [0.000] | -0.308*** [0.000] | -0.675*** [0.000] | -0.022*** [0.000] | -0.302*** [0.000] |
| Tenure Diversity _{BD} | -0.006 [0.960] | -0.013 [0.304] | 0.782 [0.451] | 0.230 [0.316] | -0.020 [0.416] | 0.780 [0.559] |
| Tenure Diversity _{BD} * Returns | -0.691** [0.029] | -0.048*** [0.001] | -1.033** [0.044] | -0.963* [0.066] | -0.084*** [0.001] | -1.315* [0.087] |
| Tenure Length | -0.043*** [0.000] | -0.002* [0.087] | -0.025*** [0.005] | -0.045*** [0.000] | -0.002 [0.125] | -0.023*** [0.006] |
| Board Independence | -0.348 [0.557] | -0.250*** [0.000] | -0.107 [0.752] | -0.329 [0.582] | -0.246*** [0.000] | -0.152 [0.637] |
| BD Gender Diversity | 0.218 [0.273] | 0.040* [0.051] | -0.017 [0.928] | 0.200 [0.324] | 0.039* [0.053] | -0.001 [0.996] |
| BD Age Diversity | 0.084 [0.354] | -0.003 [0.729] | 0.055 [0.290] | 0.080 [0.383] | -0.003 [0.770] | 0.039 [0.556] |
| BD Expertise Diversity | -0.456 [0.592] | 0.122 [0.132] | -0.266 [0.702] | -0.414 [0.626] | 0.115 [0.157] | 0.126 [0.788] |
| BD Nationality Diversity | 2.660*** [0.001] | 0.153* [0.075] | 1.173*** [0.006] | 2.623*** [0.001] | 0.152* [0.076] | 1.047** [0.025] |
| Board Size | 0.004 [0.965] | -0.026*** [0.010] | -0.004 [0.935] | -0.002 [0.985] | -0.026** [0.010] | -0.015 [0.781] |
| Institutional Ownership | -0.467*** [0.001] | -0.054*** [0.001] | -0.172** [0.041] | -0.475*** [0.001] | -0.053*** [0.001] | -0.203** [0.010] |
| Firm Size | -0.039 [0.198] | -0.000 [0.968] | -0.034* [0.066] | -0.039 [0.202] | -0.001 [0.940] | -0.032* [0.080] |
| Return Volatility | 0.616 [0.186] | -0.001 [0.989] | 0.465 [0.135] | 0.632 [0.173] | -0.001 [0.979] | 0.501 [0.105] |
| Business Segments | 0.037** [0.018] | 0.007*** [0.000] | 0.016 [0.189] | 0.035** [0.024] | 0.007*** [0.000] | 0.018* [0.086] |
| Geographic Segments | 0.018 [0.126] | 0.002 [0.285] | 0.006 [0.485] | 0.019 [0.124] | 0.002 [0.274] | 0.007 [0.370] |

| | | | | | | |
|---|-----------------------------|-------------------|-----------|------------------------------|---------------|-----------|
| CEO Age | 0.039*** | 0.004*** | 0.018*** | 0.040*** | 0.004*** | 0.019*** |
| | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] |
| CEO Gender | -0.073 | -0.040* | -0.067 | -0.070 | -0.040* | -0.068 |
| | [0.730] | [0.090] | [0.586] | [0.742] | [0.095] | [0.590] |
| CEO Tenure | -0.031*** | 0.005*** | -0.017*** | -0.031*** | 0.005*** | -0.017*** |
| | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] |
| CEO Pay_Slice | -1.979*** | -0.115*** | -0.874*** | -1.987*** | -0.115*** | -0.916*** |
| | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] |
| CEO Duality | 0.125 | 0.013* | 0.091* | 0.118 | 0.013* | 0.066 |
| | [0.129] | [0.079] | [0.074] | [0.155] | [0.074] | [0.144] |
| Constant | -3.114** | | -0.798 | -3.145** | | -1.026 |
| | [0.017] | | [0.343] | [0.015] | | [0.214] |
| Controls * Returns Interaction | Included | Included | Included | Included | Included | Included |
| Fixed Effects | Year/Ind | Year/Firm | Year/Ind | Year/Ind | Year/Firm | Year/Ind |
| Number of Observations | 13,903 | 13,903 | 13,903 | 13,903 | 13,903 | 13,903 |
| (Pseudo) R-squared | 0.0501 | 0.037 | | 0.0502 | 0.037 | |
| PANEL B | | | | | | |
| | IV1st Stage | | | IV1st Stage | | |
| | Tenure Diversity: CV_Tenure | | | Tenure Diversity: HHI_Tenure | | |
| | (1) | | | (2) | | |
| Instrument 1: Cost of Living | | -0.004*** | | | -0.004*** | |
| | | [0.004] | | | [0.000] | |
| Instrument 2: Local Water Area | | 0.010*** | | | 0.005** | |
| | | [0.002] | | | [0.011] | |
| Controls Included | | YES | | | YES | |
| Fixed Effects Included | | Year/Industry | | | Year/Industry | |
| R-squared | | 0.107 | | | 0.181 | |
| Observations | | 13,903 | | | 13,903 | |
| <u>Tests of endogeneity (Tenure Diversity)</u> | | | | | | |
| H0: Tenure Diversity is exogenous | | | | | | |
| | Durbin Score Chi-Sq | 11.595 (p: 0.003) | | 4.554 (p: 0.103) | | |
| | Wu-Hausman F-test | 11.595 (p: 0.003) | | 2.253 (p: 0.105) | | |
| <u>Tests of overidentifying restrictions (Instrument Validity):</u> | | | | | | |
| H0: Instruments are exogenous | | | | | | |
| | Sargan Chi-Sq | 3.496 (p: 0.174) | | 1.126 (p: 0.569) | | |
| | Basmann Chi-Sq | 3.459 (p: 0.177) | | 1.114 (p: 0.573) | | |
| <u>Test of instrument relevance</u> | | | | | | |
| H0: Instruments are weak | | | | | | |
| | Minimum eigenvalue | 15.02 | | 29.54 | | |
| | 5% Cut-off | 11.04 | | 11.04 | | |

TABLE 5

Tenure diversity and CEO replacement choice

This table shows logistic regressions with the dependent variable being an indicator equal to 1 if a firm experiences an increase in market value following CEO replacement. All variables are defined in the appendix. Two-sided p-values are in parentheses. Robust standard errors are clustered at the firm level. Significance level is denoted by ***, **, and * for the 1%, 5%, and 10% levels, respectively.

| | Dependent variable (MV_Increase) = 1 if there is an increase in MV, 0 otherwise | |
|--------------------------------|---|---------------------------------|
| | (1) | (2) |
| | Tenure Diversity: CV_Tenure | Tenure Diversity: HHI_Tenure |
| Tenure Diversity _{BD} | 0.832*** [0.007] | 0.953* [0.091] |
| Tenure Length | 0.015 [0.597] | 0.012 [0.678] |
| Market Value _{t-1} | -0.000 [0.116] | -0.000 [0.122] |
| Board Independence | 0.082 [0.947] | 0.104 [0.933] |
| Board Size | -0.640 [0.150] | -0.648 [0.152] |
| BD Gender Diversity | -0.101 [0.649] | -0.097 [0.661] |
| BD Age Diversity | 0.895 [0.646] | 1.147 [0.559] |
| BD Expertise Diversity | -0.539 [0.752] | -0.573 [0.740] |
| BD Nationality Diversity | 0.062 [0.763] | 0.010 [0.962] |
| Institutional Ownership | -0.235 [0.464] | -0.276 [0.392] |
| Firm Size | 0.019 [0.816] | 0.015 [0.857] |
| Return Volatility | -1.841 [0.172] | -1.733 [0.204] |
| Business Segments | 0.004 [0.907] | 0.009 [0.795] |
| Geographic Segments | -0.039 [0.179] | -0.037 [0.192] |
| Sales Growth | 0.150 [0.144] | 0.149 [0.135] |
| Return on Assets | -0.417 [0.558] | -0.476 [0.506] |
| Returns Skeweness | -0.153 [0.220] | -0.145 [0.247] |
| Constant | 13.453*** [0.000] | 13.225*** [0.000] |
| CEO Controls | Yes | Yes |
| Fixed Effects | Industry + Year | Industry + Year |
| Number of Observations | 867 | 867 |
| R-squared | 0.212 | 0.209 |

TABLE 6

Tenure diversity and the likelihood of an accounting restatement

This table shows logistic regressions where the dependent variable is an indicator equal to 1 if a firm issues a negative restatement in years t , $t+1$, or $t+2$ and 0 otherwise (Daines, Gow, and Larcker (2010)). All variables are defined in the appendix. Two-sided p-values are in parentheses. Robust standard errors are clustered at the firm level. Significance level is denoted by ***, **, and * for the 1%, 5%, and 10% levels, respectively.

| | Dependent Variable (Restatement) = 1 if restatement announced, 0 otherwise | | | | | |
|--------------------------------|--|---------------------|---------------------|---------------------------------|----------------------|----------------------|
| | Tenure Diversity: CV_Tenure | | | Tenure Diversity: HHI_Tenure | | |
| | Logit | Logit w/ FFE | LPM FFE | Logit | Logit w/FFE | LPM FFE |
| Tenure Diversity _{AC} | -0.205* [0.088] | -0.255* [0.091] | -0.026* [0.088] | -0.108 [0.591] | -0.763*** [0.009] | -0.077*** [0.009] |
| Tenure Length _{AC} | -0.021* [0.071] | 0.046** [0.016] | 0.004** [0.026] | -0.023** [0.047] | 0.048** [0.011] | 0.005** [0.020] |
| Board Independence | 1.076* [0.090] | -0.614 [0.502] | -0.058 [0.538] | 1.098* [0.084] | -0.698 [0.446] | -0.063 [0.504] |
| Board Size | -0.109 [0.612] | 0.185 [0.556] | 0.024 [0.465] | -0.126 [0.559] | 0.245 [0.437] | 0.029 [0.386] |
| BD Gender Diversity | -0.101 [0.278] | 0.055 [0.669] | 0.002 [0.873] | -0.101 [0.275] | 0.057 [0.658] | 0.003 [0.831] |
| BD Age Diversity | 0.529 [0.546] | 2.250* [0.071] | 0.218 [0.105] | 0.432 [0.623] | 2.075* [0.095] | 0.200 [0.135] |
| BD Expertise Diversity | -1.102 [0.152] | 0.662 [0.625] | 0.051 [0.726] | -1.107 [0.151] | 0.655 [0.628] | 0.042 [0.770] |
| BD Nationality Diversity | -0.150 [0.146] | -0.032 [0.836] | -0.002 [0.906] | -0.146 [0.156] | -0.027 [0.861] | -0.001 [0.930] |
| Returns _{t-1} | -0.160*** [0.004] | -0.145** [0.048] | -0.013** [0.026] | -0.162*** [0.004] | -0.149** [0.042] | -0.013** [0.024] |
| Institutional Ownership | 0.337** [0.035] | 0.139 [0.551] | 0.017 [0.503] | 0.345** [0.031] | 0.148 [0.525] | 0.017 [0.502] |
| Firm Size | -0.042 [0.243] | 0.001 [0.994] | 0.004 [0.749] | -0.042 [0.236] | -0.005 [0.967] | 0.004 [0.772] |
| Return Volatility | 1.933*** [0.000] | 0.195 [0.724] | 0.005 [0.936] | 1.906*** [0.000] | 0.198 [0.721] | 0.005 [0.935] |
| Business Segments | 0.033* [0.062] | 0.009 [0.775] | 0.002 [0.513] | 0.032* [0.067] | 0.010 [0.745] | 0.002 [0.500] |
| Geographic Segments | 0.026 [0.131] | 0.003 [0.930] | -0.001 [0.704] | 0.025 [0.140] | 0.005 [0.863] | -0.001 [0.796] |
| Book to Market | 0.422*** [0.000] | 0.307*** [0.000] | 0.033*** [0.000] | 0.420*** [0.000] | 0.312*** [0.000] | 0.032*** [0.000] |
| Sales Growth | 0.000*** [0.000] | 0.000 [0.767] | 0.000** [0.010] | 0.000*** [0.000] | 0.000 [0.780] | 0.000** [0.014] |
| ROA _{t-1} | -0.957*** [0.003] | -0.615* [0.082] | -0.070* [0.058] | -0.950*** [0.003] | -0.596* [0.089] | -0.069* [0.063] |
| Returns Skeweness | 0.028 [0.480] | -0.023 [0.644] | -0.003 [0.521] | 0.028 [0.483] | -0.022 [0.672] | -0.003 [0.533] |
| Constant | -1.509** [0.013] | | | -1.537** [0.012] | | |
| Fixed Effects | Year/Ind | Year/Firm | Year/Firm | Year/Ind | Year/Firm | Year/Firm |
| Observations | 11,170 | 5,097 | 11,170 | 11,170 | 5,097 | 11,170 |
| R-squared | 0.0643 | 0.0540 | 0.026 | 0.0638 | 0.0548 | 0.027 |

TABLE 7

Post-restatement CEO turnover

This table presents a logistic model where the dependent variable is an indicator variable equal to 1 if the CEO departs either within six months or 12 months following a restatement announcement and 0 otherwise. The regression controls for restatement severity proxied by *Restatement_Magnitude*. All variables are defined in the appendix. Two-sided p-values are in parentheses. Robust standard errors are clustered at the firm level. Significance is denoted by ***, **, and * for the 1%, 5%, and 10% levels, respectively.

| | Dependent Variable = CEO_Turnover | | | |
|--------------------------------|---|------------|--|------------|
| | Within 6 months of restatement announcement | | Within 12 months of restatement announcement | |
| | (1) | (2) | (3) | (4) |
| | CV_Tenure | HHI_Tenure | CV_Tenure | HHI_Tenure |
| Tenure Diversity _{BD} | 0.869* | 3.083** | 1.056** | 4.045*** |
| | [0.074] | [0.011] | [0.011] | [0.000] |
| Restatement Magnitude | 31.705*** | 31.152*** | 20.733* | 21.589** |
| | [0.007] | [0.009] | [0.056] | [0.043] |
| Tenure Length | 0.023 | 0.011 | 0.018 | -0.000 |
| | [0.517] | [0.790] | [0.584] | [0.990] |
| BD Independence | -5.871*** | -5.433** | -2.706 | -2.002 |
| | [0.006] | [0.012] | [0.131] | [0.281] |
| Board Size | 0.222 | -0.019 | -0.466 | -0.730 |
| | [0.783] | [0.982] | [0.477] | [0.277] |
| BD Gender Diversity | -0.167 | -0.310 | -0.071 | -0.261 |
| | [0.670] | [0.416] | [0.824] | [0.390] |
| BD Age Diversity | -4.835 | -3.875 | -7.936** | -7.064** |
| | [0.279] | [0.401] | [0.022] | [0.038] |
| BD Expertise Diversity | 0.570 | 1.039 | 1.720 | 2.034 |
| | [0.895] | [0.806] | [0.635] | [0.560] |
| BD Nationality Diversity | -0.159 | -0.271 | -0.094 | -0.267 |
| | [0.718] | [0.539] | [0.773] | [0.427] |
| Institutional Ownership | -0.822 | -0.949* | -0.287 | -0.500 |
| | [0.138] | [0.077] | [0.567] | [0.305] |
| Firm Size | 0.285** | 0.315** | 0.350*** | 0.402*** |
| | [0.033] | [0.025] | [0.002] | [0.002] |
| Return Volatility | -0.671 | -0.252 | 1.760 | 2.146 |
| | [0.772] | [0.910] | [0.398] | [0.306] |
| Business Segments | 0.048 | 0.043 | 0.046 | 0.035 |
| | [0.483] | [0.519] | [0.410] | [0.520] |
| Geographic Segments | 0.013 | 0.007 | 0.014 | 0.010 |
| | [0.777] | [0.878] | [0.716] | [0.816] |
| Constant | -4.040*** | -4.012*** | -1.968* | -1.908* |
| | [0.004] | [0.006] | [0.086] | [0.090] |
| CEO controls included | Yes | Yes | Yes | Yes |
| Fixed Effects | Year/Ind | Year/Ind | Year/Ind | Year/Ind |
| Number of Observations | 870 | 870 | 870 | 870 |
| R-squared | 0.194 | 0.202 | 0.239 | 0.253 |

TABLE 8

TABLE 8

Tenure diversity and CEO compensation

This table presents an OLS regression of the excess compensation residuals on tenure diversity and the control variables and a logistic regression with the dependent variable being an indicator equal to 1 if the firm awards any excess compensation to the CEO and 0 otherwise. All variables are defined in the appendix. Two-sided p-values are in parentheses. Robust standard errors are clustered at the firm level. Significance level is denoted by ***, **, and * for the 1%, 5%, and 10% levels, respectively.

| | Dependent variable (Excess_Comp): total excess comp awarded | | Dependent variable (Excess_Comp_Dummy): 1 if excess comp awarded, 0 otherwise | |
|--------------------------------|---|---|--|---|
| | (1) Tenure Diversity: CV_Tenure | (2) Tenure Diversity: HHI_Tenure | (3) Tenure Diversity: CV_Tenure | (4) Tenure Diversity: HHI_Tenure |
| Tenure Diversity _{CC} | -0.086*** [0.001] | -0.283*** [0.001] | -0.091** [0.042] | -0.335** [0.015] |
| Tenure Length _{CC} | -0.010*** [0.000] | -0.033*** [0.000] | -0.010*** [0.000] | -0.033*** [0.000] |
| BD Gender Diversity | -0.002 [0.906] | 0.012 [0.864] | -0.001 [0.975] | 0.018 [0.788] |
| BD Age Diversity | -0.268 [0.193] | -0.853 [0.189] | -0.304 [0.139] | -0.982 [0.129] |
| BD Expertise Diversity | 0.089 [0.754] | 0.267 [0.755] | 0.067 [0.814] | 0.221 [0.796] |
| BD Nationality Diversity | 0.654*** [0.001] | 1.914*** [0.003] | 0.670*** [0.001] | 1.969*** [0.003] |
| Board Size | 0.034 [0.500] | 0.013 [0.935] | 0.032 [0.524] | 0.012 [0.937] |
| Board Independence | 0.442*** [0.002] | 1.479*** [0.001] | 0.448*** [0.002] | 1.498*** [0.001] |
| Institutional Ownership | 0.209*** [0.000] | 0.665*** [0.000] | 0.211*** [0.000] | 0.671*** [0.000] |
| Firm Size | 0.018* [0.055] | 0.072** [0.017] | 0.018* [0.056] | 0.071** [0.017] |
| Book to Market | 0.007 [0.787] | -0.047 [0.550] | 0.005 [0.829] | -0.052 [0.503] |
| ROA | 0.121 [0.241] | 0.534* [0.096] | 0.114 [0.270] | 0.512 [0.111] |
| ROA Volatility | 0.330** [0.028] | 1.285*** [0.007] | 0.313** [0.037] | 1.211** [0.012] |

| | | | | |
|---------------------|-----------------|-----------------|-----------------|-----------------|
| Returns | 0.020** | 0.009 | 0.020** | 0.009 |
| | [0.024] | [0.761] | [0.025] | [0.772] |
| Stock Volatility | 0.084 | 0.017 | 0.077 | -0.002 |
| | [0.456] | [0.962] | [0.492] | [0.996] |
| Business Segments | -0.005 | -0.006 | -0.005 | -0.007 |
| | [0.230] | [0.647] | [0.214] | [0.623] |
| Geographic Segments | -0.004 | -0.016 | -0.004 | -0.016 |
| | [0.347] | [0.217] | [0.338] | [0.218] |
| Constant | -1.172*** | -4.896*** | -1.164*** | -4.882*** |
| | [0.003] | [0.001] | [0.004] | [0.001] |
| CEO Controls | Yes | Yes | Yes | Yes |
| Fixed Effects | Industry & Year | Industry & Year | Industry & Year | Industry & Year |
| Observations | 13,903 | 13,903 | 13,903 | 13,903 |
| R-squared | 0.035 | 0.0246 | 0.033 | 0.0240 |

TABLE 9

Tenure diversity and future firm performance

This table presents a regression of firm performance on tenure diversity. Firm performance is defined as value-weighted index-adjusted annual stock returns, measured in year t+1 and compounded monthly, or ROA (income before extraordinary items/ total assets), also measured in year t+1. All variables are defined in the appendix. Two-sided p-values are in parentheses. Robust standard errors are clustered at the firm level. Significance is denoted by ***, **, and * for the 1%, 5%, and 10% levels, respectively.

| | Dependent Variable = Future Performance | | | | | | | | | | | |
|--------------------------------|---|-----------|-----------|--------------------|-----------|----------|------------------------------|-----------|-----------|--------------------|-----------|----------|
| | Tenure Diversity: CV_Tenure | | | | | | Tenure Diversity: HHI_Tenure | | | | | |
| | Returns _{t+1} | | | ROA _{t+1} | | | Returns _{t+1} | | | ROA _{t+1} | | |
| Tenure Diversity _{BD} | 0.007 | -0.282 | 0.017 | -0.007 | 0.076* | 0.011 | 0.003 | -0.209 | -0.057 | -0.007 | 0.135** | 0.032* |
| | [0.701] | [0.384] | [0.748] | [0.111] | [0.089] | [0.146] | [0.916] | [0.583] | [0.617] | [0.399] | [0.013] | [0.057] |
| Tenure Length | -0.002* | -0.001 | -0.000 | 0.001** | 0.000 | -0.001 | -0.002* | -0.002 | -0.001 | 0.001** | 0.000 | -0.001 |
| | [0.055] | [0.772] | [0.999] | [0.012] | [0.509] | [0.379] | [0.055] | [0.408] | [0.828] | [0.014] | [0.509] | [0.244] |
| Board Independence | 0.068 | 0.058 | 0.115 | -0.061*** | -0.027* | -0.016 | 0.067 | 0.085 | 0.114 | -0.061*** | -0.029** | -0.016 |
| | [0.354] | [0.583] | [0.727] | [0.001] | [0.069] | [0.613] | [0.361] | [0.390] | [0.730] | [0.001] | [0.034] | [0.599] |
| Board Size | 0.001 | 0.044 | 0.015 | 0.001 | -0.014* | -0.013 | 0.002 | 0.031 | 0.026 | 0.001 | -0.021** | -0.013 |
| | [0.957] | [0.451] | [0.885] | [0.858] | [0.094] | [0.305] | [0.939] | [0.620] | [0.802] | [0.883] | [0.018] | [0.282] |
| BD Gender Diversity | -0.018 | -0.011 | 0.030 | -0.003 | -0.006*** | -0.004 | -0.018 | -0.007 | 0.031 | -0.003 | -0.010*** | -0.004 |
| | [0.116] | [0.480] | [0.348] | [0.412] | [0.002] | [0.430] | [0.111] | [0.713] | [0.327] | [0.441] | [0.000] | [0.391] |
| BD Age Diversity | 0.071 | 0.317 | 0.124 | -0.013 | -0.029 | 0.102* | 0.075 | 0.187 | 0.145 | -0.017 | 0.010 | 0.104* |
| | [0.511] | [0.112] | [0.737] | [0.680] | [0.306] | [0.058] | [0.486] | [0.175] | [0.688] | [0.595] | [0.608] | [0.054] |
| BD Expertise Diversity | -0.103 | -0.120 | -0.546 | -0.093*** | -0.095*** | 0.143** | -0.103 | -0.084 | -0.536 | -0.092*** | -0.116*** | 0.139** |
| | [0.323] | [0.333] | [0.248] | [0.003] | [0.000] | [0.026] | [0.325] | [0.539] | [0.257] | [0.003] | [0.000] | [0.029] |
| BD Nationality Diversity | -0.023** | -0.024 | -0.075** | -0.001 | -0.003 | 0.006 | -0.023** | -0.020 | -0.073* | -0.001 | -0.006** | 0.006 |
| | [0.029] | [0.138] | [0.048] | [0.841] | [0.112] | [0.335] | [0.029] | [0.256] | [0.051] | [0.874] | [0.013] | [0.352] |
| Institutional Ownership | -0.108*** | -0.121*** | -0.652*** | 0.042*** | 0.050*** | 0.037*** | -0.108*** | -0.111*** | -0.652*** | 0.042*** | 0.047*** | 0.037*** |
| | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.002] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.001] |
| Firm Size | -0.020*** | -0.018*** | -0.460*** | 0.002 | 0.003*** | 0.015* | -0.020*** | -0.018*** | -0.460*** | 0.002 | 0.004*** | 0.015* |
| | [0.000] | [0.001] | [0.000] | [0.125] | [0.000] | [0.064] | [0.000] | [0.001] | [0.000] | [0.126] | [0.000] | [0.065] |
| ROA Volatility | 0.286*** | 0.329*** | -1.217*** | -0.396*** | -0.395*** | -0.015 | 0.286*** | 0.323*** | -1.218*** | -0.397*** | -0.391*** | -0.016 |
| | [0.004] | [0.001] | [0.000] | [0.000] | [0.000] | [0.677] | [0.004] | [0.001] | [0.000] | [0.000] | [0.000] | [0.667] |

| | | | | | | | | | | | | |
|---------------------|----------|----------|---------------|-----------|-----------|---------------|----------|----------|---------------|-----------|-----------|---------------|
| Business Segments | -0.001 | -0.001 | -0.002 | -0.002*** | -0.003*** | 0.000 | -0.001 | -0.002 | -0.002 | -0.002*** | -0.003*** | 0.000 |
| | [0.614] | [0.851] | [0.839] | [0.001] | [0.000] | [0.800] | [0.627] | [0.596] | [0.841] | [0.001] | [0.000] | [0.830] |
| Geographic Segments | 0.002 | 0.003 | 0.008 | 0.001** | 0.001** | 0.001 | 0.002 | 0.002 | 0.008 | 0.001** | 0.001*** | 0.001 |
| | [0.285] | [0.257] | [0.223] | [0.034] | [0.012] | [0.558] | [0.282] | [0.332] | [0.224] | [0.036] | [0.004] | [0.558] |
| Lag1>Returns | | | -0.091*** | | | | | | -0.091*** | | | |
| | | | [0.000] | | | | | | [0.000] | | | |
| Lag2>Returns | | | -0.039* | | | | | | -0.039* | | | |
| | | | [0.053] | | | | | | [0.052] | | | |
| Lag1.Roa | | | | | | 0.377*** | | | | | | 0.376*** |
| | | | | | | [0.000] | | | | | | [0.000] |
| Lag2.Roa | | | | | | -0.016 | | | | | | -0.017 |
| | | | | | | [0.527] | | | | | | [0.509] |
| Constant | 0.167*** | 0.350 | 0.024 | 0.017 | -0.039 | 0.052*** | 0.168*** | 0.291 | 0.074 | 0.017 | -0.058 | 0.038*** |
| | [0.000] | [0.569] | [0.894] | [0.148] | [0.660] | [0.000] | [0.000] | [0.634] | [0.704] | [0.185] | [0.510] | [0.007] |
| Model | OLS | IV | Arellano-Bond | OLS | IV | Arellano-Bond | OLS | IV | Arellano-Bond | OLS | IV | Arellano-Bond |
| CEO Controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Fixed Effects | Ind*Year | Ind*Year | Ind*Year | Ind*Year | Ind*Year | Ind*Year | Ind*Year | Ind*Year | Ind*Year | Ind*Year | Ind*Year | Ind*Year |
| Observations | 13,903 | 13,903 | 6,952 | 13,903 | 13,903 | 7,732 | 13,903 | 13,903 | 6,952 | 13,903 | 13,903 | 7,732 |
| R-squared | 0.173 | 0.165 | | 0.251 | 0.217 | | 0.173 | 0.176 | | 0.251 | 0.217 | |